

**SANRAL**  
SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD



Reg.No.1998/009584/30

BUILDING SOUTH AFRICA  
THROUGH BETTER ROADS

## **THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED**

**CONTRACT SANRAL R.033-120-2019/1**

**FOR THE IMPROVEMENT OF NATIONAL ROAD  
R33 SECTION 12 FROM THE N1 (KM 77.0) TO  
SECTION 13 MODIMOLLE (KM 0.6)  
(TOTAL 12.3km)**

### **PROJECT DOCUMENT**

**DATE: JULY 2023**

TENDER DOCUMENT  
VOLUME 3  
BOOK 3 OF 3  
PRICING DATA, SCOPE OF  
WORKS, PROJECT INFORMATION,  
ANNEXURES

**CHIEF EXECUTIVE OFFICER  
SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED  
48 TAMBOTIE AVENUE  
VAL DE GRACE  
PRETORIA, 0184**

**NAME OF TENDERER:** .....

Set sequential number



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THIS DOCUMENT COMPILED UNDER THE DIRECTION OF THE REGIONAL  
MANAGER

THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED  
The Regional Manager Northern Region)  
The South African National Roads Agency SOC Ltd  
38 IDA Street  
Menlo Park  
PRETORIA, 0081

## **LIST OF CONTRACT DOCUMENTS**

The following documents form part of this contract:

- Volume 1: The Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (1999), published by the Federation Internationale des Ingenieurs-Conseils (FIDIC) which the tenderer shall purchase himself. (See note 1 below).
- Volume 2: The COTO Standard Specifications for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition), issued by the Committee of Transport Officials which the tenderer shall obtain himself. (See Note 2 below).
- Volume 3: The Project Document, containing the tender notice, Conditions of Tender, Tender Data, Returnable Schedules, general and particular conditions of contract, project specifications, Pricing Schedule, Form of offer and Project Information is issued by the Employer (see note 3 below). The Employer's Form of Acceptance and any correspondence from the selected tenderer, performance security-demand guarantee, and all addenda issued during the period of tender will also form part of this volume once a successful tenderer has been appointed.

The conditions of tender are the standard conditions of tender as indicated in Book 1.

- Volume 4: The road works drawings.
- Volume 5: The structural drawings.
- Volume 6: Materials investigation and utilisation.
- Volume 7: Environmental Management Plan report.

**Notes to tenderer:**

1. **Volume 1: The Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (1999)**, published by the Federation Internationale des Ingenieurs-Conseils (FIDIC), is obtainable from CESA, P. O. Box 68482, Bryanston, 2021. Tel: (011) 463 2022 Fax: (011) 463 7383, e-mail: [general@cesa.co.za](mailto:general@cesa.co.za).
2. **Volume 2: The COTO Standard Specifications for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition)** is obtainable from SANRAL and can be downloaded free of charge from the SANRAL's website [www.nra.co.za](http://www.nra.co.za).
3. **Volume 3 is issued at tender stage in electronic format and can be downloaded from the SANRAL's website link**

**The link contains the following files:**

- The full Project Document in .pdf format (excluding the standard conditions of tender)
- The returnable forms in word format
- The pricing data in Excel format

**The Standard Conditions of Tender may be downloaded from the CIDB website as indicated in Book 1.**

**At contract stage Volume 3 will be a bound signed paper copy containing the following documents:**

- Returnable schedules relevant to the project
- Agreements and Contract Data
- Pricing Data
- Scope of Work
- Project Information

4. **SUBMISSION OF TENDER – Of the contract documents, only the following elements of Volume 3 needs to be submitted:**

**VOLUME 3 – ELECTRONIC SUBMISSION**

The following information has to be submitted electronically on flash drive

- a) **The 1st file in pdf format which contains;**
  - Scanned copy of Form of Offer (pdf) and printed hardcopy of Form of Offer
  - Scanned copies of all returnable schedules and attachments (pdf)
  - Scanned copy and printed Summary of Pricing Schedule.
- b) **The 2nd file in Excel format which contains:**
  - Completed pricing schedule

For alternative offers the tenderer shall submit the following additional documentation, printed and bound hard copy and electronically in a separate flash drive marked

- a) **Alternative** (followed by the Tenderer name)" in a sealed envelope in the following order:
    - Form of Offer (signed and scanned as .pdf and state "Alternative Form of Offer" and printed hardcopy of Form of Offer)
    - All returnable schedules and attachments and certificates applicable to the alternative offer (signed and scanned as .pdf).
  - b) **Alternative Pricing Schedule** (printed Summary of Pricing Schedule and copy in Excel)
- Other relevant information.

5. **For alternative offers the tenderer shall submit the following additional documentation, in printed and bound hard copy and electronically in a separate flash drive marked "Alternative (followed by the Tenderer name)" in a sealed envelope in the following order:**



- **Form of Offer (signed and scanned as .pdf and hard copy and state “Alternative Form of Offer”);**
- **All returnable schedules and attachments and certificates applicable to the alternative offer (signed and scanned as .pdf and hard copy);**
- **Alternative Pricing Schedule (scanned copy in .pdf and copy in Excel and hard copy);**
- **Other relevant information.**

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# PART C2: PRICING DATA

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PART C2: PRICING DATA

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**C2.1 PRICING INSTRUCTIONS**

C2.1.1 Measurement and payment shall be in accordance with the relevant provisions of Chapter 1, Section C1.1 of the COTO Standard Specification for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition) or as amended in the Scope of Works.

C2.1.2 The units of measurement described in the Pricing Schedule are metric units. Abbreviations used in the Pricing Schedule are as follows:

%	=	percent
h	=	hour
ha	=	hectare
kg	=	kilogram
kl	=	kilolitre
km	=	kilometre
km-pass	=	kilometre-pass
kPa	=	kilopascal
kW	=	kilowatt
l	=	litre
m	=	metre
mm	=	millimetre
m <sup>2</sup>	=	square metre
m <sup>2</sup> -pass	=	square metre-pass
m <sup>3</sup>	=	cubic metre
m <sup>3</sup> -km	=	cubic metre-kilometre
MN	=	meganewton
MN.m	=	meganewton-metre
MPa	=	megapascal
No.	=	number
Prov sum	=	Provisional sum
PC Sum	=	Prime Cost sum
R/only	=	Rate only
sum	=	lump sum
t	=	ton (1000kg)
W/day	=	Work day

C2.1.3 For the purpose of the Pricing Schedule, the following words shall have the meanings assigned to them:

Unit:	The unit of measurement for each item of work as defined in the COTO Standard Specification for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition).
Quantity:	The number of units of work for each item.
Rate:	The payment per unit of work for which the Service Provider tenders to do the work.
Amount:	The product of the quantity and the rate tendered for an item.

C2.1.4 Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.

C2.1.5 It will be assumed that prices included in the Pricing Schedule are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for tenders. (Refer to [www.sabs.co.za](http://www.sabs.co.za) for information standards)

C2.1.6 The prices and rates in the Pricing Schedule are fully inclusive prices for the work described under the items. Such prices and rates cover all costs and expenses that

may be required in and for the execution of the work described in accordance with the provisions of the Scope of Work, and shall cover the cost of all general risks, liabilities and obligations set forth or implied in the Contract Data, as well as overhead charges and profit. These prices will be used as a basis for assessment of payment for additional work that may have to be carried out. The Contractor shall submit to the Engineer within 28 days after the Commencement Date a full breakdown of all rates. The rates are to be clearly referenced to the relevant pay item numbers, with each rate broken down into its labour, materials, plant, fuel, overhead charges, and profit components.

- C2.1.7      Where the Scope of Work requires detailed drawings and designs or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amount tendered such items.
- C2.1.8      A single lump sum will apply should a number of items be grouped together for pricing purposes.
- C2.1.9      The quantities set out in the Pricing Schedule are approximate and do not necessarily represent the actual amount of work to be done. The quantities of work accepted and certified for payment will be used for determining payments due and not the quantities given in the Pricing Schedule.
- C2.1.10     Reasonable compensation will be received where no pay item appears in the Pricing Schedule in respect of work required in terms of the Contract and which is not covered in any other pay item.
- C2.1.11     The short descriptions of the items of payment given in the Pricing Schedule are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.
- C2.1.12     The item numbers appearing in the Pricing Schedule refer to the corresponding item numbers in the COTO Standard Specification for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition). Where a standard COTO pay item is amended or a new pay item added, the item number is preceded by the letter "P" in the Pricing Schedule.
- C2.1.13     The pricing schedules are provided electronically. A printout of the entire completed pricing schedule must be signed and scanned and saved in .pdf format, and an electronic copy of the priced pricing schedule must be saved in Excel format and the printed copy bound. In the event of any discrepancy between the signed .pdf copy, and the electronically submitted copy in Excel format and the printed hard copy, the tender rates in the printed hard copy will govern. The item numbers and description of the printed hard copy document will govern. For all addenda issued relating to the pricing schedule, the item numbers, description, and quantities of the issued document will govern.

**C2.2      PRICING SCHEDULE (INCORPORATING SBD3)**

# **SCHEDULE A**

# **ROADWORKS**



## C1.2 GENERAL REQUIREMENTS AND PROVISIONS

Item		Description	Unit	Quantity	Rate	Amount (Pounds)
C1.2		GENERAL REQUIREMENTS AND PROVISIONS				
C1.2.1		Environmental Management:				
	C1.2.1.1	Monitoring of compliance with and reporting on the EMP	Month	21		
	C1.2.1.2	Dedicated Environmental Officer	Month	21		
C1.2.2		Programming and Reporting:				
	C1.2.2.3	Submission of a Scheme 2 Initial Programme	lump sum	1		
	C1.2.2.4	Submission of a Scheme 2 Full Programme	lump sum	1		
	C1.2.2.5	Reviewing and updating a Scheme 2 programme every month	Month	21		
	C1.2.2.6	Preparation and submission of all information and reports specified in the Contract Documentation	Month	21		
C1.2.3		Routine road maintenance of existing public roads within the Site of the Works or other public roads outside the Site of the Works which are used as detours:				
	C1.2.3.1	Grass cutting	ha	38		
	C1.2.3.2	Drain cleaning	km	9		
	C1.2.3.3	Cleaning out culverts	m³	120		
	C1.2.3.4	Collection of rubbish / litter	km	14		
	C1.2.3.5	Base patching using crushed stone material stabilised with bitumen emulsion and cement	m³	2000		
	C1.2.3.6	Base and / or surface patching using cold premixed asphalt	kg	2500		
	C1.2.3.7	Base and / or surface patching using hot plant mixed asphalt	t	50		
	C1.2.3.11	Other road maintenance work ordered by the Engineer	Prov. Sum	1	500000.00	500000
	C1.2.3.12	Handling cost, profit and all other charges in respect of item C1.2.3.11	%	500000		
	C1.2.3.13	Liaison with the routine road maintenance contractor	Month	3		
C1.2.4		Stakeholder liaison	Month	24		
C1.2.5		Safety:				
	C1.2.5.1	Health and safety plan	lump sum	1		
Total Carried Forward						

## C1.2 GENERAL REQUIREMENTS AND PROVISIONS

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Brought Forward							
C1.2.6	C1.2.5.2		Implementation of health and safety plan	Month	21		
			Work adjacent to properties:				
	C1.2.6.1		Survey of adjacent properties	No.	6		
	C1.2.6.2		Preventive and / or mitigation measures	Prov. Sum	1	1000000.00	1000000
	C1.2.6.3		Handling cost, profit and all other charges in respect of item C1.2.6.2	%	1000000		
PC1.2.7			Road safety audits				
	C1.2.7.1		Stage 4 work zone traffic management audit	Prov. Sum	1	180000.00	180000
	C1.2.7.2		Handling cost, profit and all other charges in respect of item C1.2.6.1	%	180000		
	C1.2.7.3		Stage 5 pre-opening stage traffic safety audit	Prov. Sum			120000
	C1.2.7.4		Handling cost, profit and all other charges in respect of item C1.2.6.3	%	120000		
C1.2.8			Dayworks:				
	C1.2.8.1		Personnel:				
		(a)	Unskilled labourer	h	300		
		(b)	Semi-skilled labourer	h	120		
		(c)	Skilled labourer	h	50		
		(d)	Gang leader	h	50		
		(e)	Foreman	h	100		
	C1.2.8.2		Construction equipment (specify size and / or model number):				
		(a)	Motor grader (140k or similar)	h	25		
		(b)	Vibratory roller (12 ton)	h	15		
		(c)	Pneumatic roller (16 ton)	h	15		
		(d)	Front end loader (145 kw fly wheel speed))	h	25		
		(e)	Tractor loader backhoe	h	25		
		(f)	Excavator (22 ton)	h	25		
		(g)	250 cmf compressor (7 m³/min) complete	h	25		
		(h)	600 cmf compressor (17 m³/min) complete	h	25		
	C1.2.8.3		Vehicles (specify size):				
		(a)	Light delivery vehicle	km	50		
Total Carried Forward							

## C1.2 GENERAL REQUIREMENTS AND PROVISIONS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Brought Forward								
C1.2.9	C1.2.8.4	(b)		Flatbed truck	km	25		
		(c)		Dump truck (6m3)	km	25		
				Materials:				
		(a)		Procurement of materials	Prov. Sum	1		160000
			(b)		Contractor's handling costs, profit and all other charges in respect of item C1.2.8.4(a)	%	160000	
				Disposal of non-useable assets:				
	C1.2.9.2			Disposal of non-useable assets not identified at time of tender	Prov. Sum	1	150000.00	150000
	C1.2.9.3			Handling cost, profit and all other charges in respect of item C1.2.9.2	%	150000		
PC.1.2.10				<b>Dispute Adjudication Board (DAB)</b>				
	PC1.2.10.1	(a)		Employer's contribution to DAB (50%)	PC Sum	1	1000000.00	1000000
		(b)		Handling cosy and profit in respect of subitem PC1.2.10.1(a)	%	1000000		
Total Carried Forward To Summary								

### C1.3 CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
PC1.3				CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS				
PC1.3.1				The Contractor's general obligations:				
	C1.3.1.1			Fixed obligations	lump sum	1		
	C1.3.1.2			Value-related obligations	lump sum	1		
	PC1.3.1.3			Time-related obligations				
		(a)		Mobilisation period	Month	3		
		(b)		Execution of the works	Month	21		
	PC1.3.1.4			Suspension Cost				
		(a)		De-establishment	No.	2		
		(b)		Re-Establishment	No.	2		
		(c)		Suspension Period	Month	5		
		(d)		Engineers Cost	PC Sum	1	2000000.00	2000000
		(e)		Handling cost, profit and all other charges in respect of item C1.3.1.4	%	2000000		
C1.3.2				Contract sign boards (drawing number 20568-TD-01)	m²	27		
Total Carried Forward To Summary								

## C1.4 FACILITIES FOR THE ENGINEER

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C1.4				FACILITIES FOR THE ENGINEER				
C1.4.1				Site accommodation:				
	C1.4.1.1			Offices and conference room	m <sup>2</sup>	400		
	C1.4.1.2			Laboratories	m <sup>2</sup>	400		
	C1.4.1.3			Open concrete working floors and verandas	m <sup>2</sup>	70		
	C1.4.1.4			Roofs over open concrete working floors and verandas	m <sup>2</sup>	45		
	C1.4.1.5			Store rooms inside the laboratory	m <sup>2</sup>	20		
	C1.4.1.6			Car ports	No.	10		
	C1.4.1.7			Ablution unit (drawing number 20568-TD-02)	No.	4		
	C1.4.1.8			Change room with a shower	No.	2		
	C1.4.1.9			Kitchen unit (drawing number 20568-TD-02)	No.	2		
	C1.4.1.13			Rented housing paid for by the Contractor	Prov. Sum	1	1650000.00	1650000
	C1.4.1.14			Contractor's handling costs, profit and all other charges in respect of item C1.4.1.13	%	1650000		
C1.4.2				Items measured by area:				
	C1.4.2.1			Shelving as specified, complete with brackets	m <sup>2</sup>	20		
	C1.4.2.2			Work benches with a concrete slab top	m <sup>2</sup>	10		
	C1.4.2.5			Concrete footings and pedestals for laboratory equipment	m <sup>2</sup>	3		
	C1.4.2.6			Roller blinds, opaque type	m <sup>2</sup>	35		
	C1.4.2.7			Venetian blinds	m <sup>2</sup>	10		
	C1.4.2.8			Notice boards	m <sup>2</sup>	2		
	C1.4.2.9			White boards	m <sup>2</sup>	2		
	C1.4.2.10			Galvanised wire mesh fencing for store rooms	m <sup>2</sup>	20		
	C1.4.2.11			Galvanised wire mesh store room gate with a padlock	m <sup>2</sup>	3		
C1.4.3				Items measured by number:				
	C1.4.3.1			Office swivel chair	No.	8		
	C1.4.3.2			Office chair	No.	38		
	C1.4.3.3			Draughtsman's stool	No.	2		
Total Carried Forward								

## C1.4 FACILITIES FOR THE ENGINEER

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Brought Forward							
	C1.4.3.4		Laboratory high chair	No.	4		
	C1.4.3.5		Office desk with 3 drawers (at least one lockable drawer)	No.	8		
	C1.4.3.7		Drawing table	No.	1		
	C1.4.3.8		Conference table	No.	2		
	C1.4.3.9		Bookcase	No.	1		
	C1.4.3.10		Filing cabinet	No.	8		
	C1.4.3.11		General purpose steel cabinet with shelves	No.	2		
	C1.4.3.13		220 / 250 volt power outlet plug point	No.	16		
	C1.4.3.14		400 / 231 volt 3-phase power outlet plug point	No.	2		
	C1.4.3.15		Single 1 500 mm, 58 watt fluorescent tube ceiling light	No.	10		
	C1.4.3.18		7 watt LED bulb ceiling light	No.	20		
	C1.4.3.19		Wash-hand basin	No.	6		
	C1.4.3.20		Laboratory basin	No.	4		
	C1.4.3.21		Extractor fan	No.	2		
	C1.4.3.22		Fume cupboard	No.	1		
	C1.4.3.23		Fire extinguisher 9,0 kg, dry powder type	No.	3		
	C1.4.3.24		Air-conditioning unit	No.	8		
	C1.4.3.25		Heater	No.	3		
	C1.4.3.27		Waste paper basket	No.	8		
	C1.4.3.28		UPS / Voltage stabiliser	No.	3		
	C1.4.3.29		A3 / A4 colour printer, copier, scanner	No.	2		
	C1.4.3.31		Rain gauge	No.	4		
	C1.4.3.32		Minimum / maximum atmospheric temperature gauge	No.	1		
	C1.4.3.33		Digital thermometer	No.	2		
	C1.4.3.34		Mobile outdoor weather station	No.	1		
	C1.4.3.35		3,0 m aluminium straight edge complete with two measuring wedges	No.	2		
	C1.4.3.36		Measuring wheel	No.	2		
	C1.4.3.37		First aid kit	No.	1		
	C1.4.3.38		Standpipe complete with 30 m of 19 mm dia. heavy duty hose pipe	No.	1		
Total Carried Forward							

## C1.4 FACILITIES FOR THE ENGINEER

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
Brought Forward								
C1.4.4				Prime cost items:				
	C1.4.4.1			Cell phones costs, including pro-rata rentals, for calls made in connection with contract administration	PC Sum	1	36000.00	36000
	C1.4.4.2			Handling costs and profit in respect of item C1.4.4.1	%	36000		
	C1.4.4.5			The provision of internet connectivity and WiFi data for Engineer's site staff	PC Sum	1	12000.00	12000
	C1.4.4.6			Handling costs and profit in respect of item C1.4.4.5	%	12000		
	C1.4.4.7			The provision of paper and ink for a combination colour printer / copier / scanner	PC Sum	1	7500.00	7500
	C1.4.4.8			Handling costs and profit in respect of item C1.4.4.7	%	7500		
	C1.4.4.15			The provision of all gas installations required at the site offices, laboratories and at the Engineer's staff accommodation (if required), including gas storage cylinders, tubing, regulators, gas burners and shut-off cocks	PC Sum	1	30000.00	30000
	C1.4.4.16			Handling costs and profit in respect of item C1.4.4.15	%	30000		
C1.4.5				Services at site offices, laboratories and site accommodation:				
	C1.4.5.1			Fixed costs	lump sum	1		
	C1.4.5.2			Running costs	Month	21		
C1.4.6				Office staff:				
	C1.4.6.1			Secretary / receptionist	Month	21		
C1.4.7				Site inspection transport:				
	C1.4.7.1			Provision of a bus, mini-bus or combi van for site inspection purposes (18 seater mini van)	per day	50		
	C1.4.7.2			Travel on site	km	2000		
C1.4.8				Site security measures for the Engineer's facilities:				
	C1.4.8.1			Supply and installation of all required security measures at the Engineer's site offices and laboratories	lump sum	1		
	C1.4.8.2			Provision of security guards / watchmen and an armed response service at the Engineer's site offices and laboratories	Month	21		
Total Carried Forward To Summary								

## C1.5 ACCOMMODATION OF TRAFFIC

Item		Description		Unit	Quantity	Rate	Amount (Pounds)
C1.5			ACCOMMODATION OF TRAFFIC				
C1.5.1			Accommodation of pedestrian and non-motorised traffic:				
	C1.5.1.1		Accommodation of pedestrian and non-motorised traffic	Month	21		
C1.5.2			Accommodation of vehicular traffic	Month	21		
C1.5.3			Liaison with traffic authorities	Month	21		
PC1.5.4			Construction of temporary deviations				
	C1.5.4/C1.5.7.1		Delineators including mounting bases and ballast:				
		(a)	Single sided, reversible left or right (TW401)	No.	840		
		(b)	Double sided, reversible left or right (200mmx800mm) Class III material	No.	840		
	C1.5.4/C1.5.7.3		Flagmen	man-shift	1656		
	PC1.5.4/C1.5.7.5		Provision of illuminated traffic signs:				
		(a)	Sign mounted flashing amber lights (2 lights with the specified power supply) mounted on a backing board which is:				
		(i)	900 mm wide x 150 mm high	No.	4		
		(b)	Flashing LED illuminated arrow board	No.	4		
	PC1.5.4/C1.5.7.6		Maintenance of illuminated traffic signs:				
		(a)	Sign mounted flashing amber lights (a pair of two lights mounted on a separate backing board)	Month	18		
		(b)	Flashing LED illuminated arrow board	Month	18		
		(c)	Illuminated road sign – R & TR series (1200 mm ø)	Month	18		
		(d)	Illuminated road sign – TW series (1500mm)	Month	18		
	PC1.5.4/C1.5.7.7		Traffic calming devices:				
		(a)	25 mm high x 100 mm wide asphalt rumble strips	m	36		
		(c)	150 mm high x 3 m wide asphalt speed control humps	m	4		
	PC1.5.4/C1.5.7.9		Cleaning of traffic control facilities	Month	18		
Total Carried Forward							



## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
PC1.5.4/C1.5.11   <							

## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C1.5.4/C11.6.2			Extra over on item C11.6.1 for using:				
	C1.5.4/C1.6.2.1		Background of retro-reflective material:				
		(a)	Class III	m <sup>2</sup>	268		
C1.5.4/C1.6.1			Clearing				
	C1.5.4/C1.6.1.1		Clearing with machines and some hand labour where necessary	ha	1		
	C1.5.4/C1.6.1.2		Clearing with hand labour only when labour enhanced work is specified	m <sup>2</sup>	1000		
C1.5.4/C1.6.2			Grubbing				
	C1.5.4/C1.6.2.1		Grubbing with machines and some hand labour where necessary	ha	1		
	C1.5.4/C1.6.2.2		Grubbing with hand labour when labour enhancement work is specified or it is not practical to use a machine	m <sup>2</sup>	1000		
C1.5.4/C1.6.3			Removal and grubbing of large trees and tree stumps:				
	C1.5.4/C1.6.3.1		Girth equal to or exceeding 1,0 m up to and including 2,0 m	No	25		
C1.5.4/C1.6.8			Conservation of vegetation:				
	C1.5.4/C1.6.8.1		Establishment of a temporary nursery	No.	1		
C1.5.4/C1.6.9			Conservation of topsoil:				
	C1.6.9.1		Stockpiling topsoil	m <sup>3</sup>	1200		
C1.5.4/C1.7.2			Hauling				
	C1.5.4/C1.7.2.1		Hauling material for use in the Works and off-loading it on the site of the Works:				
		(a)	Soil, gravel, crushed stone and pavement layer material	m <sup>3</sup> - km	100000		
	C1.5.4/C1.7.2.2		Hauling material to spoil and off-loading it at a designated spoil area:				
		(a)	Cleared and grubbed material (organic matter and all other unsuitable or waste material)	m <sup>3</sup> - km	10000		
C1.5.4/C3.1.1			Excavation for open drains:				
Total Carried Forward							

## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C1.5.4/C3.1.2	C1.5.4/C3.1.1.1	(a)	Excavating all material situated within the following depth ranges below the surface level using conventional methods:				
			0m to 1,5m	m³	6400		
	C1.5.4/C3.1.1.2		Extra over sub-item C3.1.1.1 for excavation in hard and boulder material, irrespective of depth	m³	630		
			Clearing, shaping and disposal of accumulated sediment in existing unlined open drains				
	C1.5.4/C3.1.2.1		Using conventional methods	m³	37		
C1.5.4/C3.2.1	C1.5.4/C3.1.2.2		Using labour enhanced construction methods	m³	4		
		Excavation for culvert structures:					
	C1.5.4/C3.2.1.1	(a)	Excavating in all material situated within the following depth ranges below the surface level:				
	0m to 1,5m		m³	390			
PC1.5.4/C3.2.2			Backfilling				
	C1.5.4/C3.2.2.2		(a)	Using imported selected material:			
				From commercial sources (selected backfill or as instructed by the engineer)			
	(i)	Dump rock (300mm thick, tightly compacted)		m³	180		
	C1.5.4/C3.2.4		(ii)	Pioneering layer (200mm thick, tightly compacted)	m³	120	
		(iii)	Engineered Layer (150mm, stabilised selected layer or as instructed by the engineer)	m³	90		
C1.5.4/C3.2.2.3		(a)	Extra over sub-items C3.2.2.1 and C3.2.2.2 for soil cement backfilling				
			With wet mixture (soil or gravel mixed with 5 % of CEM II class 32.5 cement)	m³	90		
			Metal and U-PVC culverts:				
	C1.5.4/C3.2.4.1		4.65x3.03m Low-profile corrugated steel pipe arch prefabricated metal culvert	m	40		
	C1.5.4/C3.2.4.2		Provision of skew or bevelled ends for metal culverts	No.	4		
Total Carried Forward							

## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C1.5.4/C3.3.2	C1.5.4/C3.2.4.3	(a)	Anchor bolts (250mm long M20 with hooked end)	No.	4		
			Concrete kerbing-channeling combination:				
C1.5.4/C3.3.2.1	Prefabricated kerbing-channeling ( Type C concrete channel and in situ bedding material compacted to 90% MDD, drawing number 20568-TD-46)						
	Fig 8c and subbase material		m	2500			
C1.5.4/C3.3.6			Chutes (typical designs):				
C1.5.4/C3.3.6.1	Prefabricated chutes (Unperforated 300mm downpipe upvc pipe as shown on drawing number 20568-TD-33)		m	1000			
C1.5.4/C3.3.8			Linings for open drains:				
C1.5.4/C3.3.8.1	Cast in situ concrete lining (C25/30-20 for all types of open drains)		m³	37			
C1.5.4/C3.3.8.2	Class U2 surface finish to cast in situ concrete (all types of open drains)		m²	336			
PC1.5.4/C3.3.9			Formwork to cast in situ concrete lining for open drains (Class F1 surface finish):				
	PC1.5.4/C3.3.9.2		To sides with formwork on both internal and external faces (each face measured)	m²	40		
	PC1.5.4/C3.3.9.3		To ends of slabs	m²	5		
C1.5.4/C3.3.10		(a)	Sealed joints in concrete and stone pitched linings of open drains (drawing number 20568-TD-30,20568-TD-31,20568-TD-42,20568-TD-46, and 20568-TD-47)				
			10mm bitumen impregnated fibre board with silicon joint sealer or approved equivalent	m	4		
C1.5.4/C3.3.15			Energy dissipaters in outlet structures				
	C1.5.4/C3.3.15.1		Precast concrete blocks in outlet structures	No.	16		
C1.5.4/C4.2.9			Excavate material to spoil in sites designated by the Contractor, material obtained from				
	C1.5.4/C4.2.9.1		Soft excavation, overburden and unsuitable material	m³	2122		
C1.5.4/C4.2.10			Backfilling of the unavoidable overbreak in hard and boulder excavation				
Total Carried Forward							

## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C1.5.4/C4.4. 2	C1.5.4/C4.2.10.1		Compliant gravel material	m³	360		
			Commercial materials identified by the Contractor from commercial, private or other non-commercial suppliers:				
	C1.5.4/C4.4.2.1		Pavement layer material:				
		(c)	G7 material for upper selected layer	m³	2160		
		(d)	G5b material for base layer	m³	5040		
	C1.5.4/C4.4.2.5		Fill material in the earthworks:				
		(a)	Normal or coarse fill	m³	10246		
	C1.5.4/C4.4.2.6		Pioneer material	m³	924		
C1.5.4/C4.4. 4			Cementitious stabilising agents				
		(a)	Cement (CEM II A-L 32,5N)	t	500		
C1.5.4/C5.1. 4			Removal of unsuitable material to spoil:				
	C1.5.4/C5.1.4.1		In layer thicknesses of 200mm and less				
		(b)	Unstable material	m³	360		
	C1.5.4/C5.1.4.2		In layer thicknesses exceeding 200mm				
		(d)	Unstable material	m³	360		
C1.5.4/C5.2. 2			Fill construction:				
	C1.5.4/C5.2.2.1		Normal fill material in compacted layer thicknesses of 200mm and less:				
		(b)	Compacted to 93% of MDD	m³	2946		
		(d)	Compacted to 95% of MDD	m³	7300		
C1.5.4/C5.3. 2			Construction of pavement layers				
	C1.5.4/C5.3.2.1		Construction of layers using conventional construction methods:				
		(d)	Upper selected subgrade layer (G7 150 mm thick) compacted to 97% of MDD	m³	2160		
		(n)	Gravel base layer (chemically stabilised) (G5 200 mm thick) compacted to 97% of MDD	m³	2880		
Total Carried Forward							

## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Brought Forward							
C1.5.4/C5.3.9	C1.5.4/C5.3.9.1	(d)	Gravel base layer (chemically stabilised) (G5 150 mm thick) compacted to 97% of MDD	m³	2160		
			Construction of a trial section:				
C1.5.4/C5.4.2	C1.5.4/C5.4.2.1	(a)	Construction of a trial section using conventional methods of construction				
		(i)	Stabilised gravel layer (150mm) trial section	m³	1		
C1.5.4/C5.4.5	C1.5.4/C5.4.5.1		Base layer (200mm) bypass	m³	1		
			Chemical stabilisation:				
C1.5.4/C5.4.10	C1.5.4/C5.4.10.1		Chemical stabilisation (350mm) of pavement layers (subbase)	m³	20000		
			Cementitious stabilisation agents for pavement layers:				
C1.5.4/C8.1.1	C1.5.4/C8.1.1.2	(a)	Addition of cementitious stabilisation agents for pavement layers				
			Common cements to SABS ENV 197-1 (base), CEM II A-L 32,5N or similarly approved	t	5800		
C1.5.4/C10.1.1	C1.5.4/C10.1.1.3		Provision and application of water for curing	kilolitre (kl)	20		
			Prime coat:				
C1.5.4/C10.1.4	C1.5.4/C10.1.4.1		MC -30 cut-back bitumen	ℓ	35000		
			Single seals including a cover spray, if specified (S1, PG58H-22):				
C1.5.4/C10.1.9	C10.1.9.10		Using 10 mm aggregate	m²	40000		
			Embargo period effects:				
C1.5.4/C10.1.9	C10.1.9.11		Re-establishment of sealing team after embargo period	lump sum	1		
			Extra-over for sealing during the specified embargo period (S1, MC3000)	m²	10000		
			Bituminous binder variations:				
			70 / 100 Penetration grade bitumen	ℓ	5000		
			MC-3000 cut-back bitumen	ℓ	5000		
			Precoating fluid (state type)	ℓ	1000		
Total Carried Forward							

## C1.5 ACCOMMODATION OF TRAFFIC

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
Brought Forward								
C1.5.4/C10.1.10				Aggregate variation (Grade A):				
C1.5.4/C10.1.10.3				10mm aggregate	m³	144		
C1.5.4/C11.2				NON-STRUCTURAL GABIONS				
C1.5.4/C11.2.1				Foundation trench excavation:				
	C1.5.4/C11.2.1.1			Excavating all material situated within the following depth ranges below the surface level:				
		(a)		0 m to 1,5 m	m³	310		
		(b)		Exceeding 1,5 m and up to 3,0 m	m³	160		
	C1.5.4/C11.2.1.2			Extra over sub-item C11.2.1.1 for excavation in hard material, irrespective of depth	m³	20		
	C1.5.4/C11.2.1.3			Excavating soft material within 1,5 m below the surface level using labour enhanced construction methods:	m³	100		
	C1.5.4/C11.2.1.4			Excavating intermediate material within 1,5 m below the surface level using labour enhanced construction methods:	m³	20		
C1.5.4/C11.2.2				Surface preparation for bedding the gabion boxes and mattresses	m²	320		
C1.5.4/C11.2.3				Gabion boxes and mattresses:				
	C1.5.4/C11.2.3.1			Galvanized gabion boxes (1 m x 1 m x 1 m)	m³	750		
	C1.5.4/C11.2.3.3			Galvanized gabion mattresses (3 m x 1 m x 0.3 m)	m³	450		
	C1.5.4/C11.2.3.3			Galvanized gabion mattresses (3 m x 1 m x 0.5 m)	m³	180		
C1.5.4/C11.2.4				Geotextile (Continuous filament nonwoven needle punched Class 2 geotextile as per Table 2(b) of GRI-GT13(b) specifications)	m²	4400		
C1.5.4/C11.3				Guide Blocks and Kilometer Markers				
C1.5.4/C11.3.1				Guide Blocks (250x250x250mm, D25/30-20-XC4)	No.	250		
C1.5.4/C13.1				FOUNDATIONS				
C1.5.4/C13.1.3				Excavation:				
Total Carried Forward								

## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C1.5.4/C13.1.6	C1.5.4/C1 3.1.3.1		Excavating soft material situated within the following successive depth ranges:				
		(a)	0 m up to 1,5 m	m³	530		
		(b)	> 1,5 m and < 3,0 m	m³	190		
	C1.5.4/C1 3.1.3.2		Extra over subitem C13.1.3.1 for excavation in hard material irrespective of depth	m³	50		
	C1.5.4/C1 3.1.3.3		Extra over subitem C13.1.3.1 for additional excavation required by the Engineer after excavation is complete	m³	50		
	C1.5.4/C1 3.1.3.4		Extra over subitem C13.1.3.1 for excavation by hand	m³	50		
			Access and drainage:				
C1.5.4/C13.1.14	C1.5.4/C1 3.1.6.1		Access	lump sum	1		
	C1.5.4/C1 3.1.6.2		Drainage	lump sum	1		
	C1.5.4/C1 3.1.14.3		Compacted granular material	m³	150		
			Foundation fill consisting of:				
C1.5.4/C13.2	C1.5.4/C1 3.1.14.1		Rock Fill	m³	360		
	C1.5.4/C1 3.1.14.3		Compacted granular material	m³	320		
	C1.5.4/C1 3.1.14.3		Concrete Blinding (75mm thick, C16/20-20-XC4)	m³	30		
			FALSEWORK, FORMWORK AND CONCRETE FINISH				
C1.5.4/C13.2.2		Vertical formwork to provide (class of finish indicated as F1, F2, F3 or board) surface finish to (description of member to which applicable)					
C1.5.4/C13.3		(a)	Culvert ring beams (F2)	m²	80		
		(b)	Inlet/Outlet walls (F2)	m²	10		
C1.5.4/C13.3			STEEL REINFORCEMENT				
C1.5.4/C13.3.1			Reinforcement for:				
	C1.5.4/C1 3.3.1.1		Culvert Ring Beams				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	3		
Total Carried Forward							



## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C1.5.4/C13.4	C1.5.4/C13.3.1.2		Inlet/Outlet walls				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	6		
	C1.5.4/C13.3.1.3		Road slab				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	45		
C1.5.4/C13.4.1			CONCRETE				
			Cast-in-situ concrete (class of concrete and use or position in structure stated):				
	C1.5.4/C13.4.1.2		Durable concrete (Class D):				
		(a)	Culvert ring beams (D25/30-20-XC4)	m³	12		
		(b)	Inlet/Outlet walls (D25/30-20-XC4)	m³	30		
		(c)	Road slab (D25/30-20-XC4)	m³	420		
C1.5.5			Maintenance of temporary deviations:				
	C1.5.5.1		Grass cutting	ha	4		
	C1.5.5.2		Drain cleaning	km	2		
	C1.5.5.3		Cleaning out culverts	m³	500		
	C1.5.5.5		Base patching using crushed stone material stabilised with bitumen emulsion and cement	m³	500		
	C1.5.5.6		Base and / or surface patching using cold premixed asphalt	kg	5000		
	C1.5.5.7		Base and / or surface patching using hot plant mixed asphalt	t	15		
	C1.5.5.11		Other road maintenance work ordered by the Engineer	Prov. Sum			
	C1.5.5.12		Handling cost, profit and all other charges in respect of item C1.5.6.11	%	350000		
C1.5.6			Removal of temporary deviations	kilometre (km)	1		
C1.5.7			Temporary traffic control facilities:				
	C1.5.7.1		Delineators including mounting bases and ballast:				
		(a)	Single sided, reversible left or right (TW401)	No.	840		
		(b)	Double sided, reversible left or right (TW401)	No.	2100		
	C1.5.7.3		Flagmen	man-shift	2600		
Total Carried Forward							350000

## C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C1.5.8	PC1.5.7.5	(iii) )	Provision if illuminated traffi signs				
			2400mm wide x 1800mm high (TW336-WF)	No.	24		
	C1.5.7.6		Maintenance of illuminated traffic signs:				
	(b)		Flashing LED illuminated arrow board	Month	21		
		(c)	Illuminated road sign – R & TR series (diameter indicated)	Month	21		
		(d)	Illuminated road sign – TW series (length of sides indicated)	Month	21		
	C1.5.7.7		Traffic calming devices:				
		(a)	25 mm high x 100 mm wide asphalt rumble strips	m	500		
		(b)	50 mm high x 500 m wide asphalt rumble strips	m	500		
	C1.5.7.8		Traffic control stations	Month	21		
	C1.5.7.9		Cleaning of traffic control facilities	Month	21		
			Traffic safety officer	man-month	21		
	C1.5.9		Traffic safety vehicle	Month	21		
	C1.5.11		Provision of safety equipment for visitors				
		C1.5.11.1		Provision of reflective safety vests for visitors	No.	10	
		C1.5.11.2		Provision of hard hats for visitors	No.	10	
PC1.5/C11.6			ROAD SIGNS				
PC11.6.1			Road signboards with painted or coloured semi-matt background. Symbols, lettering and borders in semi-matt black or in Class I retro-reflective material, where the sign board is constructed from:				
	C11.6.1.8		Regulatory signs, temporary				
		(c)	1200mm diameter (steel or aluminium, Class III retro reflective background, semi-matt symbol)	No.	75		
	PC11.6.1.10		Warning signs, temporary				
		(d)	1500mm size (steel or aluminium, Class III retro reflective background, semi-matt symbol)	No.	12		
		(e)	Rectangular				
Total Carried Forward							

C1.5 ACCOMMODATION OF TRAFFIC

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C11.6.2	C11.6.1.12	(i)	2400mm wide x 400 mm high (TW411)	No.	6		
		(ii)	(2) 2400mm x 1800mm	No.	48		
	C11.6.2.1		Supplementary plates to temporary regulatory or warning signs (steel or aluminium, Class III retro reflective background, semi-matt symbol)	m²	54		
			Extra over on item C11.6.1 for using: Background of retro-reflective material:				
		(b)	Class III	m²	269		
Total Carried Forward To Summary							

## C1.6 CLEARING AND GRUBBING

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C1.6				CLEARING AND GRUBBING				
C1.6.1				Clearing				
	C1.6.1.1			Clearing with machines and some hand labour where necessary	ha	10		
	C1.6.1.2			Clearing with hand labour only when labour enhanced work is specified	ha	1		
	C1.6.1.3			Clearing for new fence lines (over a width of 2,0m)	km	4		
C1.6.2				Grubbing				
	C1.6.2.1			Grubbing with machines and some hand labour where necessary	ha	2		
	C1.6.2.3			Grubbing by hand for new fence lines (over a width of 2,0m)	km	8		
C1.6.8				Conservation of vegetation:				
	C1.6.8.1			Establishment of a temporary nursery	No.	1		
	C1.6.8.2			Removal, storage and maintenance of trees, girth up to and including 1,0m	No.	10		
	C1.6.8.3			Removal, storage and maintenance of trees, girth exceeding 1,0m up to and including 2,0m	No.	10		
Total Carried Forward To Summary								

C1.7 LOADING AND HAULING

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C1.7				LOADING AND HAULING				
C1.7.2				Hauling				
	C1.7.2.1			Hauling material for use in the Works and off-loading it on the site of the Works:				
		(a)		Soil, gravel, crushed stone and pavement layer material	m³ - km	1516125		
	C1.7.2.2			Hauling material to spoil and off-loading it at a designated spoil area:				
		(a)		Cleared and grubbed material (organic matter and all other unsuitable or waste material)	m³ - km	17000		
Total Carried Forward To Summary								

C2.1 GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C2.1				GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES				
C2.1.1				Location, identification, protection and relocation of existing services				
	C2.1.1.1			Contractor's obligations	lump sum	1		
	C2.1.1.2			Permanent services relocation or protection work by others	PC Sum	1	1600000.00	1600000
	C2.1.1.3			Handling costs and profit in respect of item C2.1.1.2 above	%	1600000		
	C2.1.1.4			Permanent services relocation or protection work by the Contractor	Prov. Sum	1	500000.00	500000
C2.1.2				Existing services location, detection and verification:				
	C2.1.2.1			Using specialist detection services (ground penetrating radar, radio detection, etc.)	PC Sum	1	500000.00	500000
	C2.1.2.2			Handling costs and profit in respect of item C2.1.2.1 above	%	500000		
	C2.1.2.3			Survey to verify existing service positions	PC Sum	1	500000.00	500000
	C2.1.2.4			Handling costs and profit in respect of item C2.1.2.3 above	%	500000		
	C2.1.2.5			Using hand excavation to locate, expose and verify services	m³	2500		

C2.4 ENERGY AND OTHER SERVICES

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C2.4				ENERGY AND OTHER SERVICES				
PC2.4.4				<b>Provision of lighting</b>				
		a)		Street Lighting	Prov. Sum	1	30000000.0 0	30000000
		b)		handling cost, profit and all other charges in respect of item P2.4.4. a)	%	3000000 0		
Total Carried Forward To Summary								

## C3.1 DRAINS

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
C3.1			DRAINS				
C3.1.1			Excavation for open drains:				
	C3.1.1.1		Excavating all material situated within the following depth ranges below the surface level using conventional methods:				
		(a)	0m to 1,5m	m <sup>3</sup>	13200		
	C3.1.1.2		Extra over sub-item C3.1.1.1 for excavation in hard and boulder material, irrespective of depth	m <sup>3</sup>	1500		
C3.1.2			Clearing, shaping and disposal of accumulated sediment in existing unlined open drains				
	C3.1.2.1		Using conventional methods	m <sup>3</sup>	1893		
	C3.1.2.2		Using labour enhanced construction methods	m <sup>3</sup>	811		
C3.1.4			Excavation and disposal of material for subsoil drainage systems:				
	C3.1.4.1		Excavating in all material situated within the following depth ranges below the surface:				
		(a)	0m to 1,5m	m <sup>3</sup>	15899		
	C3.1.4.4		Extra over sub-item C3.1.4.1 for excavation in hard and boulder material, irrespective of depth	m <sup>3</sup>	2417		
C3.1.5			Impermeable backfilling to subsoil drainage systems				
	C3.1.5.1		Un-stabilised natural gravel obtained from approved sources on the site	m <sup>3</sup>	12045		
	C3.1.5.2		G5 material obtained from commercial sources	m <sup>3</sup>	1370		
C3.1.6			Construction of banks and dykes:				
	C3.1.6.1		Banks and dykes using conventional methods	m <sup>3</sup>	2102		
	C3.1.6.2		Banks and dykes using labour enhanced construction methods	m <sup>3</sup>	224		
C3.1.9			Pipes in subsoil drainage systems:				
	C3.1.9.1		U-PVC pipes and fittings, normal duty, complete with couplings (100mm dia, perforated or slotted)	m	4380		
C3.1.10			Polymer film sheeting or similar approved material, for lining subsoil drainage systems. Synthetic-fibre filter fabric, Grade A3.				
Total Carried Forward							



## C3.1 DRAINS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
Brought Forward								
C3.1.13	C3.1.10.1			0,15mm thick	m²	17520		
				Concrete outlet structures, manhole boxes, junction boxes and cleaning eyes for subsoil drainage systems:				
	C3.1.13.1			Outlet structures (Type A using C16/20-20, drawing number 20568-TD-43)	No.	60		
	C3.1.13.3			Junction boxes (subsurface drainage, drawing number 20568-TD-44)	No.	12		
	C3.1.13.4			Cleaning eyes (subsurface drainage, drawing number 20568-TD-44)	No.	60		
C3.1.14				Caps for subsoil drain pipes:				
	C3.1.14.1			Concrete caps	No.	30		
C3.1.15				Repairing or replacing existing drainage systems	Prov sum	1	250000.00	250000
C3.1.16				Loading and hauling of material in excess of 1,0 km	cubic metre-kilometre (m³ - km)	225		
C3.1.17				Backfilling existing eroded side drains	m³	2000		
C3.1.18				Backfilling of drains with selected material compacted to 93% of MDD prior to construction of concrete lining and/or stone pitched lining	m³	2000		
C3.1.20				Breaking into existing drainage structures and install subsoil drain pipe	No.	6		
C3.1.21				Clearing of existing subsoil drains				
	C3.1.21.1			Cleaning rod, brush and flushing	m	200		
	C3.1.21.2			Hydro jetting	m	200		
C3.1.22				Test flushing of subsoil drain pipe systems	No.	2		
C3.1.23				Subsoil drain outlet marker (drawing 20568-TD-43)	No.	60		
C3.1.24				Submission of as built drawings by the Contractor	Prov sum	1	10000.00	10000
Total Carried Forward To Summary								

## C3.2 CULVERTS

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
C3.2			CULVERTS				
			Excavation for culvert structures:				
	C3.2.1.1		Excavating in all material situated within the following depth ranges below the surface level:				
		(a)	0m to 1,5m	m <sup>3</sup>	2660		
		(b)	Exceeding 1,5m and up to 3,0m	m <sup>3</sup>	1594		
	C3.2.1.2		Excavating soft material 0m to 1,5m below the surface level using labour enhanced construction methods, or instructed by hand under Clause A3.2.7.2(d)	m <sup>3</sup>	296		
	C3.2.1.5		Extra over sub-item C3.2.1.1 for excavation in stabilised existing road layers, irrespective of depth	m <sup>3</sup>	296		
C3.2.2			Backfilling				
	C3.2.2.1		Using the excavated material	m <sup>3</sup>	2045		
	C3.2.2.2		Using imported selected material:				
		(a)	From commercial sources (selected backfill or as instructed by the engineer)	m <sup>3</sup>	227		
	C3.2.2.3		Extra over sub-items C3.2.2.1 and C3.2.2.2 for soil cement backfilling				
		(a)	With wet mixture (soil or gravel mixed with 5 % of CEM II class 32.5 cement)	m <sup>3</sup>	227		
C3.2.3			Concrete pipe culverts:				
	C3.2.3.2		(i) On Class B bedding (interlocking joint class 75D SANS677; 600mm dia)	m	36		
			(ii) On Class B bedding (interlocking joint class 75D SANS677; 850mm dia)	m	61		
			(iii) On Class B bedding (interlocking joint class 75D SANS677; 900mm dia)	m	100		
C3.2.5			Rectangular culverts with prefabricated elements:				
	C3.2.5.1		Prefabricated portal culverts; wall and roof combination				
			i) W450 x H1200 rectangular culvert	m	231		
			ii) H600 x W1200 rectangular culvert	m	95		
			iii) H1500 x W1800 rectangular culvert	m	100		
			iv) H1200 x W2100 rectangular culvert	m	69		
			v) H1600 x W1800 rectangular culvert	m	25		
Total Carried Forward							

## C3.2 CULVERTS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
Brought Forward								
C3.2.6				Extra over items C3.2.3, C3.2.4 and C3.2.5 for constructing inclined culverts	m	125		
C3.2.7	C3.2.7.5			Cast in situ concrete and formwork:  In inlet and outlet structures including kerbs, chutes and downpipes, skewed ends, catchpits, manholes, thrust and anchor blocks, excluding formwork but including Class U2 surfacing finish (C25/30-20)	m³	43		
	C3.2.7.6			Formwork of concrete under items C3.2.7.3 to 5 above (F1 surface finish)	m²	171		
C3.2.16				Brickwork (Engineering bricks):				
	C3.2.16.2			230mm thick	m²	19		
C3.2.24				Compaction of bedding for inlets, outlets, manholes and catchpits:				
	C3.2.24.1			Preparation and compaction of in situ bedding material to 90% of MDD (150mm)	m²	181		
	C3.2.24.2			Extra-over sub-item C3.2.24.1 for compaction to 93% of MDD (150mm)	m²	18		
								</

C3.3 CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C3.3				CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS				
C3.3.1				Concrete kerbing-channeling combination:				
	C3.3.1.1			Prefabricated kerbing				
		(a)		Fig 3 and subbase material (drawing number 20568-TD-30)	m	3034		
		(b)		Fig 12 and in situ bedding material compacted to 90% MDD (drawing number 20568-TD-30)	m	1500		
C3.3.2				Concrete kerbing-channeling combination:				
	C3.3.2.1			Prefabricated kerbing-channeling				
		(a)		Fig 7 kerb and 300mm wide channel, (drawing number 20568-TD-47/Typical cross)	m	2000		
		(b)		Type C concrete channel and in situ bedding material compacted to 90% MDD (drawing number 20568-TD-46)	m	1500		
C3.3.3				Extra over items C3.3.1 and C3.3.2 for concrete kerbing or concrete kerbing and channeling on curves				
	C3.3.3.1			On curves of radii more than or equal to 5,0m but less than 20m	m	3500		
C3.3.6				Chutes (typical designs):				
	C3.3.6.4			Prefabricated chutes (Unperforated 300mm downpipe upvc pipe as shown on drawing number 20568-TD-33)	m	750		
C3.3.8				Linings for open drains:				
	C3.3.8.1			Cast in situ concrete lining (C25/30-20 for all types of open drains)	m³	802		
	C3.3.8.2			Class U2 surface finish to cast in situ concrete (all types of open drains)	m²	8015		
PC3.3.9				Formwork to cast in situ concrete lining for open drains (Class F1 surface finish):				
	PC3.3.9.2			To sides with formwork on both internal and external faces (each face measured)	m²	876		
	PC3.3.9.3			To ends of slabs	m²	1		
Total Carried Forward								

C3.3 CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
Brought Forward								
C3.3.10			(a)	Sealed joints in concrete and stone pitched linings of open drains (drawing number 20568-TD-30,20568-TD-31,20568-TD-42,20568-TD-46, and 20568-TD-47)				
			(a)	10mm bitumen impregnated fibre board with silicon joint sealer or approved equivalent	m	88		
C3.3.11				Concrete screed or backfill below chutes (150mm C16/20-20 of concrete or in situ bedding material compacted to 90% MDD)	m³	1202		
C3.3.12	C3.3.12.3			Reinforcement:				
				Welded steel fabric	kg	25000		
C3.3.13				Polymer film sheeting (0,15 mm thick) for concrete-lined open drains	m²	8015		
C3.3.14				Cutting bituminous surfacing and pavement layers for concrete kerbing, channeling or concrete-lined drains	m	16620		
C3.3.15	C3.3.15.1			Energy dissipaters in outlet structures				
				Precast concrete blocks in outlet structures	No.	78		
C3.3.16				Demolition and removal of existing kerbs and/or channel (Kerb-channel 500mm)	m³	88		
PC3.3.17				Inlet, outlet, transition and similar structures (typical designs):				
			(a)	In situ inlet structures for chutes as shown on drawing number 20568-TD-32 and 20568-TD-33 using C25/30-20 concrete)	No.	13		
			(b)	In situ outlet structures for chutes (as shown on drawing 20568-TD-33 using C25/30-20 concrete)	No.	13		
			(c)	In situ transition and down chutes (as shown on the drawing 20568-TD-31 using C25/30-20 concrete.	No.	13		
Total Carried Forward To Summary								

## C4.2 CUT MATERIALS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C4.2				CUT MATERIALS				
C4.2.1				Compiling and implementing M&U plans for the cuttings				
	C4.2.1.1			Cuttings exceeding 5 000 m3 up to 10 000 m3	No.	1		
C4.2.3				Excavating of materials in cuttings, material obtained from				
	C4.2.3.1			Soft excavation	m³	39500		
	C4.2.3.4			Hard excavation (other than by blasting)	m³	2000		
C4.2.4				Excavating of materials in box cuts, material obtained from				
	C4.2.4.4			Hard excavation (other than by blasting)	m³	1000		
C4.2.7				Removal of unsuitable stable cut material to spoil				
	C4.2.7.1			In layer thicknesses of 200mm and less	m³	2000		
C4.2.10				Backfilling of the unavoidable overbreak in hard and boulder excavation				
	C4.2.10.1			Compliant gravel material	m³	1000		
C4.2.12				Finishing the side slopes				
	C4.2.12.1			Cuttings:				
		(a)		In soft material	m²	10000		

### C4.3 EXISTING ROAD MATERIALS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C4.3				EXISTING ROAD MATERIALS				
C4.3.1				Additional material investigations				
	C4.3.1.1			Cost of additional trial pits, sampling of asphalt and laboratory testing	Prov. Sum	1	100000.00	100000
	C4.3.1.2			Handling cost and profit in respect of item C4.3.1.1	%	100000		
C4.3.3				Removal of bituminous seal surfacing (thickness not exceeding 30 mm)	m <sup>2</sup>	40000		
C4.3.5				Providing the milling machine on the site:				
	C4.3.5.1			Small milling machine with a cutting width of 1,2 m or smaller	No.	1		
	C4.3.5.2			Large milling machine with a cutting width exceeding 1,2 m	No.	1		
				Milling and removal of existing asphalt layers with an average milling depth (Contractor takes ownership):				
	C4.3.6.1			Not exceeding 50 mm	m <sup>3</sup>	8468		
Total Carried Forward To Summary								

## C4.4 COMMERCIAL MATERIALS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C4.4				COMMERCIAL MATERIALS				
C4.4.2				Commercial materials identified by the Contractor from commercial, private or other non-commercial suppliers:				
	C4.4.2.1			Pavement layer material:				
		(b)		Type G1 material	m <sup>3</sup>	21700		
		(c)		G5b Type	m <sup>3</sup>	35600		
		(d)		G7 material	m <sup>3</sup>	10000		
	C4.4.2.5			Fill material in the earthworks:				
		(a)		Normal or coarse fill	m <sup>3</sup>	10000		
C4.4.3				Cost to procure commercial materials identified by the Employer from private or non-commercial sources:				
	C4.4.3.1			Cost of procuring	Prov. Sum	1	20000000.00	20000000
	C4.4.3.2			Handling cost and profit in respect of item C4.4.3.1	%	20000000		
C4.4.4				Cementitious stabilising agents				
		(a)		Common cements to SABS ENV 197-1 (subbase), CEM II A-L 32,5N or similarly approved	t	5800		
		(b)		Slaked Lime (subbase)	t	1450		
C4.4.7				Sampling and material testing by a commercial laboratory for the stabilisation designs				
	C4.4.7.1			Cost of sampling and material testing	Prov sum	1	100000.00	100000
	C4.4.7.2			Handling cost and profit in respect of item C4.4.7.1	%	100000		
PC4.4.8				Provision of NME stabilization product				
	PC 4.4.8.1			Cost of procuring	Prov. Sum	1	2250000.00	2250000
	PC4.4.8.2			Handeling cost and profit in respect of item PC4.4.8.1	%	2250000		
Total Carried Forward To Summary								



C5.1 ROADBED

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C5.1				ROADBED				
C5.1.1				Roadbed construction and compaction:				
	C5.1.1.2			Compaction of in-situ material to 93 % of MDD	m³	17000		
				In-situ treatment of roadbed in hard material:				
	C5.1.5.1			In-situ treatment by ripping	m³	1500		
				Roller-pass compaction:				
	C5.1.6.2			Pad foot vibratory rollers	m²	39200		
	C5.1.6.7			High energy impact compactor / roller (HEIC)	m²	800000		
C5.1.7				Construction of a roadbed trial section:				
	C5.1.7.1			Non wetting-up collapsing soil trial section at in-situ moisture content using conventional rollers and / or HEIC	m³	6000		
Total Carried Forward To Summary								

## C5.2 FILL

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C5.2				FILL				
C5.2.1				Compiling and implementing M&U plans:				
C5.2.2				Fill construction:				
	PC5.2.2.1			Normal fill material in compacted layer thicknesses of 200mm and less:				
		(d)		Compacted to 95% of MDD	m <sup>3</sup>	80000		
C5.2.3				Side-cut to fill compacted to 93% of MDD in compacted layer thicknesses of 200mm and less	m <sup>3</sup>	10500		
C5.2.7				Construction of a trial section:				
	C5.2.7.1			Normal fill	m <sup>3</sup>	500		
C5.2.11				Finishing-off fill slopes, medians and interchange areas:				
	C5.2.11.1			Fill slopes	m <sup>2</sup>	15000		
Total Carried Forward To Summary								

## C5.3 ROAD PAVEMENT LAYERS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C5.3				ROAD PAVEMENT LAYERS				
C5.3.1				Compiling and implementing M&U plans for the construction of all the pavement layers	No.	1		
PC5.3.2				Construction of pavement layers:				
	C5.3.2.1			Construction of layers using conventional construction methods:				
		(b)		Lower selected subgrade layer (150mm thickness) compacted to 95% of MDD	m³	19500		
		(c)		Upper selected subgrade layer (150mm thickness) compacted to 95% of MDD	m³	19500		
		(j)		Lower subbase gravel layer (chemically stabilised, 150mm thickness) compacted to 95% of MDD	m³	19500		
		(k)		Upper subbase gravel layer (chemically stabilised, 150mm thickness) compacted to 97% of MDD	m³	22500		
		(d)		G1 crushed stone base layer (150mm thickness) compacted to 88% of AD	m³	21700		
C5.3.9				Construction of a trial section:				
	C5.3.9.1			Construction of a trial section using conventional methods of construction				
		(a)		Stabilised gravel layer (150mm) trial section	m³	250		
		(b)		Crushed stone base layer (175mm) trial section	m³	250		
		(d)		Stabilised subbase layer (200mm) trial section	m³	250		
C5.3.12				Surface regularity payment adjustments	Prov sum	1	1000000.00	1000000
Total Carried Forward To Summary								

## C5.4 STABILISATION

Item		Description		Unit	Quantity	Rate	Amount (Pounds)
Item							
C5.4			STABILISATION				
C5.4.2			Chemical stabilisation:				
	C5.4.2.1		Chemical stabilisation (350mm) of pavement layers (subbase)	m <sup>3</sup>	39000		
C5.4.5			Cementitious stabilisation agents for pavement layers:				
	C5.4.5.1		Addition of cementitious stabilisation agents for pavement layers				
		(a)	Common cements to SABS ENV 197-1 (subbase), CEM II A-L 32,5N or similarly approved	t	5800		
		(b)	Slaked Lime (subbase)	t	1450		
C5.4.10			Provision and application of water for curing	kℓ	20000		
C5.4.11			Curing by covering with the subsequent layer	m <sup>2</sup>	86500		
			Curing with a membrane (type of material to be specified):				
	C5.4.12.3		Spray grade emulsion	ℓ	35000		
C5.4.14			Trial section for a chemically stabilised layer	m <sup>3</sup>	250		
C5.4.15			Trial section for a bituminous stabilised layer (3.5m width)	m <sup>2</sup>	500		
Total Carried Forward To Summary							

## C5.5 RECONSTRUCTION OF PAVEMENT LAYERS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C5.5				RECONSTRUCTION OF PAVEMENT LAYERS				
C5.5.1				Compiling and implementing M&U plans for the reconstruction of an existing road pavement	number (No.)	1		
C5.5.2	C5.5.2.1			Reconstruction preparatory work:				
		(a)		Undivided carriageway:				
				Uniform section from km 77 to km 78	km	1		
C5.5.3				Construction equipment for sampling of in-situ material for mix design procedure	No.	1		
C5.5.4				Sampling of in-situ material for mix design procedure	No.	1		
C5.5.5				Construction of a trial section using a recycler	m³	300		
C5.5.13				Cross mixing of material (200mm)	m³	1500		
PC5.5.16	PC5.5.16.4			In-situ reconstruction of a pavement layer using a recycler to construct a stabilised base layer:				
		(d)		NME Emulsion stabilised subbase layer compacted to 102 % of MDD:				
				Using pre-pulverised material (as per item C5.5.8) compacted to 200 mm thick	m³	1500		
C5.5.20	C5.5.20.3			Material shortfall or make-up material:				
				For base layer (G5b)	m³	500		

C6.2 SEGMENTAL BLOCK PAVING

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C6.2.1				SEGMENTAL BLOCK PAVING				
	C6.2.1.1			Concrete block paving (25MPa, Type S-A 60mm interlocking grey)	m²	9500		
C6.2.3				Provision and application of approved herbicide and ant poison				
	C6.2.3.1			Provision of materials	PC Sum	1	50000.00	50000
	C6.2.3.2			Contractor's charges and profit added to the prime cost sum	%	50000		
Total Carried Forward To Summary								

C8.1 PRIME COAT

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C8.1				PRIME COAT				
C8.1.1				Prime coat:				
	C8.1.1.2			MC -30 cut-back bitumen	ℓ	100000		
	C8.1.1.3			Inverted bitumen emulsion	ℓ	100000		
C8.1.2				Aggregate for blinding:				
	C8.1.2.2			Crusher sand	m³	500		
C8.1.3				Extra over item C8.1.1 for applying the prime coat accessible only to hand-held or light equipment	ℓ	1500		
Total Carried Forward To Summary								

## C9.1 ASPHALT LAYERS

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
C9.1			ASPHALT LAYERS				
C9.1.1			Asphalt mix designs:				
	C9.1.1.1		Stone skeletal mixes:				
		(a)	Continuously graded Base St-E20 (PG64E-16{SBS}), Level III	lump sum	1		
	C9.1.1.2		Sand skeletal mixes:				
		(a)	Continuously graded surfacing (Sa-E14 (PG64E-16){EVA}, Level III)	lump sum	1		
C9.1.2			Construction of trial sections:				
	C9.1.2.1	a)	Asphalt layers (Sa-E14 (PG64E-16){EVA}, 50mm layer thickness and placing technique paver, 14NMPS, min 93%MVD, level III)	m <sup>2</sup>	500		
	C9.1.2.1	b)	Asphalt layers (St-E20 (PG64E-16){SBS}, 110mm layer thickness and placing technique paver, 20NMPS, min 93%MVD, level III)	m <sup>2</sup>	500		
	C9.1.2.2		Removal of trial section where so instructed by the Engineer	m <sup>2</sup>	1000		
C9.1.3			Application of bond coat:				
	C9.1.3.1		Stable – grade 30 % net bitumen emulsion as specified. Applied with a calibrated distributor	ℓ	90500		
	C9.1.3.2		Applied in restricted areas using a portable pressure sprayer	ℓ	500		
	C9.1.3.3		Applied by hand using brushes on all exposed transverse and longitudinal construction joints	ℓ	2500		
C9.1.4			Asphalt base:				
	C9.1.4.1		New Construction:				
		(a)	Stone skeletal mix – continuously graded as defined (120mm, St-E20 (PG64E-16{SBS}), placing technique paver, 20NMPS, min 93%MVD)	m <sup>2</sup>	38500		
	C9.1.4.2		Rehabilitation:				
		(a)	Stone skeletal mix – continuously graded as defined (120mm, St-E20 (PG64E-16{SBS}) and Level II, placing technique paver, 20NMPS, min 93%MVD)	t	15250		
C9.1.5			Asphalt surfacing				
	C9.1.5.1		New construction				
Total Carried Forward							



## C9.1 ASPHALT LAYERS

Item			Description	Unit	Quantity	Rate	Amount (Pounds)		
Item									
Brought Forward									
C9.1.8	C9.1.8.1	(e)	Sand skeletal mix – Continuously graded as defined (50mm, Sa-E14 (PG64E-16){EVA} and Level III, placing technique paver, 14NMPS, min 93%MVD)	m²	87000				
			Surfacing of bridge decks:						
C9.1.10	C9.1.10.1	(e)	Levelling course: Continuously graded (sand skeletal), PG58V-22 and 7mm nominal maximum particle size, placed by Paver, min 93%MVD)	t	600				
			Surfacing, Continuously Graded as defined (50mm, Sa-E14 (PG64E-16){EVA} and Level III, placing technique paver, 14NMPS, min 93%MVD)	t	600				
			Variation rates:						
			a) Bitumen (PG64E-16{SBS})	t	8				
			b) Bitumen (PG64E-16{EVA})	t	8				
			Aggregate	t	850				
C9.1.10	C9.1.10.3	(e)	Active filler (lime )	t	10				
			C9.1.10.6	Bituminous bond coat – net bitumen (Stable grad 30%)	t	5			
			C9.1.13	C9.1.13.1	Coring of asphalt layers:				
					100 mm diameter	No.	30		
C9.1.15	C9.1.15.1	(e)	Milling of bridge decks and keys adjacent to bridge decks:						
			Provision of an appropriate sized milling machine	No.	1				
			C9.1.15.2	Milling of bridge decks and keys to bridge deck approaches	m³	75			
			C9.1.15.3	Cleaning of milled surfaces	m²	250			
Total Carried Forward To Summary									

## C10.1 GENERAL REQUIREMENTS FOR SURFACE TREATMENTS

Item		Description	Unit	Quantity	Rate	Amount (Pounds)
C10.1		GENERAL REQUIREMENTS FOR SURFACE TREATMENTS				
C10.1.3		Multiple stone seals including a cover spray, if specified using:				
	C10.1.3.1	20 mm and 10 mm aggregate PG58E-22 (SBS) (S-E2)	m <sup>2</sup>	138000		
C10.1.4		Embargo period effects:				
	C10.1.4.1	Re-establishment of sealing team after embargo period	lump sum	1		
	C10.1.4.2	Extra-over for sealing during the specified embargo period (S2 (20/10), S-E1 (winter grade))	m <sup>2</sup>	70000		
C10.1.9		Bituminous binder variations:				
	C10.1.9.5	Homogeneous modified binder PG58E-22 (SBS) (S-E2)	ℓ	15000		
	C10.1.9.8	Homogeneous modified binder S-E1 with 4,5% MC30	ℓ	10000		
	C10.1.9.9	Homogeneous modified binder S-E1 with 9% MC30	ℓ	10000		
	C10.1.9.11	Precoating fluid (Petroleum Based)	ℓ	3000		
C10.1.10		Aggregate variation:				
	C10.1.10.3	10 mm aggregate	m <sup>3</sup>	150		
	C10.1.10.5	20 mm aggregate	m <sup>3</sup>	250		
C10.1.13		Precoating of aggregate using a dedicated plant:				
	C10.1.13.1	Product containing low flashpoint solvent (MC 30)	ℓ	30000		
	C10.1.13.2	Product containing no low flashpoint solvent (Diluted Emulsion)	ℓ	30000		
C10.1.17		Aggregate for blinding:				
	C10.1.17.2	Crusher sand	m <sup>3</sup>	50		
C10.1.18		Aggregate for blinding by hand:				
	C10.1.18.2	Crusher sand	m <sup>3</sup>	100		
C10.1.26		Trial sections for all seal types specified (S2)	lump sum	1		
C10.1.27		Provision of performance guarantee in respect of the surfacing	lump sum	1		
Total Carried Forward To Summary						

C11.1 PITCHING, STONework, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C11.1				PITCHING, STONework, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION				
C11.1.2	C11.1.2.2			Stone pitching:  Grouted stone pitching with mortar	m²	250		
Total Carried Forward To Summary								

## C11.2 NON-STRUCTURAL GABIONS

Item	Item	Description	Unit	Quantity	Rate	Amount (Pounds)
C11.2		NON-STRUCTURAL GABIONS				
C11.2.1		Foundation trench excavation:				
	C11.2.1.1	Excavating all material situated within the following depth ranges below the surface level:				
		(a) 0 m to 1,5 m	m³	750		
	C11.2.1.3	Excavating soft material within 1,5 m below the surface level using labour enhanced construction methods:	m³	750		
C11.2.2		Surface preparation for bedding the gabion boxes and mattresses	m²	2550		
C11.2.3		Gabion boxes and mattresses:				
	C11.2.3.3	Galvanized gabion mattresses ((6m long x 2m wide x 0.3 m deep) Mesh size: 80mm x 100mm Wire diameter: 2,7 mm. Diaphragm spacing: 1,0m	m³	750		
PC11.2.4		Geotextile (Non-woven Needle punched, Grade A3)	m²	2550		
Total Carried Forward To Summary						

## C11.4 ROAD RESTRAINT SYSTEMS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C11.4				ROAD RESTRAINT SYSTEMS				
C11.4.1				Erecting of guardrails at 3,81 m spacing:				
	C11.4.1.1			Complete galvanized system compliant to SANS 1350:				
		(a)		On timber posts (drawing number 20215-TD-16 to 17)	m	1500		
		(d)		Extra over C11.4.1.1(a) and C11.4.1.1(b) for excavating holes of posts using labour enhanced methods (soft and intermediate)	m	1000		
	C11.4.1.2			Terminal sections for 3,81 guardrails comprising of:				
		(a)		End wings to SANS 1350	No.	16		
		(c)		Bridge adapters to SANS 1350	No.	12		
		(g)		Extra over C11.4.1.2(d) and C11.4.1.2(e) for excavating holes for posts using labour enhanced methods (soft and intermediate)	No.	12		
C11.4.5				Additional guardrail posts for 3,81m systems:				
	C11.4.5.1			Timber	No.	19		
C11.4.6				Reflective plates:				
	C11.4.6.1			Steel plates	No.	245		
C11.4.14				Nailing of gang nail plates on top of timber guardrail posts	No.	245		
Total Carried Forward To Summary								

## C11.5 FENCING

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C11.5				FENCING				
C11.5.1				Supply and erect new fencing material for new fences and for supplementing material in existing fences which are being repaired or removed:				
	C11.5.1.1			Zinc-coated barbed wire (grade, and size indicated)				
				3,2 X 2,5mm OVAL HIGH TENSILE GRADE SINGLE STRAND (SANS 675), FULLY GALVANIZED.	km	4		
	C11.5.1.7			Standards (1850 x 2.5 kg/m " Y" SECTION COMPLETE WITH HOLES AT 50MM c/c)	No.	560		
	C11.5.1.8			Droppers (1200 x 0.56mm kg/m RIGDEBACK PATTERN)	No.	2800		
	C11.5.1.9			Straining posts, stays and anchors:				
		(a)		Vertical				
		(ii)		Timber straining posts ( 2000x100 dia.)	No.	200		
				Timber post to be treat in accordance with SANS 10005 with a creosote that complies with SANS 538 or 539				
		(b) (i)		Steel stays and anchors (2130 x 60ø x 3mm MILD STEEL TUBING)	No.	60		
		(c)		Horizontal				
		(ii)		Timber stays and anchors (20568-TD-4 to 7)	No.	200		
C11.5.2				New gates (Single leaf, 5m "w" pattern)	No.	5		
C11.5.3				Moving existing fences and gates:				
	C11.5.3.2			Gates (type and size indicated)	No.	5		
C11.5.4				Dismantling existing fences and gates:				
	C11.5.4.1			Fences:				
		(a)		Stock-proof fences	kilometre (km)	37		
	C11.5.4.2			Gates (20568-TD-4 and 6)	No.	5		
C11.5.7				Drilling and blasting holes for posts and anchors	No.	25		
Total Carried Forward To Summary								

## C11.6 ROAD SIGNS

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
PC11.6			ROAD SIGNS				
PC11.6.1			Road signboards with painted or coloured semi-matt background. Symbols, lettering and borders in semi-matt black or in Class I retro-reflective material, where the sign board is constructed from:				
	C11.6.1.3		Prepainted galvanized steel plate:				
		(c)	Area exceeding 2,0 m <sup>2</sup> but not 10 m <sup>2</sup>	m <sup>2</sup>	16		
	C11.6.1.4		Prepainted galvanized steel profiles (200mm high panels):				
		(b)	Area exceeding 0,5 m <sup>2</sup> but not 2,0 m <sup>2</sup>	m <sup>2</sup>	2		
		(c)	Area exceeding 2,0 m <sup>2</sup> but not 10 m <sup>2</sup>	m <sup>2</sup>	40		
	C11.6.1.9		Warning signs, permanent				
		(c)	1200mm size (signboard material, background and symbol retro-reflective Class I)	No.	12		
		(e)	600mm x 150mm (prepainted galvanized steel, background and symbol retro-reflective Class I)	No.	24		
		(f)	600mm x 300mm (prepainted galvanized steel, background and symbol retro-reflective Class I)	No.	4		
		(g)	600mm x 450mm (prepainted galvanized steel, background and symbol retro-reflective Class I)	No.	1		
		(h)	1200mm x 450mm (prepainted galvanized steel, background and symbol retro-reflective Class I)	No.	15		
		(i)	1200mm x 600mm (prepainted galvanized steel, background and symbol retro-reflective Class I)	No.	27		
		(j)	3932mm x 600mm (prepainted galvanized steel, background and symbol retro-reflective Class I)	No.	9		
	PC11.6.1.1 3		Moveable barricade/road sign combination (prepainted galvanized steel, background and symbol retro-reflective Class III and 2400mm wide x 400mm high TW411)	No.	24		
C11.6.2			Extra over on item C11.6.1 for using:				
	C11.6.2.1		Background of retro-reflective material:				
		(a)	Class III	m <sup>2</sup>	151		
Total Carried Forward							

## C11.6 ROAD SIGNS

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
Item							
Brought Forward							
C11.6.3	C11.6.2.2		Lettering, symbols, numbers, arrows, emblems and borders of retro-reflective material:				
		(a)	Class III	m <sup>2</sup>	151		
			Road sign supports (overhead road sign structures excluded):				
C11.6.4	C11.6.3.2		Timber (diameter and type indicated)				
		(a)	Timber support shall be straight round poles complying with the requirements of sans 457-3 and shall not have excessive cracking at the ends.				
		i	100mm	m	788		
		ii	125mm	m	92		
		iii	150mm	m	92		
			Kilometre Markers				
C11.6.5	C11.6.4.1		Kilometre markers on posts (type and post indicated and reference to drawings)	No.	12		
			Excavation and backfilling for road sign supports (not applicable to kilometre posts):				
C11.6.6	C11.6.5.1		Excavating soft material and backfilling	m <sup>3</sup>	622		
	C11.6.5.3		Extra over item C11.6.5.1 for cement-treated soil backfill	m <sup>3</sup>	113		
			Dismantling, storing and re-erecting road signs with a surface area of:				
C11.6.8	C11.6.6.2		Area exceeding 0,5 m <sup>2</sup> but not 2,0 m <sup>2</sup>	m <sup>2</sup>	20		
	C11.6.6.3		Exceeding 2,0 m <sup>2</sup> but not 10 m <sup>2</sup>	m <sup>2</sup>	320		
C11.6.10			Danger plates at culverts / structures:				
	C11.6.8.1		Size 150 x 600mm (timber and Class I)	No.	159		
			Disposing of road signs with a surface area of:				
	C11.6.10.2		Area exceeding 0,5 m <sup>2</sup> but not 2,0 m <sup>2</sup>	m <sup>2</sup>	20		
	C11.6.10.3		Exceeding 2,0 m <sup>2</sup> but not 10 m <sup>2</sup>	m <sup>2</sup>	320		
Total Carried Forward To Summary							



## C11.7 ROAD MARKINGS AND ROAD STUDS

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
C11.7			ROAD MARKINGS AND ROAD STUDS				
C11.7.2			Retro-reflective road marking:				
	C11.7.2.1		White lines broken or unbroken (Water Borne Paint)				
			(i) 100mm wide	km	26		
			(ii) 150mm wide	km	3		
			(iii) 200mm wide	km	2		
			(iv) 300mm	km	1		
	C11.7.2.2		Yellow lines broken or unbroken ( Water Borne Paint)				
			(i) 150mm wide	km	18		
			(ii) 200mm wide	km	8		
	C11.7.2.4		White lettering and symbols (Water Borne Paint)	m²	700		
	C11.7.2.5		Yellow lettering and symbols (Water Borne Paint)	m²	320		
	C11.7.2.7		Transverse lines, painted island and arrestor bed markings, any colour (Water Borne Paint)	m²	9200		
PC11.7.3			Thermoplastic road marking:				
	C11.7.3.1		Thermoplastic road marking, broken or unbroken (colour and width of line indicated):				
			(i) white 100mm wide	km	27		
			(ii) White 150mm wide	km	3		
			(iii) white 200mm wide	km	2		
			(iv) white 300mm wide	km	1		
			(iii) Yellow 150mm wide	km	18		
			(iv) Yellow 200mm wide	km	8		
C11.7.4			Cold plastic road marking material:				
	C11.7.4.1		White lettering and symbols	m²	750		
	C11.7.4.2		Yellow lettering and symbols	m²	320		
	C11.7.4.4		Transverse lines, painted island and arrestor bed markings (any colour)	m²	9500		
C11.7.5			Variations in rate of application:				
	C11.7.5.1		White paint	ℓ	900		
Total Carried Forward							

## C11.7 ROAD MARKINGS AND ROAD STUDS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
Brought Forward								
C11.7.7	C11.7.5.2			Yellow paint	ℓ	900		
	C11.7.5.4			Retro-reflective beads	kg	75		
	C11.7.5.5			Thermoplastic material, all colours	kg	75		
	C11.7.5.6			Cold plastic marking material, all colours	kg	75		
				Road studs:				
	C11.7.7.2			Permanent road studs compliant to SANS 1463 (RSA1)				
				(i) Yellow/Red	No.	1150		
				(ii) White/Red	No.	650		
				(iii) White/White	No.	1000		
				(iv) Red/Red	No.	160		
C11.7.8								
				Setting out and premarking the lines (excluding traffic island markings, lettering and symbols)	km	49		
C11.7.9								
				Re-establishing the painting unit during the defects notification period and at other instances on instruction of the Engineer	No.	2		
C11.7.10								
				Removal of existing, temporary or final road marking				
	C11.7.10.2							
				Water-jetting	m²	60		
C11.7.11								
				Removal of existing road studs	No.	2850		
								</

## C11.8 LANDSCAPING AND PLANTING PLANTS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
C11.8				LANDSCAPING AND PLANTING PLANTS				
C11.8.1				Trimming:				
	C11.8.1.1			Machine trimming	m <sup>2</sup>	10000		
	C11.8.1.2			Hand trimming	m <sup>2</sup>	10000		
C11.8.3				Preparing the areas for grassing:				
	C11.8.3.1			Ripping	ha	1		
	C11.8.3.2			Scarifying for loosening topsoil	ha	6		
	C11.8.3.3			Topsoiling within the road reserve where the following materials are used:				
		(a)		Topsoil obtained from within the road reserve or borrow areas	m <sup>3</sup>	7700		
		(b)		Topsoil obtained from commercial sources by the Contractor	m <sup>3</sup>	1000		
	C11.8.3.5			Providing and applying chemical fertilisers and / or soil-improvement material:				
		(c)		Limestone ammonium nitrate	t	10		
		(d)		2:3:2 (22)	t	20		
		(e)		3:2:1 (25)	t	20		
C11.8.4				Grassing:				
	C11.8.4.3			Hydroseeding:				
		(c)		Hydroseeding	ha	4		
Total Carried Forward To Summary								

C11.9 FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
C11.9				FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS				
C11.9.1				Finishing the road and road reserve:				
	C11.9.1.2			Single carriageway road	km	25		
Total Carried Forward To Summary								

## C20.1 TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP

Item			Description	Unit	Quantity	Rate	Amount (Pounds)
C20.1			TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP				
C20.1.1	C20.1.1.1		Special tests requested by the Engineer:				
			Employer's contribution to concrete durability tests:				
		(a)	Tests for water sorptivity	PC Sum	1	250000.00	250000
		(i)	Handling costs and profit in respect of item C20.1.2.1(a)	%	250000		
		(b)	Tests for oxygen permeability	PC Sum	1	250000.00	250000
		(i)	Handling costs and profit in respect of item C20.1.2.1(b)	%	250000		
		(c)	Tests for chloride conductivity	PC Sum	1	75000.00	75000
		(i)	Handling costs and profit in respect of item C20.1.2.1(c)	%	75000		
		(d)	Tests for concrete cover	PC Sum	1	75000.00	75000
		(i)	Handling costs and profit in respect of item C20.1.2.1(d)	%	75000		
C20.1.2			Providing testing equipment:				
	C20.1.3.1		Core drill	No.	1		
C20.1.3			Special tests using Automated Road condition assessment instruments operated by service providers as requested by the Engineer for acceptance control in terms of Clause A20.1.3.6b)(iii):				
	C20.1.4.1		Using Highspeed Inertial Non-Contact laser profilers (Clause A20.1.5.5c)(ii))	PC Sum	1	75000.00	75000
		(a)	Handling cost and profit in respect of item C20.1.4.1	%	75000		
	C20.1.4.3		Rutting measurements (Clause A20.1.5.5 d)(i))	PC Sum	1	50000.00	50000
		(a)	Handling cost and profit in respect of item C20.1.4.3	%	50000		
	C20.1.4.4		Surface macro texture (Clause A20.1.5.5 b))	PC Sum	1	50000.00	50000
		(a)	Handling cost and profit in respect of item C20.1.4.4	%	50000		
	C20.1.3.5		Deflection measurements (FWD) (Clause A20.1.5.5e))	PC Sum	1	75000.00	75000
		(a)	Handling cost and profit in respect of item C20.1.4.5	%	75000		
Total Carried Forward							

C20.1 TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP

Item				Description	Unit	Quantity	Rate	Amount (Pounds)
Item								
Brought Forward								
PC20.1.5				Financial contribution for an independent laboratory	Month	15		
PC20.1.6	C20.1.6.1			Payment of Independent site laboratory				
				Direct payment by contractor	PC Sum	1	14000000.00	14000000
		(a)		Handling cost and profit in respect of item C20.1.6.1	%	14000000		
Total Carried Forward To Summary								

SUMMARY OF SECTIONS

Section	Description	Amount (Pounds)
C1.2	GENERAL REQUIREMENTS AND PROVISIONS	
C1.3	CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS	
C1.4	FACILITIES FOR THE ENGINEER	
C1.5	ACCOMMODATION OF TRAFFIC	
C1.6	CLEARING AND GRUBBING	
C1.7	LOADING AND HAULING	
C2.1	GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES	
C2.4	ENERGY AND OTHER SERVICES	
C3.1	DRAINS	
C3.2	CULVERTS	
C3.3	CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS	
C4.2	CUT MATERIALS	
C4.3	EXISTING ROAD MATERIALS	
C4.4	COMMERCIAL MATERIALS	
C5.1	ROADBED	
C5.2	FILL	
C5.3	ROAD PAVEMENT LAYERS	
C5.4	STABILISATION	
C5.5	RECONSTRUCTION OF PAVEMENT LAYERS	
C6.2	SEGMENTAL BLOCK PAVING	
C8.1	PRIME COAT	
C9.1	ASPHALT LAYERS	
C10.1	GENERAL REQUIREMENTS FOR SURFACE TREATMENTS	
C11.1	PITCHING, STONEMASONRY, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION	
C11.2	NON-STRUCTURAL GABIONS	
C11.4	ROAD RESTRAINT SYSTEMS	
C11.5	FENCING	
C11.6	ROAD SIGNS	
C11.7	ROAD MARKINGS AND ROAD STUDS	
C11.8	LANDSCAPING AND PLANTING PLANTS	
Total Carried Forward		

SUMMARY OF SECTIONS

Section	Description	Amount (Pounds)
Brought Forward		
1	C11.9 FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS	
1	C20.1 TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP	
	SUBTOTAL	
Total Carried Forward To Summary Of Schedules		



## **SCHEDULE B**

### **BRIDGES**

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

**C1.6 CLEARING AND GRUBBING**

Item				Description	Unit	Quantity	Rate	Amount R
<b>C1.6</b>				<b>CLEARING AND GRUBBING</b>				
<b>C1.6.1</b>				<b>Clearing:</b>				
	C1.6.1.1			Clearing with machines and some hand labour where necessary	ha	2		Rate Only
	C1.6.1.2			Clearing with hand labour only when labour enhanced work is specified	m²			
<b>C1.6.2</b>				<b>Grubbing:</b>				
	C1.6.2.1			Grubbing with machines and some hand labour where necessary	ha	2		Rate Only
	C1.6.2.2			Grubbing with hand labour when labour enhancement work is specified or it is not practical to use a machine	m²			
<b>C1.6.3</b>				<b>Removal and grubbing of large trees and tree stumps:</b>				
	C1.6.3.1			Girth equal to or exceeding 1,0 m up to and including 2,0 m	No	5		
	C1.6.3.2			Girth exceeding 2,0 m up to and including 3,0 m	No	1		
Total Carried Forward To Summary								

BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

C1.7 LOADING AND HAULING

Item				Description	Unit	Quantity	Rate	Amount R
C1.7				LOADING AND HAULING				
C1.7.1				Loading:				
	C1.7.1.1			Loading from stockpile using machines and some hand labour where necessary	m³	1500		
C1.7.2				Hauling:				
	C1.7.2.2			Hauling material to spoil and off-loading it at a designated spoil area:				
		(a)		Cleared and grubbed material (organic matter and all other unsuitable or waste material)	m³-km	500		
		(b)		Soil and gravel material	m³-km	500		
		(c)		Boulders and hard material	m³-km	500		

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

## C11.2 NON-STRUCTURAL GABIONS

Item		Description	Unit	Quantity	Rate	Amount R
<b>C11.2</b>			<b>NON-STRUCTURAL GABIONS</b>			
<b>C11.2.1</b>			<b>Foundation trench excavation:</b>			
	C11.2.1.1		Excavating all material situated within the following depth ranges below the surface level:			
		(a)	0 m to 1,5 m	m <sup>3</sup>	375	
		(b)	Exceeding 1,5 m and up to 3,0 m	m <sup>3</sup>	250	
	C11.2.1.2		Extra over sub-item C11.2.1.1 for excavation in hard material, irrespective of depth	m <sup>3</sup>	50	
	C11.2.1.3		Excavating soft material within 1,5 m below the surface level using labour enhanced construction methods:	m <sup>3</sup>	50	
	C11.2.1.4		Excavating intermediate material within 1,5 m below the surface level using labour enhanced construction methods:	m <sup>3</sup>	50	
C11.2.2			Surface preparation for bedding the gabion boxes and mattresses	m <sup>2</sup>	1000	
<b>C11.2.3</b>			<b>Gabion boxes and mattresses:</b>			
	C11.2.3.1		Galvanized gabion boxes (1 m x 1 m x 1 m)	m <sup>3</sup>	330	
	C11.2.3.3		Galvanized gabion mattresses (3 m x 1 m x 0.3 m)	m <sup>3</sup>	600	
C11.2.4			Geotextile (Continuous filament nonwoven needle punched Class 2 geotextile as per Table 2(b) of GRI-GT13(b) specifications)	m <sup>2</sup>	600	
Total Carried Forward To Summary						

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

**C12.1 PILING**

Item			Description	Unit	Quantity	Rate	Amount R
<b>C12.1</b>			<b>PILING</b>				
<b>C12.1.2</b>			<b>Access and drainage:</b>				
	C12.1.2.1		Access	lump sum	1		
	C12.1.2.2		Drainage by pumping or other means	lump sum	1		
<b>C12.1.3</b>			<b>Establishment on site for piling (Augered Piles)</b>	lump sum	1		
<b>C12.1.4</b>			<b>Moving to, and setting up equipment at each position for installing piles (pile type indicated)</b>	No.	26		
<b>C12.1.5</b>			<b>Augered piles with a diameter of 900mm through material situated within the following successive depth ranges:</b>				
	C12.1.5.1		Augered holes:				
		(a)	0 m up to 10 m provided for in pay item C12.1.6	m	260		
		(b)	Exceeding 10 m and up to 15 m	m	130		
<b>C12.1.6</b>			<b>Extra over item C12.1.5 irrespective of the depth, to form augered and bored pile holes through identified materials consisting of:</b>				
	C12.1.6.1		Coarse gravel with a matrix content of less than (max. 60%)	m	50		
	C12.1.6.2		Boulders (R3 Sandstone, max size 400mm)	m	20		
	C12.1.6.3		Rock formation				
		(a)	Sandstone R2	m	10.0		
		(b)	Sandstone R3	m	10.0		
		(c)	Sandstone R4	m	10.0		
		(d)	Sandstone R5	m	10.0		
<b>C12.1.9</b>			<b>Forming augered or bored pile holes through obstructions</b>	Prov. Sum	1	150000.00	150000
<b>C12.1.11</b>			<b>Installing and removing temporary casings in augered holes for piles of (900mm)</b>	m	390		
<b>C12.1.15</b>			<b>Steel reinforcement in cast-in-situ piles:</b>				
	C12.1.15.2		High-yield-stress-steel bars (Y-Bars)	t	40		
Total Carried Forward							

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

## C12.1 PILING

Item			Description	Unit	Quantity	Rate	Amount R
Brought Forward							
<b>C12.1.16</b>			<b>Cast-in-situ concrete in piles, underreams, bulbous bases and sockets (D32/40-20-XC4)</b>	m <sup>3</sup>	250		
<b>C12.1.17</b>			<b>Extra over item C12.1.16 for concrete cast underwater</b>	m <sup>3</sup>	200		
<b>C12.1.24</b>			<b>Stripping / cutting the pile heads (900mm Augered Piles)</b>	No.	26		
<b>C12.1.27</b>			<b>Establishment on site for core drilling</b>	lump sum	1		
<b>C12.1.28</b>			<b>Moving equipment to and assembling at each location where cores are to be drilled</b>	No.	10		
<b>C12.1.29</b>			<b>Drilling the cores in:</b>				
	C12.1.29.1		Concrete (85mm)	m	130		
	C12.1.29.2		Founding formation:				
		(a)	Irrespective of hardness	m	65		
<b>C12.1.30</b>			<b>Standing time for pile-installation frame</b>	hour (h)	24		
<b>C12.1.31</b>			<b>Pile Integrity Testing on augered / bored piles:</b>				
	C12.1.31.1		Providing and installing (85mm) mild steel tubes for "Cross Hole Sonic Logging" in all designated piles	m	1550		
	C12.1.31.2		Carrying out of Impact Frequency Response (IFR) measurements or Sonic Tapping tests and interpretation of results (per pile diameter)	No.	26		
	C12.1.31.3		Cross-Hole Sonic Logging tests and interpreted results (per pile diameter)	m	390		
	C12.1.31.4		Base integrity tests (per designated pile)	No.	26		
Total Carried Forward To Summary							

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

**C13.1 FOUNDATIONS**

Item			Description	Unit	Quantity	Rate	Amount R
<b>C13.1</b>			<b>FOUNDATIONS</b>				
<b>C13.1.2</b>			<b>Additional foundation investigations:</b>				
	C13.1.2.1		Provisional sum allowed for additional foundation investigations	Prov. Sum	1	50000.00	50000
	C13.1.2.2		Handling costs and profit in respect of item C13.1.2.1	%	50000		
<b>C13.1.3</b>			<b>Excavation:</b>				
	C13.1.3.1		Excavating soft material situated within the following successive depth ranges:				
		(a)	0 m up to 1,5 m	m³	335		
		(b)	> 1,5 m and < 3,0 m	m³	120		
	C13.1.3.2		Extra over subitem C13.1.3.1 for excavation in hard material irrespective of depth	m³	100		
	C13.1.3.3		Extra over subitem C13.1.3.1 for additional excavation required by the Engineer after excavation is complete	m³	50		
	C13.1.3.4		Extra over subitem C13.1.3.1 for excavation by hand	m³	115		
<b>C13.1.6</b>			<b>Access and drainage:</b>				
	C13.1.6.1		Access	lump sum	1		
	C13.1.6.2		Drainage	lump sum	1		
<b>C13.1.7</b>			<b>Backfill to excavations utilising:</b>				
	C13.1.7.1		Material from excavation	m³	80		
	C13.1.7.2		Imported material	m³	70		
<b>C13.1.8</b>			<b>Backfill to excavations utilising labour:</b>				
	C13.1.8.1		Material from excavation	m³	50		
	C13.1.8.2		Imported material	m³	50		
<b>C13.1.9</b>			<b>Fill within a restricted area (extra over item C5.2.2)</b>	m³	60		
<b>C13.1.10</b>			<b>Haul in excess of 1,0 km on excavated material and on material imported for backfill,</b>	m³ - km	7800		
<b>C13.1.14</b>			<b>Foundation fill consisting of:</b>				
	C13.1.14.3		Compacted granular material	m³	350		
<b>C13.1.15</b>			<b>Foundation fill placed by labour enhanced methods consisting of:</b>				
Total Carried Forward							

BRIDGE B621 NYL RIVER BRIDGE (km 82.1)  
C13.1 FOUNDATIONS

Item			Description	Unit	Quantity	Rate	Amount R
Brought Forward							
C13.1.23	C13.1.15.3		Compacted granular material	m³	50		
	C13.1.15.5		Concrete blinding (D25/30-20-XC4)	m³	20		
	C13.1.23.1	(a)	<b>Lateral support for excavations:</b> Excavation or fill at (Pile Caps): 0 to 2,5 m depth	m²	80		
Total Carried Forward To Summary							



## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

### C13.2 FALSEWORK, FORMWORK AND CONCRETE FINISH

Item		Description	Unit	Quantity	Rate	Amount R
C13.2			<b>FALSEWORK, FORMWORK AND CONCRETE FINISH</b>			
C13.2.2			<b>Vertical formwork to provide surface finish to</b>			
		(a)	Return walls (F2)	m²	110	
		(b)	Abutments (F2)	m²	265	
		(c)	Piers (F2)	m²	135	
		(d)	Pile Caps (F2)	m²	65	
		(e)	Deck (F2)	m²	35	
C13.2.3			<b>Horizontal formwork to provide surface finish to</b>			
		(a)	Deck (F2)	m²	1050	
C13.2.4			<b>Inclined formwork to provide (F2) surface finish to (Spine beams)</b>			
				m²	510	
C13.2.10			<b>Provision of designs and drawings of falsework and formwork by an ECSA registered Professional Engineer or Technologist</b>			
				lump sum	1	
Total Carried Forward To Summary						

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

**C13.3 STEEL REINFORCEMENT**

Item			Description	Unit	Quantity	Rate	Amount R
<b>C13.3</b>			<b>STEEL REINFORCEMENT</b>				
<b>C13.3.1</b>			<b>Reinforcement for:</b>				
	C13.3.1.1		Deck				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	100		
	C13.3.1.2		Piers				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	12		
	C13.3.1.3		Abutments				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	40		
	C13.3.1.4		Pile Caps				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	7		
	C13.3.1.6		Return Walls				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	7		
	C13.3.1.7		Approach Slabs				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	6		
	C13.3.1.8		Parapets				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	10		
	C13.3.1.9		Barriers				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	8		
	C13.3.1.10		End Blocks				
		(b)	High-yield-stress-steel bars (Y-Bars)	t	3		
<b>C13.3.4</b>			<b>Extra-over item C13.3.1 (a), (b), etc. for galvanising of reinforcement</b>	t	21		
Total Carried Forward To Summary							

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

### C13.4 CONCRETE

Item		Description	Unit	Quantity	Rate	Amount R
<b>C13.4</b>			<b>CONCRETE</b>			
<b>C13.4.1</b>			<b>Cast-in-situ concrete:</b>			
	C13.4.1.2		Durable concrete (Class D):			
		(a)	Deck (D50/60-20-XC4)	m <sup>3</sup>	690	
		(b)	Piers (D32/40-20-XC4)	m <sup>3</sup>	65	
		(c)	Abutments (D32/40-20-XC4)	m <sup>3</sup>	210	
		(d)	Pile Caps (D32/40-20-XC4)	m <sup>3</sup>	35	
		(e)	Return Walls (D32/40-20-XC4)	m <sup>3</sup>	40	
		(f)	Approach Slabs (D32/40-20-XC4)	m <sup>3</sup>	35	
<b>C13.4.5</b>			<b>Curing and surface protection of cast-in-situ concrete, as and where specifically required:</b>			
	C13.4.5.1		Deck (tenderer to specify method of curing):	m <sup>2</sup>	1280	
Total Carried Forward To Summary						

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

### C13.5 PRESTRESSING

Item				Description	Unit	Quantity	Rate	Amount R
<b>C13.5</b>				<b>PRESTRESSING</b>				
<b>C13.5.1</b>				<b>Prestressing tendons:</b>				
	C13.5.1.1			Longitudinal tendons	meganew ton-metre (MN-m)	5750		
<b>C13.5.2</b>				<b>Anchorage and couplers:</b>				
	C13.5.2.1			Anchorage at jacking end	meganew ton (MN)	190		
<b>Total Carried Forward To Summary</b>								

BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

C13.7 JOINTS

Item			Description	Unit	Quantity	Rate	Amount R
C13.7			JOINTS				
C13.7.2			Filled joints:				
	C13.7.2.1		Between abutments and return walls: 50mm filled joint	m²	100		
	C13.7.2.2		Between parapets/barriers and end blocks: Min. 10mm thick closed cell expanded polyethelyne joint filler	m²	25		
C13.7.4			Sealing joints with:				
	C13.7.4.1		Between abutments and return walls: Jointex and 50x50mm tear-off strip	m	200		
	C13.7.4.2		Between parapets/barriers and end blocks:50x50mm silicone seal	m	190		
Total Carried Forward To Summary							

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

### C13.8 ANCILLARY STRUCTURAL ELEMENTS

Item		Description	Unit	Quantity	Rate	Amount R
<b>C13.8</b>		<b>ANCILLARY STRUCTURAL ELEMENTS</b>				
<b>C13.8.1</b>		<b>Concrete barriers and parapets (refer to drawings):</b>				
	C13.8.1.1	Barriers	m	120		
	C13.8.1.2	Parapets	m	120		
<b>C13.8.3</b>		<b>Concrete transition blocks (3.35m)</b>	<b>No.</b>	8		
<b>C13.8.6</b>		<b>Service ducts in structures:</b>				
	C13.8.6.1	Type and size (100mm PVC)	m	250		
	C13.8.6.2	Joint in ducts at bridge deck expansion joints	No.	8		
<b>C13.8.7</b>		<b>Numbers for structures: (refer to drawing no. 20568-S-126):</b>				
	C13.8.7.3	Numbers formed in concrete	No.	2		
<b>C13.8.10</b>		<b>Drainage pipes and weep holes:</b>				
	C13.8.10.1	Drainage pipes:				
		(b) 110mm uPVC scupper	No.	40		
	C13.8.10.2	Weep holes:				
		(a) 75mm dia uPVC pipe cast in abutments	m	40		
<b>C13.8.12</b>		<b>Synthetic-fibre filter fabric (Grade A3, Non-woven needle punched)</b>	<b>m<sup>2</sup></b>	210		
<b>C13.8.15</b>		<b>Drainage strips (Grade A3, non-woven needle punched)</b>	<b>m</b>	75		
<b>C13.8.16</b>		<b>Perforated drainage pipes:</b>				
	C13.8.16.1	Size (110mm) and type of pipe wrapped in synthetic – filter fabric as specified (65mm HDPE pipe to BS2782)	m	50		
PC13.8.19		Additional items required for buried joint as per drawing 20568-S-104	1	Lump Sum		
<b>Total Carried Forward To Summary</b>						

BRIDGE B621 NYL RIVER BRIDGE (km 82.1)  
C13.11 STRUCTURAL STEELWORK FOR MAJOR STRUCTURES

Item				Description	Unit	Quantity	Rate	Amount R
C13.11				STRUCTURAL STEELWORK FOR MAJOR STRUCTURES				
C13.11.2				Miscellaneous metalwork (location and member to be specified)				
		(a)		Guardrail cleat for connection to transition block (Refer to drawing 20568-S-108)	No.	8		
		(b)		Guardrail backing plate for connection to transition block (Refer to drawing 20568-S-108)	No.	8		

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

### C14.3 DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK

Item		Description	Unit	Quantity	Rate	Amount R
C14.3						
C14.3.1		DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK				
	C14.3.1.1	Demolition of concrete members or elements:  Full member or element (Existing bridge)	m³	300		
Total Carried Forward To Summary						



## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

## PC15.1 BRIDGE MONITORING INSTALLATION

Item			Description	Unit	Quantity	Rate	Amount R
<b>C15.1</b>			<b>BRIDGE MONITORING INSTALLATION</b>				
<b>C15.1.1</b>			<b>Demolition of concrete members or elements:</b>				
		(a)	Installation of 15 m long Measurand Shape Accel Array with 500 mm segments including all sleeves and grouting, as per Structural Monitoring Drawing (Drawing Number: 20568-S-118	lump sum	1		
<b>C15.1.2</b>			Installation of Vibrating Wire Strain Gauges				
		(a)	Installation of Vibrating Wire Strain Gauges	lump sum	1		
<b>C15.1.3</b>			Thermistor Strings				
		(a)	Installation of Thermistor strings	lump sum	1		
<b>C15.1.4</b>			Cable strand meter				
		(a)	Installation of strand meter	lump sum	1		
<b>C15.1.5</b>			Pressure cells				
		(a)	Installation of earth pressure cells	No.	1		
<b>C15.1.6</b>			Loggers				
		(a)	Installation of loggers	lump sum	1		
<b>C15.1.7</b>			<b>Batteries, chargers, and solar panels</b>				
		(a)	12Volt 102Ah deep cycle battery to charge loggers including battery box and blanket	No.	4		
		(b)	Optimate 6 trickle charger	No.	2		
		(c)	300 W solar panel	No.	2		
<b>C15.1.8</b>			<b>Watertight storage cupboards</b>				
		(a)	Schneider Electric (or similar approved) 300x800x1000mm watertight stainless-steel box, water tightness rating IP66 bolted to concrete	No.	3		
<b>C15.1.9</b>			<b>Ducting in deck and piers for sensor cables</b>				
		(a)	110mm diameter KayDuct (or similar approved)	metre (m)	180		
		(b)	110mm dia steel pipe with end cap (4mm thick)	metre (m)	30		
<b>C15.1.10</b>			<b>Grouting of ducting in deck and piers for sensor cables</b>				
Total Carried Forward							

## BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

## PC15.1 BRIDGE MONITORING INSTALLATION

Item				Description	Unit	Quantity	Rate	Amount R
Brought Forward								
C15.1.11		(a)	Grouting of ducts with bentonite	cubic metre (m³)		5		
			<b>Bridge monitoring reference structures</b>					
C15.1.12		(a)	Bridge monitoring reference structures completed as per Structural Monitoring Drawing Number: 20568-S-118	lump sum		1		
			<b>Material testing</b>					
		(a)	Compression cubes (150x150mm)	No.		9		
		(b)	Concrete E value (150mm dia. cylinder)	No.		9		
		(c)	Split cylinder (150mm diameter cylinder)	No.		9		
		(d)	Modulus of rupture (100x100x300 Beam)	No.		9		
		(e)	Concrete coefficient of thermal expansion	No.		3		
		(f)	Concrete shrinkage	No.		3		
		(g)	Concrete creep (150mm diameter cylinder)	No.		6		
C15.1.13			<b>Weather Station</b>					
C15.1.14		(a)	ClimaVUE50 weather Station (or similar approved)	No.		1		
			<b>Bridge monitoring handling fee</b>					
		(a)	Contractors charges and profit associated with bridge monitoring	lump sum		1		
Total Carried Forward To Summary								

BRIDGE B621 NYL RIVER BRIDGE (km 82.1)

SUMMARY OF SECTIONS

Section	Description	Amount (Pounds)
C1.6	CLEARING AND GRUBBING	
C1.7	LOADING AND HAULING	
C11.2	NON-STRUCTURAL GABIONS	
C12.1	PILING	
C13.1	FOUNDATIONS	
C13.2	FALSEWORK, FORMWORK AND CONCRETE FINISH	
C13.3	STEEL REINFORCEMENT	
C13.4	CONCRETE	
C13.5	PRESTRESSING	
C13.7	JOINTS	
C13.8	ANCILLARY STRUCTURAL ELEMENTS	
C13.11	STRUCTURAL STEELWORK FOR MAJOR STRUCTURES	
C14.3	DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK	
PC15.1	BRIDGE MONITORING INSTALLATION	
	SUBTOTAL	
	Total Carried Forward To Summary Of Schedules	

SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)

### C3.3 CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS

Item		Description	Unit	Quantity	Rate	Amount R
<b>C3.3</b>		<b>CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS</b>				
<b>C3.3.1</b>		<b>Concrete kerbing:</b>				
<b>C3.3.2</b>	C3.3.1.2	<b>Concrete kerbing-channeling combination:</b>				
	(a)	Modified Figure 3 Kerb, C25/30-20-XC0, Class F2 finish, as per drawing 20568-S-202	m	60.0		
<b>C3.3.15</b>		<b>Energy dissipaters in outlet structures:</b>				
	C3.3.15.1	Precast concrete blocks in outlet structures	No.	24.0		
<b>C3.3.16</b>		<b>Demolition and removal of existing kerbs and / or channel (Figure 3 kerb)</b>	m³	4.0		
Total Carried Forward To Summary						

SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)

C4.3 EXISTING ROAD MATERIALS

Item				Description	Unit	Quantity	Rate	Amount R
C4.3				EXISTING ROAD MATERIALS				
C4.3.12				Removing of existing concrete material within the following average depth ranges:				
	C4.3.12.1			The break-up method:				
		(b)		Exceeding 150 mm but not exceeding 250 mm (removal of existing sidewalks)	m³	20.0		
								</

SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)

### C11.1 PITCHING, STONework, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION

Item				Description	Unit	Quantity	Rate	Amount R
C11.1				<b>PITCHING, STONEMWORK, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION</b>				
C11.1.2				<b>Stone pitching:</b>				
	C11.1.2.1			Plain stone pitching:				
	C11.1.2.2			Grouted stone pitching with mortar	m²	215.0		
C11.1.6				<b>Concrete edge beam type A (D25/30-20-XC4) as per drawing 20568-S-202</b>	m³	10.0		
C11.1.7				<b>Provision of approved herbicide and ant poison:</b>				
	C11.1.7.1			Provision of materials	PC Sum	1.0	20000.00	20000
	C11.1.7.2			Contractor's charges and profit added to the prime cost sum	%	20000.00		
Total Carried Forward To Summary								

SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)**C11.2 NON-STRUCTURAL GABIONS**

Item			Description	Unit	Quantity	Rate	Amount R
<b>C11.2</b>			<b>NON-STRUCTURAL GABIONS</b>				
<b>C11.2.1</b>			<b>Foundation trench excavation:</b>				
	C11.2.1.1		Excavating all material situated within the following depth ranges below the surface level:				
		(a)	0 m to 1,5 m	m <sup>3</sup>	15.0		
	C11.2.1.2		Extra over sub-item C11.2.1.1 for excavation in hard material, irrespective of depth	m <sup>3</sup>	1.5		
<b>C11.2.2</b>			<b>Surface preparation for bedding the gabion boxes and mattresses</b>	m <sup>2</sup>	50.0		
<b>C11.2.3</b>			<b>Gabion boxes and mattresses:</b>				
	C11.2.3.3		Galvanized gabion mattresses (3m long x 1m wide x 0.3m deep) Mesh size: 80mm x 100mm. Wire diameter: 2,5mm Diaphragm spacing: 1,0m: 0.3 m deep	m <sup>3</sup>	15.0		
<b>C11.2.4</b>			<b>Geotextile (Continuous filament nonwoven needle punched Class 2 geotextile as per Table 2(b) of GRI-GT13(b) specifications)</b>	m <sup>2</sup>	70.0		
Total Carried Forward To Summary							

SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)**C11.4 ROAD RESTRAINT SYSTEMS**

Item				Description	Unit	Quantity	Rate	Amount R
C11.4				ROAD RESTRAINT SYSTEMS				
C11.4.1				Erecting of guardrails at 3,81 m spacing:				
	C11.4.1.1			Complete galvanized system compliant to SANS 1350:				
		(a)		On timber posts (See Drawing No.20568-S-203)	m	50.0		
	C11.4.1.2			Terminal sections for 3,81 guardrails comprising of:				
		(a)		End wings to SANS 1350	No.	4.0		
		(c)		Bridge adapters to SANS 1350	No.	4.0		
C11.4.5				Additional guardrail posts for 3,81 m systems:				
	C11.4.5.1			Timber	No.	20.0		
C11.4.6				Reflective plates:				
	C11.4.6.1			Steel plates	No.	50.0		
C11.4.14				Nailing of gang nail plates on top of timber guardrail posts	No.	50.0		



## SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)

## C13.1 FOUNDATIONS

Item			Description	Unit	Quantity	Rate	Amount R
<b>C13.1</b>			<b>FOUNDATIONS</b>				
<b>C13.1.1</b>			<b>Provision of designs and drawings of temporary works by an ECSA-registered Professional Engineer or Technologist or Geotechnical Engineer:</b>				
	C13.1.1		Deck Support structure for foundation investigations	lump sum	1.0		
<b>C13.1.2</b>			<b>Additional foundation investigations:</b>				
	C13.1.2.1		Provisional sum allowed for additional foundation investigations	Prov. Sum	1.0	200000.00	200000
	C13.1.2.2		Handling costs and profit in respect of item C13.1.2.1	%	200000.00		
<b>C13.1.3</b>			<b>Excavation:</b>				
	C13.1.3.1	(a)	Excavating soft material situated within the following successive depth ranges:				
			0 m up to 1,5 m	m³	85.0		
	C13.1.3.3		Extra over subitem C13.1.3.1 for additional excavation required by the Engineer after excavation is complete	m³	10.0		
	C13.1.3.5		Extra over subitem C13.1.3.1 for excavation in restricted areas	m³	85.0		
<b>C13.1.7</b>			<b>Backfill to excavations utilising:</b>				
	C13.1.7.1		Material from excavation	m³	85.0		
<b>C13.1.14</b>			<b>Foundation fill consisting of:</b>				
	C13.1.14.4		Mass concrete (C25/30-20-XC0)	m³	5.0		
	C13.1.14.5		Concrete blinding (75mm thick, C12/15-20-XC0) under stone pitching	m³	20.0		
Total Carried Forward To Summary							

SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)**C13.7 JOINTS**

Item				Description	Unit	Quantity	Rate	Amount R
C13.7				JOINTS				
C13.7.5				Supply and installation of Agrément South Africa certified proprietary expansion joints:				
	C13.7.5.1			Claw and other modular joints in nosings:				
		(a)		Single Seal steel claw and rubber band Expansion Joint up to 50mm movement as per drawing 20568-S-204	m	6.0		
	C13.7.5.2			Asphaltic plug type joints:				
		(c)		400 x 75 mm	m	30.0		
		(g)		Extra over for variation in joint depth of asphaltic joints	ℓ	15.0		
	C13.7.5.3			Provision of Engineering Drawings of proprietary joints and certification after installation by an ECSA registered professional engineer or technologist	lump sum	1.0		
C13.7.8				Additional water tests for joints ordered by the Engineer	No.	2.0		

## SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)

## C13.8 ANCILLARY STRUCTURAL ELEMENTS

Item			Description	Unit	Quantity	Rate	Amount R
<b>C13.8</b>			<b>ANCILLARY STRUCTURAL ELEMENTS</b>				
<b>C13.8.6</b>			<b>Service ducts in structures:</b>				
	C13.8.6.1		120mm diameter uPVC Service ducts in sidewalks	m	220.0		
	C13.8.6.2		Joint in ducts at bridge deck expansion joints	No.	16		
<b>C13.8.10</b>			<b>Drainage pipes and weep holes:</b>				
	C13.8.10.1		Drainage pipes:				
		(a)	315mm outer diameter PVC-U Class 34 (Heavy Duty) Pipe 9.2mm thick with integral joints	m	40.0		
C13.8/3.1.4			Excavation and disposal of material for subsoil drainage systems:				
C13.8/C3.1.4.1			Excavating in all material situated within the following depth ranges below the surface:				
		(a)	0 m to 1,5 m	m <sup>3</sup>	10.0		
C13.8/C3.1.13			Concrete outlet structures, manhole boxes, junction boxes and cleaning eyes for subsoil drainage systems:				
	C3.1.13.1		Outlet structures (See drawing no. 20568-S-206 & 207)	No.	4.0		
	C3.1.13.5		Inlet structures (See drawing no. 20568-S-206)	No.	4.0		
	C3.1.13.5		Inlet drain covers (See drawing no. 20568-S-206)	No.	4.0		
C13.8/C3.1.25			Backfilling of pipes with selected material compacted to 93 % of MDD.	m <sup>3</sup>	10.0		
C13.8/14.3.1			Demolition of concrete members or elements:				
	C14.3.1.1		Full member or element (Damaged existing inlet drain covers)	m <sup>3</sup>	2.0		
Total Carried Forward To Summary							





SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)

C14.5 ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION

Item				Description	Unit	Quantity	Rate	Amount R
C14.5				ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION				
C14.5.3				Establishment on site for crack injection	lump sum	1		
C14.5.4				Surface preparation and surface sealing for crack injection to (all areas - where required)	m	30.0		
C14.5.5				Crack injection adhesive to (all areas - where required)	ℓ	20.0		
C14.5.6				Crack filling: Complete System - tenderer to submit details with tender				
	C14.5.6.1			Repair system to (all areas - where required)	m	200.0		

Item		Description	Unit	Quantity	Rate	Amount R
C14.7		<b>PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE</b>				
C14.7.1		<b>Cleaning and preparation of concrete surface</b>				
	C14.7.1.1	High pressure water jetting (at least 1000 kPa to remove curing compounds, membranes etc. without producing an exposed aggregate finish)	m <sup>2</sup>	800.0		
C14.7.2		<b>Application of protective coatings and treatments (tenderer to submit details for with tender)</b>				
	C14.7.2.1	Protective spray-applied treatment that will penetrate the capillaries and pores of low permeability reinforced concrete structures to condition the concrete and to improve pH of all concrete surfaces	m <sup>2</sup>	800.0		
	C14.7.2.2	Extra over for variation in application rate	ℓ	50.0		
C14.7.3		<b>On site monitoring and supply of written product performance guarantee</b>	lump sum	1		
C14.7.4		Trial sample panels	m <sup>2</sup>	1.0		
Total Carried Forward To Summary						

SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)

C14.9 REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS

Item				Description	Unit	Quantity	Rate	Amount R
C14.9				REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS				
C14.9.4				Joint terminations as specified on the drawings in:				
	C14.9.4.2			Sidewalks (Joint termination box as per Drawing 20568-S-205)	No.	4.0		
C14.9.15				Fix or re-fix ancillary elements:				
	C14.9.15.1			Fix existing guardrails to end blocks as per drawing 20568-S-203	No.	4.0		
C14.9.16				Supply new ancillary elements:				
	C14.9.16.1			New bridge sidewalk as per drawing 20568-S-202	m	55.0		



SCHEDULE B2 - BRIDGE B3837 ROAD OVER RAIL (km 86.6)

SUMMARY OF SECTIONS

Section	Description	Amount (Pounds)
C3.3	CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS	
C4.3	EXISTING ROAD MATERIALS	
C11.1	PITCHING, STONework, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION	
C11.2	NON-STRUCTURAL GABIONS	
C11.4	ROAD RESTRAINT SYSTEMS	
C13.1	FOUNDATIONS	
C13.7	JOINTS	
C13.8	ANCILLARY STRUCTURAL ELEMENTS	
C14.1	ACCESS FOR BRIDGE REHABILITAION	
C14.4	SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS	
C14.5	ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION	
C14.7	PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE	
C14.9	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS	
	SUBTOTAL	
	Total Carried Forward To Summary Of Schedules	

**SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)**

## C1.6 CLEARING AND GRUBBING

Item		Description	Unit	Quantity	Rate	Amount R
<b>3</b>		<b>CLEARING AND GRUBBING</b>				
C1.6.1		Clearing:				
	C1.6.1.1	Clearing with machines and some hand labour where necessary	ha	4.0		
	C1.6.1.2	Clearing with hand labour only when labour enhanced work is specified	m²	200.0		
C1.6.2		Grubbing:				
	C1.6.2.1	Grubbing with machines and some hand labour where necessary	ha	4.0		
	C1.6.2.2	Grubbing with hand labour when labour enhancement work is specified or it is not practical to use a machine	m²	200.0		
C1.6.3		Removal and grubbing of large trees and tree stumps:				
	C1.6.3.1	Girth equal to or exceeding 1,0 m up to and including 2,0 m	No	30.0		
	C1.6.3.2	Girth exceeding 2,0 m up to and including 3,0 m	No	5.0		
<b>Total Carried Forward To Summary</b>						

SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

C1.7 LOADING AND HAULING

Item				Description	Unit	Quantity	Rate	Amount R
C1.7				LOADING AND HAULING				
C1.7.1	C1.7.1.1			Loading: Loading from stockpile using machines and some hand labour where necessary	m³	0.0		
C1.7.2	C1.7.2.2			Hauling: Hauling material to spoil and off-loading it at a designated spoil area:				
		(b)		Soil and gravel material	m³-km	300000.0		
		(c)		Boulders and hard material	m³-km	600.0		

## SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

## C3.2 CULVERTS

Item			Description	Unit	Quantity	Rate	Amount R
<b>C3.2</b>			<b>CULVERTS</b>				
<b>C3.2.1</b>			<b>Excavation for culvert structures:</b>				
	C3.2.1.1		Excavating in all material situated within the following depth ranges below the surface level:				
		(a)	0 m to 1,5 m	m <sup>3</sup>	50.0		
	C3.2.1.4		Extra over sub-item C3.2.1.1 for excavation in hard or boulder material, irrespective of depth	m <sup>3</sup>	5.0		
<b>C3.2.2</b>			<b>Backfilling:</b>				
	C3.2.2.1		Using the excavated material	m <sup>3</sup>	28.0		
	C3.2.2.2		Using imported selected material:				
		(a)	From commercial sources (granular material)	m <sup>3</sup>	5.0		
	C3.2.2.4		Extra over sub-items C3.2.2.1 and C3.2.2.2 for screed layers (75mm thick, Class C16/20-20-X0)	m <sup>3</sup>	2.0		
<b>C3.2.7</b>			<b>Cast-in-situ concrete and formwork:</b>				
	C3.2.7.5		In inlet and outlet structures including kerbs, chutes and downpipes, skewed ends, catchpits, manholes, thrust and anchor blocks, excluding formwork but including Class U2 surfacing finish (75mm thick, Class C16/20-X0-20)	m <sup>3</sup>	4.0		
	C3.2.7.6		Formwork of concrete under items C3.2.7.3 to 5 above				
		(a)	Class F1 surface finish to concealed surfaces	m <sup>2</sup>	25.0		
		(b)	Class F2 surface finish to exposed surfaces	m <sup>2</sup>	18.0		
<b>C3.2.10</b>			<b>Reinforcement:</b>				
	C3.2.10.2		High-tensile steel bars	t	1.0		
	C3.2.10.3		Welded steel fabric (Mesh Ref 617)	kg	60.0		
<b>C3.2.24</b>			<b>Compaction of bedding for inlets, outlets, manholes and catchpits:</b>				
	C3.2.24.1		Preparation and compaction of in-situ bedding material to 90 % of MDD (200mm depth)	m <sup>3</sup>	21.0		
	C3.2.24.2		Extra-over sub-item C3.2.24.1 for compaction to 93 % of MDD (200mm depth)	m <sup>3</sup>	13.0		
Total Carried Forward To Summary							

## SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

**C3.3 CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS**

Item			Description	Unit	Quantity	Rate	Amount R
<b>C3.3</b>			<b>CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS</b>				
<b>C3.3.1</b>			<b>Concrete kerbing:</b>				
<b>C3.3.2</b>			<b>Concrete kerbing-channeling combination:</b>				
	C3.3.2.2		Cast-in-situ kerbing-channeling (Kerb to match existing (C25/30-20-X0) as per drawing 20568-S-306, Class F2 finish):				
		(a)	Figure 7 Kerb and Channel (as per drawing 20568-S-306)	m	30.0		
<b>C3.3.16</b>			<b>Demolition and removal of existing kerbs and / or channel (Figure 3 kerb) with side walk</b>	m <sup>3</sup>	10.0		
Total Carried Forward To Summary							

**SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)**

## C4.2 CUT MATERIALS

Item		Description	Unit	Quantity	Rate	Amount R
C4.2		<b>CUT MATERIALS</b>				
C4.2.5		Excavating of materials in designated excavations, material obtained from (River Training):				
	C4.2.5.1	Soft excavation	m³	40000.0		
	C4.2.5.2	Boulder excavation class A	m³	200.0		
	C4.2.5.3	Boulder excavation class B	m³	200.0		
	C4.2.5.4	Hard excavation (other than by blasting)	m³	200.0		
Total Carried Forward To Summary						

SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

## C11.2 NON-STRUCTURAL GABIONS

Item		Description	Unit	Quantity	Rate	Amount R
<b>C11.2</b>			<b>NON-STRUCTURAL GABIONS</b>			
C11.2.1			Foundation trench excavation:			
	C11.2.1.1		Excavating all material situated within the following depth ranges below the surface level:			
		(a)	0 m to 1,5 m	m <sup>3</sup>	950.0	
		(a)	>1.5 m to 3 m	m <sup>3</sup>	500.0	
	C11.2.1.2		Extra over sub-item C11.2.1.1 for excavation in hard material, irrespective of depth	m <sup>3</sup>	150.0	
C11.2.2			Surface preparation for bedding the gabion boxes and mattresses	m <sup>2</sup>	1000.0	
C11.2.3			Gabion boxes and mattresses:			
	C11.2.3.1		Galvanized gabion boxes: Mesh size: 80mm x 100mm Wire diameter: 2,7 mm Diaphragm spacing: 1,0 m: 2 m x 1 m x 1 m	m <sup>3</sup>	600.0	
	C11.2.3.3		Galvanized gabion mattresses (3m long x 1m wide x 0.3m deep) Mesh size: 80mm x 100mm . Wire diameter: 2,5mm Diaphragm spacing: 1,0m: 0.3 m deep	m <sup>3</sup>	50.0	
C11.2.4			Geotextile (Continuous filament nonwoven needle punched Class 2 geotextile as per Table 2(b) of GRI-GT13(b) specifications)	m <sup>2</sup>	2000.0	
Total Carried Forward To Summary						

SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

## C11.4 ROAD RESTRAINT SYSTEMS

Item				Description	Unit	Quantity	Rate	Amount R
C11.4				<b>ROAD RESTRAINT SYSTEMS</b>				
C11.4.1				<b>Erecting of guardrails at 3,81 m spacing:</b>				
	C11.4.1.1	(a)		Complete galvanized system compliant to SANS 1350: On timber posts	m	50.0		
	C11.4.1.2			Terminal sections for 3,81 guardrails comprising of:				
		(a)		End wings to SANS 1350	No.	2.0		
		(d)		End treatments where single guardrail sections are specified (drawing reference)	No.	2.0		
		(e)		End treatments where double guardrail sections are specified (drawing reference)	No.	2.0		
	C11.4.5.1			Timber	No.			
C11.4.6				<b>Reflective plates:</b>				
	C11.4.6.1			Steel plates	No.	40.0		
C11.4.14				Nailing of gang nail plates on top of timber guardrail posts	No.	100.0		
<b>Total Carried Forward To Summary</b>								



SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

C11.8 LANDSCAPING AND PLANTING PLANTS

Item			Description	Unit	Quantity	Rate	Amount R
C11.8			LANDSCAPING AND PLANTING PLANTS				
C11.8.1			Trimming:				
	C11.8.1.1		Machine trimming	m²	40000.0		Rate Only
	C11.8.1.2		Hand trimming	m²			
C11.8.3			Preparing the areas for grassing:				
	C11.8.3.1		Ripping	hectare (ha)	4.0		Rate Only
	C11.8.3.2		Scarifying for loosening topsoil	hectare (ha)	4.0		
	C11.8.3.4		Topsoiling of borrowpits by using topsoil obtained from borrow areas or from the road reserve	m³			
C11.8.4			Grassing:				
	C11.8.4.3		Hydroseeding:				
		(c)	Hydroseeding	hectare (ha)	4.0		
Total Carried Forward To Summary							

**SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)****C13.1 FOUNDATIONS**

Item			Description	Unit	Quantity	Rate	Amount R
<b>C13.1</b>			<b>FOUNDATIONS</b>				
C13.1.1			Provision of designs and drawings of temporary works by an ECSA-registered Professional Engineer or Technologist or Geotechnical Engineer (description of works to which applicable):	lump sum	1.0		
C13.1.2			Additional foundation investigations:				
	C13.1.2.1		Provisional sum allowed for additional foundation investigations	Prov. Sum	1.0		
	C13.1.2.2		Handling costs and profit in respect of item C13.1.2.1	%	50000.0		
C13.1.3			Excavation:				
	C13.1.3.1		Excavating soft material situated within the following successive depth ranges:				
		(a)	0 m up to 1,5 m	m <sup>3</sup>	820.0		
		(b)	> 1,5 m and < 3,0 m	m <sup>3</sup>	470.0		
		(c)	> 3,0 m and < 4,5 m	m <sup>3</sup>	310.0		
	C13.1.3.2		Extra over subitem C13.1.3.1 for excavation in hard material irrespective of depth	m <sup>3</sup>	50.0		
	C13.1.3.3		Extra over subitem C13.1.3.1 for additional excavation required by the Engineer after excavation is complete	m <sup>3</sup>	50.0		
	C13.1.3.4		Extra over subitem C13.1.3.1 for excavation by hand	m <sup>3</sup>	50.0		
	C13.1.3.5		Extra over subitem C13.1.3.1 for excavation in restricted areas	m <sup>3</sup>	50.0		
C13.1.6			Access and drainage:				
	C13.1.6.1		Access	lump sum	1.0		
	C13.1.6.2		Drainage	lump sum	1.0		
C13.1.7			Backfill to excavations utilising:				
	C13.1.7.1		Material from excavation	m <sup>3</sup>	500.0		
	C13.1.7.2		Imported material (G5)	m <sup>3</sup>	250.0		
	C13.1.7.3		Soil cement	m <sup>3</sup>	50.0		
C13.1.10			Haul in excess of 1,0 km on excavated material and on material imported for backfill,	m <sup>3</sup> - km	12000.0		
C13.1.14			Foundation fill consisting of:				
	C13.1.14.1		Rock fill	m <sup>3</sup>	250.0		
Total Carried Forward							

SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

C13.1 FOUNDATIONS

Item				Description	Unit	Quantity	Rate	Amount R
Brought Forward								
C13.1.33	C13.1.14.3			Compacted granular material (G5)	m³	500.0		
	C13.1.14.4			Mass concrete C16/20-20-XC0	m³	10.0		
	C13.1.14.5			Concrete blinding (75mm thick and C16/20-20-XC0)	m³	50.0		
				Rockgrid PC100/100	m²	650.0		
Total Carried Forward To Summary								

SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

### C13.2 FALSEWORK, FORMWORK AND CONCRETE FINISH

Item		Description	Unit	Quantity	Rate	Amount R
<b>C13.2</b>			<b>FALSEWORK, FORMWORK AND CONCRETE FINISH</b>			
C13.2.2		a)	Vertical formwork to provide (class F1) surface finish			
		i)	Culvert Foundation slab	m²	30.0	
		ii)	Wing Wall Foundation	m²	30.0	
		iii)	Cut off Walls at Apron	m²	140.0	
		iv)	Approach Slab	m²	30.0	
		b)	Vertical formwork to provide (class F2) surface finish			
		i)	Culvert Walls	m²	350.0	
		ii)	Culvert Roof Slab	m²	40.0	
		iii)	Wing Walls	m²	90.0	
		iv)	Head Wall	m²	20.0	
		v)	Ear Walls	m²	60.0	
C13.2.3			Horizontal formwork to provide (class F2) surface finish			
		i)	Roof Slab	m²	180.0	
C13.2.4			Inclined formwork to provide (class F2) surface finish			
		i)	Culvert Wall	m	90.0	
		ii)	Ear Walls	m²	10.0	
C13.2.10			Provision of designs and drawings of falsework and formwork by an ECSA registered Professional Engineer or Technologist	lump sum	1.0	
Total Carried Forward To Summary						

**SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)**

### C13.3 STEEL REINFORCEMENT

Item		Description	Unit	Quantity	Rate	Amount R
C13.3		<b>STEEL REINFORCEMENT</b>				
C13.3.1		Reinforcement for:				
	C13.3.1.1	Major Culvert C0843:				
	(b)	High-yield-stress-steel bars (Y-bars)	t	70.0		
	(C )	Welded steel fabric (Mesh Ref 888)	kg	2500.0		
C13.3.4		Extra-over item C13.3.1 (a), (b), galvanising of reinforcement	t	2.0		
Total Carried Forward To Summary						

Item		Description	Unit	Quantity	Rate	Amount R
<b>C13.4</b>			<b>CONCRETE</b>			
C13.4.1			Cast-in-situ concrete (class of concrete and use or position in structure stated):			
	C13.4.1.2		Durable concrete (Class D):			
		(a)	Major Culvert C0843 - D35/45-20-XC4			
		i)	Culvert Floor Slab	m <sup>3</sup>	100.0	
		ii)	Culvert Walls	m <sup>3</sup>	85.0	
		iii)	Culvert Roof Slab	m <sup>3</sup>	130.0	
		iv)	Apron Slabs and Energy Dissipators	m <sup>3</sup>	50.0	
		v)	Cut off Walls	m <sup>3</sup>	25.0	
		vi)	Wing Wall Foundation	m <sup>3</sup>	20.0	
		vii )	Wing Walls	m <sup>3</sup>	20.0	
		viii )	Culvert Head walls	m <sup>3</sup>	5.0	
C13.4.5			Curing and surface protection of cast-in-situ concrete, as and where specifically required:			
	C13.4.5.1		Indicate structural element and surface to be cured (tenderer to specify method of curing):	m <sup>2</sup>	900.0	
Total Carried Forward To Summary						

Item	Description	Unit	Quantity	Rate	Amount R
C13.7	<b>JOINTS</b>				
C13.7.5	<b>Supply and installation of Agrément South Africa certified proprietary expansion joints:</b>				
C13.7.5.1	Claw and other modular joints in nosings:				
C13.7.5.2	Asphaltic plug type joints:				
(c)	400 x 75 mm	m	30.0		
(g)	Extra over for variation in joint depth of asphaltic joints	ℓ	15.0		
C13.7.5.3	Provision of Engineering Drawings of proprietary joints and certification after installation by an ECSA registered professional Engineer or technologist	lump sum	1.0		
C13.7.6	Joint terminations in:				
C13.7.6.2	Sidewalks (Aphaltic Plug Joint)	No.	4.0		
C13.7.8	<b>Additional water tests for joints ordered by the Engineer</b>	No.	2.0		
<b>Total Carried Forward To Summary</b>					

Item		Description	Unit	Quantity	Rate	Amount R
<b>C13.8</b>		<b>ANCILLARY STRUCTURAL ELEMENTS</b>				
C13.8.1		Concrete barriers and parapets (refer to drawings):				
	C13.8.1.2	Parapets	m	22.0		
C13.8.3		Concrete transition blocks (length = 3m )	No.	4.0		
C13.8.6		Service ducts in structures:				
	C13.8.6.1	110mm diameter uPVC	m	160.0		
	C13.8.6.2	Joint in ducts at bridge deck expansion joints	No.	4.0		
<b>C13.8.7</b>		<b>Numbers for structures: (refer to drawing no. 20568-S-126):</b>				
	C13.8.7.3	Numbers formed in concrete	No.	2		
C13.8.15		Drainage strips (200mm filter elements at 45-degree angle)	m	125.0		
C13.8.16		Perforated drainage pipes:				
	C13.8.16.1	Size (110mm) and type of pipe wrapped in synthetic – filter fabric as specified (65mm HDPE pipe to BS2782)	m	70.0		
Total Carried Forward To Summary						



**SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)**

### C13.11 STRUCTURAL STEELWORK FOR MAJOR STRUCTURES

Item		Description	Unit	Quantity	Rate	Amount R
C13.11		<b>STRUCTURAL STEELWORK FOR MAJOR STRUCTURES</b>				
C13.11.2		Miscellaneous metalwork (location and member to be specified)				
	(a)	Guardrail cleat for connection to transition block (Refer to drawing 20568-S-311)	No.	4.0		
	(b)	Guardrail backing plate for connection to transition block (Refer to drawing 20568-S-311)	No.	4.0		
<b>Total Carried Forward To Summary</b>						

**SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)**

### C14.3 DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK

Item		Description	Unit	Quantity	Rate	Amount R
C14.3						
C14.3.1		<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>				
		Demolition of concrete members or elements:				
	C14.3.1.1	(a) Full member in half widths, Phase 1 - existing major culvert	m <sup>3</sup>	130.0		
		(b) Full member in half widths, Phase 2 - existing major culvert	m <sup>3</sup>	90.0		
Total Carried Forward To Summary						

SCHEDULE B3 - MAJOR CULVERT C0843 (km 87.5)

SUMMARY OF SECTIONS

Section	Description	Amount (Pounds)
C1.6	CLEARING AND GRUBBING	
C1.7	LOADING AND HAULING	
C3.2	CULVERTS	
C3.3	CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS	
C4.2	CUT MATERIALS	
C11.2	NON-STRUCTURAL GABIONS	
C11.4	ROAD RESTRAINT SYSTEMS	
C11.8	LANDSCAPING AND PLANTING PLANTS	
C13.1	FOUNDATIONS	
C13.2	FALSEWORK, FORMWORK AND CONCRETE FINISH	
C13.3	STEEL REINFORCEMENT	
C13.4	CONCRETE	
C13.7	JOINTS	
C13.8	ANCILLARY STRUCTURAL ELEMENTS	
C13.11	STRUCTURAL STEELWORK FOR MAJOR STRUCTURES	
C14.3	DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK	
	SUBTOTAL	
	Total Carried Forward To Summary Of Schedules	

**SCHEDULE D**

**SMALL CONTRACTOR DEVELOPMENT,  
TRAINING AND COMMUNITY  
LIAISON**

**Schedule D: Stakeholder and Community Liaison, and Targeted Labour and Targeted Enterprises Utilisation and Development**

Number	Item Description	Unit	Quantity	Rate	Amount R
D1000	SMALL CONTRACTOR DEVELOPMENT, TRAINING AND COMMUNITY LIAISON				
D10.01	Target Group Participation				
	(a) Contract Participation Performance bonus	PC Sum	1.0	2000000.00	2000000
D10.02	Stakeholder and Community Liaison and Social Facilitation				
	(a) Cost of liaison, social facilitation and PLC support	PC Sum	1.0	1000000.00	1000000
	(b) Handling cost and profit in respect of sub-item D10.02(a)	%	1000000.00		
D10.03	Tender Process for Targeted Enterprises				
	(a) Contractor's charge for the management and execution of the Targeted Enterprise procurement process:				
	(i) Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading	No	30.0		
	(ii) Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 3 and 4 contractor grading	No	10.0		
	(iii) Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 5 and higher contractor grading	No	5.0		
	(iv) Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise suppliers	No	45.0		
	(b) Targeted Enterprise Procurement Coordinator	Month	21.0		
D10.04	Responsibilities of the Contractor towards Targeted Enterprises				
	(a) Contractor's establishment, management, management support assistance, coaching, guidance, mentoring and supervision of Targeted Enterprises	Month	21.0		
	(b) Targeted Enterprise Construction Manager	Person. month	15.0		
	(c) Targeted Enterprise Site Supervisors	Person. month	150.0		
D10.05	Construction Works by Targeted Enterprises				
	(a) Payments associated with the construction works executed by Targeted Enterprise sub-contractors of CIDB 1 and 2 contractor grading designation appointed in terms of Section D of the Specifications	Prov sum	1.0	12000000.00	12000000
	(b) Handling costs and profit in respect of payment associated with subitem D10.05(a)	%	1200000.00	5.00	600000
Total Carried Forward					

**Schedule D: Stakeholder and Community Liaison, and Targeted Labour and Targeted Enterprises Utilisation and Development**

Number	Item Description	Unit	Quantity	Rate	Amount R
Brought Forward					
D10.06	(c) Fluctuation between the main contractor's rates and that of the Targeted Enterprise sub-contractors	lump sum	1.0		
	(d) Preliminary and General Obligations of Targeted Enterprise sub-contractors appointed in terms of Section D of the Specifications	lump sum	1.0		
	Training, coaching, guidance, mentoring, assistance				
	(a) Training Costs				
	(i) Accredited NQF training	Prov sum	1.0	2000000.00	2000000.00
	(ii) Accredited generic skills training	Prov sum	1.0	2000000.00	2000000.00
	(iii) Community skills training	Prov sum	1.00	2000000.00	2000000.00
	(iv) Handling cost and profit in respect of Subitems D10.06(a)(i),(ii) and (iii)	%	6000000.00		
	(c) Other costs during training	Prov sum	1.0	2000000.00	2000000.00
	(d) Training venue	lump sum	1.0		
Total Carried Forward To Summary					

Schedule D: Stakeholder and Community Liaison, and Targeted Labour and Targeted Enterprises Utilisation and Development

SUMMARY OF SECTIONS

Section	Description	Amount R
D1000	SCHEDULE D: SMALL CONTRACTOR DEVELOPMENT, TRAINING AND COMMUNITY LIAISON	
Total Carried Forward To Summary Of Schedules		

**CALCULATION OF TENDER SUM**



C2.3 SUMMARY OF PRICING SCHEDULE

SCHEDULE A:	ROADWORKS.....	R .....
	(from page .....)	
SCHEDULE B:	BRIDGES .....	R .....
	(from page .....)	
SCHEDULE D:	SMALL CONTRACTOR DEVELOPMENT, TRAINING AND COMMUNITY LIAISON .....	R .....
	(from page .....)	
SUBTOTAL A	.....	R .....
CONTRACT SKILLS DEVELOPMENT GOAL:		
0.25% of Subtotal A.....		R .....
SUBTOTAL B	.....	R .....
VALUE ADDED TAX:		
15% of Subtotal B .....		R .....
<hr/>		
TOTAL CARRIED TO C.1.1.1: FORM OF OFFER		R .....
<hr/>		

SIGNED BY TENDERER: .....

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# PART C3: SCOPE OF WORKS

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PART C3: SCOPE OF WORKS

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SECTION B: SPECIFICATION DATA.....	C3-159
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SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.033-120-2019/1

THE IMPROVEMENT OF NATIONAL ROAD R33 SECTION 12 FROM THE N1 (KM 77.0) TO SECTION 13 MODIMOLLE (KM 0.6) (TOTAL 12.3km)

**SECTION A1: STANDARD AMENDMENTS ISSUED BY COTO**

**Notes to tenderer:**

1. The Standard Specifications for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition) prepared by the Committee of Transport Officials, (COTO), as amended, shall apply to this contract. The amendments are those issued by COTO and reproduced in Section A1, together with additional amendments as set out in Section A2 and Project specific Specification Data as set out in Section B.

As at **30 June 2023** no amendments have been issued by COTO.

SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.033-120-2019/1

THE IMPROVEMENT OF NATIONAL ROAD R33 SECTION 12 FROM THE N1 (KM 77.0) TO SECTION 13 MODIMOLLE (KM 0.6) (TOTAL 12.3km)

**SECTION A2: PROJECT SPECIFICATION AMENDMENTS TO THE COTO STANDARD SPECIFICATIONS**

**Notes to tenderer:**

1. This Section A2 contains amendments to the Standard Specification, including additional clauses, amendment to clauses or deletion of clauses and specifications, required for this particular contract. Where the Standard Specifications allow a choice to be specified in the Contract Documentation or Project Specifications, between alternative materials or methods of construction, and for additional requirements to be specified to suit a particular contract, these selections are not made in this Section A2. Details of such alternatives or additional requirements applicable to this contract are contained in Section B: Specification Data. Section B also contains project specific sections for Sections C, D and E.
2. The number of each clause and each payment item in this part of the project specifications follows the numbering format of the standard specifications.

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<b>COTO CHAPTER 3: DRAINAGE .....</b>	<b>132</b>
<b>COTO CHAPTER 4: EARTHWORKS AND PAVEMENT LAYERS: MATERIALS .....</b>	<b>133</b>
<b>COTO CHAPTER 5: EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION .....</b>	<b>136</b>
<b>COTO CHAPTER 8: PRETREATMENT AND REPAIR OF EXISTING LAYERS .....</b>	<b>138</b>
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**COTO CHAPTER 1: GENERAL****SECTION 1.1: GENERAL PREAMBLE****PART A: SPECIFICATIONS****A1.1.2 DEFINITIONS**

*Replace the Definition for "Site / Site of the Works" with the following:*

"Site / Site of the Works - shall mean the entire road reserve (both new and existing), inclusive of road junctions and property accesses, required for construction of the Works as defined by the limits of construction given in the Contract Documentation. It shall also include areas within statutory building lines where work has to be carried out and any additional lengths of road required for the placement of advanced warning road signs and/or traffic accommodation measures beyond the limits of construction as shown on the drawings. The Site shall also include areas outside of the road reserve required for Construction camps, Engineer's site facilities, Borrow pit areas or quarry areas, haulage and access roads, temporary deviations, storage areas, spoil areas and stockpile areas. The exact extent of the limits of the construction will be verified once the Site is handed over to the Contractor."

**PART C: MEASUREMENT AND PAYMENT****C1.1.3 PAYMENT****C1.1.3.5 Payment for materials on the Site**

*In the last sentence of the 1<sup>st</sup> paragraph, delete the following:*

" , or, in the case of crushed stone which has not been purchased but has been produced on the site, at 80% of a fair evaluation of such crushed material".

*Add the following new subclauses:*

**"C1.1.3.9 Reduced payments for substandard work**

Where provision for reduced payments for sub-standard work is made in the Contract Documentation, acceptance of reduce payment for substandard work may be accepted by the Engineer subject to prior approval by the Employer.

**C1.1.3.10 Procurement of sub-services and omitted rates (Second tier procurement)**

Second tier procurement include the procurement of any work where either the particulars of the work is not scheduled and priced, or where the process of procurement of the sub-service provider is specified elsewhere in the contract specification. It includes the procurement of work where rates have been omitted or where allowance for the work is made under a Provisional sum or Prime sum item or where allowance for the work is made under a Provisional sum or Prime sum item but the particulars of the work is not scheduled, or where work is instructed under clause 13[Variations and Adjustments] or where work is to be performed by Targeted Enterprises.

The following procurement methods is to be followed as appropriate:

- a) **Where the particulars of the work is not scheduled but existing rates for similar work exist in the contract and the work can therefore be executed by the contractor or his sub-contractor at the existing contract rates.**

No separate procurement process is required. The work is to be quantified and scheduled utilising existing rates and approved through the Works Authorisation process.

- b) **Where the payment calculation is based on a formula specified in the contract document, or**

**where the payment rate is pre-determined or fixed by the client.**

No separate procurement process is required. The work is to be quantified and approved through the Works Authorisation process.

- c) **Where the supplier is not selected by the contractor and actual cost is reimbursable and/or no procurement process is possible.**

No separate procurement process is required. The work is invoiced by supplier on completion and approved through the Works Authorisation process at the end of the contract.

- d) **Where there are omitted items as part of the existing scheduled scope of work and no existing rates for similar work exist in the contract, or where there are no existing rates for the materials to be supplied and suitable rates for material to be determined.**

A proposal for a new rate shall be submitted by the contractor and evaluated by the engineer, by comparing with either adjusted relevant rates in the contract, or by comparing with similar rates on similar contracts, or by comparing three informal quotes to substantiate the rate. The new agreed rate is approved through the Works Authorisation process.

- e) **Where the particulars of the work is not scheduled and the estimated cost of the work (including VAT and excluding Contract Price Adjustment) is equal or less than R1,000,000.00 and there are no existing rates for similar work and the contractor's proposal submitted in terms of FIDIC Variation 13.1 is not accepted and the work is to be performed by a sub-contractor.**

A minimum of three quotations shall be obtained from Targeted Enterprises (as defined in Section D1000). The following is the minimum requirements for this process:

- Prequalification for BEE level 1 or 2 and EME or QSE (Approval to deviate must be granted by the Employer, based on market research)
- Quotation to include form of quotation, CSD registration, CIDB (where applicable),

A Works Authorisation shall be approved prior to execution of the work.

- f) **Where the particulars of the work is not scheduled and the estimated cost of the work is more than R1,000,000.00 (including VAT and excluding Contract Price Adjustment) and there are no existing rates for similar work and the contractor's proposal submitted in terms of FIDIC Variation 13.1 is not accepted and the work is to be performed by a sub-contractor.**

The work is to be procured through a tender process. The following is the minimum requirements for this process:

- Prequalification for BEE level 1 or 2 and EME or QSE (Approval to deviate must be granted by the Employer, based on market research)
- Tenders to close at the relevant site offices at a specific date and time
- Tender documents to include form of Offer, CSD registration, Tax compliance, CIDB (where applicable), SBD1, SBD 4, SBD 6.2, BEE certificate, Form A2.2
- Tenders to be evaluated on price and preference
- Evaluation by contractor for review by engineer

A Works Authorisation shall be approved prior to execution of the work.

- g) **Where the particulars of the work is identified by the contractor to be performed by subcontractors who are Targeted Enterprises to form part of the specified Contract Participation Goals for Targeted Enterprises.**

The work is to be procured as per the process specified in clause D1007.



- h) **Where the work is unforeseen, urgent and the relevant procurement method as indicated above will result in a delay to the contract and payment for a claim for extension of time and/or cost, or where the above procurement methods are not applicable or cannot fully be complied with.**

The Employer will determine the most appropriate procurement process to be followed and approved through the Works Authorisation process.”

## **SECTION 1.2: GENERAL REQUIREMENTS AND PROVISIONS**

### **PART A: SPECIFICATIONS**

#### **A1.2.3 GENERAL**

##### **A1.2.3.15 Routine maintenance**

*Add the following new paragraphs:*

“The Contractor’s responsibility for routine maintenance on this contract is indicated in the Contract Documentation.”

The backfilling for patching shall be done as indicated in the Contract Documentation.

The riding quality of gravel deviations shall comply with the requirements indicated in the Contract Documentation.”

*Add the following new subclause after A1.2.3.23:*

##### **"A1.2.3.24 Reference Manuals, other specifications and test methods**

In various chapters of this Standard Specification, reference is made to Manuals, other specifications and test methods. If not otherwise indicated in the Contract Documentation, the latest published Manual, other specification and test methods at time of close of tender will apply. Any changes to be implemented on a project as a result of revisions to manuals, other specifications and test methods, will be handled in terms of the Conditions of Contract.

Certain TRH and TMH documents are published as Sabita Manuals/TRH or Sabita Manuals/TMH publications. Where reference is made to the TRH or TMH document, it shall be read as referring to the latest version of the Sabita Manual/TRH publication or Sabita Manual/TMH publication, respectively.”

#### **A1.2.7 EXECUTION OF THE WORKS**

##### **A1.2.7.1 Programme of work**

###### **a) General**

*Add the following new paragraphs:*

“The contractor shall note that the examination of a road with a view to rehabilitation is normally undertaken a considerable period of time before the commencement of the contract, and that conditions may subsequently change. The engineer will make further examinations during the period of contract, and, depending on the results of such examinations, the quantities of any items of work may be drastically increased or decreased.

The contractor shall base his initial programme for road rehabilitation on the scope of the work as described in the project specifications on the quantities contained in the Pricing Schedule (Part C2).”

**PART C: MEASUREMENT AND PAYMENT**

**(ii) Items that will not be measured separately**

*Replace the wording of item 8 with the following:*  
“8. The design of all temporary work and the construction of all temporary work, unless otherwise indicated in the Contract Documentation.”

Item	Unit
<b>C1.2.7 Road safety audits</b>	

*In the wording of item C1.2.7.2, replace “C1.2.6.1” with “C1.2.7.1”.*

*In the wording of item C1.2.7.4, replace “C1.2.6.3” with “C1.2.7.3”.*

*In the 4<sup>th</sup> paragraph of the item description, replace “C1.2.7.2” with “C1.2.7.3”.*

*Add the following new pay items:*

Item	Unit
<b>C1.2.10 Dispute Adjudication Board (DAB)</b>	

C1.2.10.1 Employer’s contribution to DAB (50%) .....prime cost (PC) sum

The unit of measurement for item C1.2.10.1 is the prime cost sum. Payment of the prime cost sum shall be in terms of FIDIC Clause 13.5 for 50% of the amounts invoiced from the appointed DAB. No sum for overhead charges and profit in terms of FIDIC Clause 13.5(ii) is payable for this item.”

**SECTION 1.3: CONTRACTOR’S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS**

**PART C: MEASUREMENT AND PAYMENT**

Item	Unit
<b>C1.3.1 The Contractor's general obligations</b>	

*Delete subitem C1.3.1.3 and replace with the following:*

“C1.3.1.3	Time related obligations:	
	a) Mobilisation period .....	month
	b) Execution of the works .....	month”

*Add the following pay subitems:*

“C1.3.1.4	Suspension Cost	
	a) De-establishment .....	Number
	b) Re-establishment .....	Number
	c) Suspension period .....	month
	d) Engineer’s cost .....	prime cost sum (PC) sum
	e) Handling cost, profit and all other charges in respect of item C1.3.1.4 (d).....	percent (%)

*Under the heading “Item C1.3.1.3”, delete the 2<sup>nd</sup> paragraph and replace with the following:*

“The contract rate shall include full compensation for that part of the Contractor's general obligations which are mainly a function of construction time. The contract rate shall be deemed to include, leasing costs, hire costs or cost of ownership per month for Contractor's Equipment. The contract rate will be paid monthly, pro rata for parts of a month, from the Commencement Date in terms of the Contract Documentation until the end of the

Mobilisation Period for item C1.3.1.3(a). For item C1.3.1.3(b) the contract rate will be paid monthly, pro rata for parts of a month, from the end of Mobilisation Period until the end of the original Contract Period specified for completion of the Works.”

*Add the following new paragraphs:*

“Item C1.3.1.4

The rates tendered under subitem C1.3.1.4 shall represent full compensation for all Costs for Suspension of Work and all Costs during Suspension of Works period, and no other Costs (including other monthly costs) shall be payable.

Payment of subitems C1.3.1.4(a) and C1.3.1.4(b) shall be made for the number of de-establishments and re-establishments of all Personnel and Goods (Contractor’s Equipment, Materials, Plant and Temporary Works) as instructed by the Engineer. Payment of subitems C1.3.1.4(a) and C1.3.1.4(b) shall not apply during the Mobilisation Period.

Payment of subitem C1.3.1.4(c) shall be made monthly, pro rata for parts of a month, from the date on which the Contractor has suspended progress of all the Works in terms of Conditions of Contract clause 8.8 and commenced with de-establishment of the site, until permission or instruction to proceed in terms of Conditions of Contract clause 8.12 is given. Payment of subitem C1.3.1.4(c) shall not apply during the Mobilisation Period.

The Prime Sum in subitem C1.3.1.4(d) is provided to cover the cost of the Engineer during the period of suspension of the works. The amounts certified by the Employer shall be made to the Engineer, within 30 days of it being certified by the Employer.

The percentage for items C1.3.1.4 (e) is a percentage of the amount spent under the relevant provisional sum item. It shall include full compensation for the handling costs of the Contractor and the profit for providing the specified service.”

**SECTION 1.5: ACCOMMODATION OF TRAFFIC**

**PART A: SPECIFICATIONS**

**A1.5.7 EXECUTION OF THE WORKS**

**A1.5.7.10 Construction of temporary deviations**

**a) General**

*Delete the last paragraph and replace with the following:* “The proposed location, layout, temporary drainage, earthworks, pavement layers, surfacing and ancillary works details of all temporary deviations, including the signage and road marking required, shall be agreed with the Engineer before construction of any temporary deviation commences.”.

**b) Drainage works for temporary deviations**

*In the 2<sup>nd</sup> paragraph in the 1<sup>st</sup> sentence delete “specified” and replace with: “approved”.*

**PART C: MEASUREMENT AND PAYMENT**

Item	Unit
<b>C1.5.4 Construction of temporary deviations</b>	
<i>In the last sentence of the item description, after the words “...include full compensation for the”, add the following: “design and the”.</i>	

**SECTION 1.6: CLEARING AND GRUBBING**

**PART C: MEASUREMENT AND PAYMENT**

**(iii) Items to be measured and paid for using items specified elsewhere in the specifications**

*In Table C1.6-1 for the Preparation of topsoil stockpile sites activity, delete reference to "Chapter 11" and replace with "Chapter 4".*

## **COTO CHAPTER 2: SERVICES**

There are no amendments to this Chapter.

**COTO CHAPTER 3: DRAINAGE****SECTION 3.2: CULVERTS****PART C: MEASUREMENT AND PAYMENT**

Item	Description	Unit
------	-------------	------

**C3.2.2 Backfilling**

C3.2.2.3 Extra over sub-items C3.2.2.1 and C3.2.2.2 for soil cement backfilling

*In sub-item (a), delete "of 3% cement".**In sub-item (b), delete "of 3% cement".*

Item	Description	Unit
------	-------------	------

**C3.2.13 Removing and relaying existing culverts**

*In the 2<sup>nd</sup> paragraph of the item description, delete the wording:  
 "transporting for a haul distance within 5,0 km without additional payment,"  
 and replace with the following:  
 "transporting over a distance of less than and up to 1,0 km,"*

**SECTION 3.3: CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS****PART C: MEASUREMENT AND PAYMENT**

Item	Description	Unit
------	-------------	------

*Add the following pay-item***"C3.3.6 Concrete chutes (typical designs):**

C3.3.6.4	Other chutes (description of type with reference to drawing)	m"
----------	--	----

**COTO CHAPTER 4: EARTHWORKS AND PAVEMENT LAYERS: MATERIALS****SECTION 4.1: BORROW MATERIALS****PART A: SPECIFICATIONS****A4.1.7 EXECUTION OF THE WORKS****A4.1.7.2 Borrow pit and quarry operations****b) Classes of excavation***(iv) Hard excavation**In the 2<sup>nd</sup> bullet after: "Ripping with a bulldozer" add the following:*

"Ripping shall be carried out on typically moderately weathered soft rock (soft rock as defined in Section 12.1 Table A12.1.7-1) that can be efficiently ripped by a bulldozer with a weight of at least 35 tons and minimum nett power of 220 kW."

**SECTION 4.2: CUT MATERIALS****PART A: SPECIFICATIONS****A4.2.3 GENERAL****A4.2.3.2 Contractor prepared plans for cuttings**

*In 1<sup>st</sup> paragraph at the end of the last sentence, add the following as part of the last sentence:*

" , unless otherwise indicated in the Contract Documentation."

**SECTION 4.4: COMMERCIAL MATERIALS****PART A: SPECIFICATIONS****PCA4.4.5 Materials****Add the following new section after subitem A4.4.5.8****A4.4.5.9 New (3rd millennium) Modified Emulsions (NME)**

The material requirements for the different classes of NME given in Table A4.4.5-4.

PCTable A4.4.5-3: Requirements for NMEs

Test(1)	Specimen size, compaction effort and curing	Criteria for NME	
		NME1	NME2
Type of material before stabilisation		45	25
CBR before stabilization (%) <sup>1</sup>			
Grading, P <sub>0.075</sub> , PI, XRD and DMI		Refer to Technical Recommendation for Highways (TRH) 24	

UCS <sub>wet</sub> (150mm Ø) Unconfined Compression Strength) (kPa)	as per test procedure specified for the testing of cementitious stabilising agents (SANS 3001- GR32:2010, 2010).  The curing protocol shall be as per TRH 24 and 7 day normal curing	>2200 <sup>2</sup>	>1200 <sup>2</sup>
Retained Compressive Strength (RCS): (UCS <sub>wet</sub> /UCS <sub>dry</sub> ) (%)		>85	>75
RCS in relation to minimum UCS <sub>wet</sub> (criteria) = RCS <sub>effective</sub> = (RCS x (UCS <sub>wet</sub> /UCS <sub>wet</sub> (criter ia))) (%)		>100	>90
ITS <sub>wet</sub> (Indirect Tensile Strength) (kPa)	as per test procedure specified for the testing of cementitious stabilising agents (SANS 3001- GR32:2010, 2010).  The curing protocol shall be as per TRH 24 and 7 day normal curing  Sample 150mm Ø.	>220 <sup>2</sup>	>180 <sup>2</sup>
Retained Tensile strength (RTS): ITS <sub>wet</sub> /ITS <sub>dry</sub> (%)		>85	>75
RTS in relation to minimum ITS <sub>wet</sub> (criteria) = RTS <sub>effective</sub> = ((RTS x (ITS <sub>wet</sub> /ITS <sub>wet</sub> (criteria))) (%))		>100	>90

1 CBR only used as reference to traditionally used test procedures as a broad first indicator

\*Definitions: UCS = Unconfined Compressive Strength; ITS = Indirect Tensile Strength);

2Criteria based on reference TG2 (Asphalt Academy, 2009)

\*UCS and ITS data is during the construction phase.

#### A4.4.7 EXECUTION OF THE WORKS

##### A4.4.7.1 Selection (design) of the stabilising agent content

##### c) Cementitious stabilising agent for chemical stabilisation

**Step 2: Determine the Initial Consumption of Stabiliser (ICS) of the material.**

*Add the following after the 1<sup>st</sup> paragraph:*

"The ICS shall be determined for more than one stabilizer agent and the stabilizer agent to be utilised in Step 3 shall be selected by the Engineer based on the ICS results."

#### PART C: MEASUREMENT AND PAYMENT

Item	Description	Unit
Add the following new payment item after items C4.4.7.		
PC4.4.8	Provision of NME stabilization product	
PC 4.4.8.1	Cost of procuring	Provisional Sum
PC4.4.8.2	Handling cost and profit in respect of item PC4.4.8.1	%



The tendered rates shall include full compensation for procuring, transporting and delivering the stabilising agent to the site.

The material supplied shall meet the end product specification as per the Section A2: project specification amendments to the COTO standard specifications, Chapter 4 subclause PCA4.4.5.

All haul costs shall be included in the tendered rates of item PC4.4.8

**COTO CHAPTER 5: EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION****SECTION 5.2: FILL****PART C: MEASUREMENT AND PAYMENT**

Item	Description	Unit
------	-------------	------

*Add the following pay-item***“PC5.2.2 Fill Construction***C5.2.2.1 (d) Compaction to 95% of MDD**m<sup>3</sup>”***SECTION 5.3: ROAD PAVEMENT LAYERS****PART A: SPECIFICATION****A5.3.8 WORKMANSHIP****A5.3.8.4 Construction tolerances for pavement layers***Add the following as a new sub-clause:***“f) Surface texture**

The maximum volumetric texture depth (measured as described in SANS 3001-BT11) of the base, shall be as specified in Table A5.3.8-7, for the different seal types to be placed on the base.

**Table A5.3.8-7: Maximum texture of base**

Surfacing type	Max texture depth of the base
Single seal with 10 mm aggregate	0,8
Single seal with 10 mm aggregate (with cover spray)	1,0
Single seal with 14 mm aggregate	0,8
Single seal with 14 mm aggregate (with cover spray)	1,5
Single seal with 14 mm aggregate (with Bitumen rubber)	1,2
Double seal with 10 mm aggregate and sand	1,0
Double seal with 14 mm aggregate and sand	1,5
Cape Seal with 10 mm aggregate and one layer of slurry	1,5
Cape Seal with 14 mm aggregate and one layer of slurry	2,0
Cape Seal with 20 mm aggregate and two layers of slurry	2,5
Double seal with 14 mm aggregate and a layer of 7 mm aggregate	1,5
Double seal with 14 mm aggregate and a layer of 5 mm aggregate	1,5
Double seal with 20 mm aggregate and a layer of 10 mm aggregate	2,0
Double seal with 20 mm aggregate and a layer of 7 mm aggregate	2,0
Double seal with 20 mm aggregate and two layers of 7 mm aggregate	1,5
Other surfacing type (as indicated in the Contact Documentation)	As specified in the Contract Documentation”

**A5.3.8.5 Surface regularity***Add the following to the 1<sup>st</sup> paragraph:*

“The surface regularity shall be assessed on the final prepared layer after all excess fines have been swept off the surface.”

c) By using a profiler

*In the paragraph following Table A3.5.8--6, delete the following: " for payment items \*\*\* \_\_\_\_\_", and replace with the following: "for payment items as specified in the Contract Documentation".*

SECTION 5.5 RECONSTRUCTION OF PAVEMENT LAYERS

PART C: MEASUREMENT AND PAYMENT

Add the following new pay item after C5.5.16.3

Item	Description	Unit
PC5.5.16	In-situ reconstruction of a pavement layer using a recycler to construct a stabilised base layer:	
PC5.5.16.4	NME Emulsion stabilised subbase layer compacted to 102 % of MDD	
	(d) Using pre-pulverised material (as per item C5.5.8) compacted to _____ mm thick cubic metre (m3)	

Amend the payment description as follows. Replace the first sentence of the forth paragraph of the payment description “The tendered rates for items C5.5.14.1d), C5.5.14.2d) and C5.5.14.3d); items C5.5.15.1d), C5.5.15.2d) and C5.5.15.3d) and items C5.5.16.1d), C5.5.16.2d) and C5.5.16.3d)...” with “The tendered rates for items C5.5.14.1d), C5.5.14.2d) and C5.5.14.3d); items C5.5.15.1d), C5.5.15.2d) and C5.5.15.3d) and items C5.5.16.1d), C5.5.16.2d) C5.5.16.3d) and **C5.5.16.4d)**...”

**COTO CHAPTER 8:     PRETREATMENT AND REPAIR OF EXISTING LAYERS**

**SECTION 8.1:           PRIME COAT**

**PART A:     SPECIFICATION**

**A8.1.5       MATERIALS**

**A8.1.5.1     Bituminous material**

*In Table A8.1.5-1 Delete “the excavated area” in the table caption and heading.*

**A8.1.8       WORKMANSHIP**

**A8.1.8.2     Testing**

*Replace the last sentence of the 1<sup>st</sup> paragraph with the following: “Unless agreed in advance and in writing, the Contractor shall only spray when the Engineer’s representative is present.”*

**COTO CHAPTER 9:     ASPHALT LAYERS**

**SECTION 9.1:           ASPHALT LAYERS**

**PART A:     SPECIFICATION**

**A9.1.5       MATERIALS**

**A9.1.5.4     Aggregates**

**a)     Aggregate properties**

*In the 1<sup>st</sup> paragraph, delete the 2<sup>nd</sup> sentence: “Coarse and fine aggregate shall be clean and free from decomposed materials, vegetable matter or any other deleterious substances, and shall meet the requirements listed in Table A9.1.5-1 below unless otherwise specifically stated in the Contract Documentation.”, and replace with the following:*

*“Coarse and fine aggregate shall be clean from excess dust and free from decomposed materials, vegetable matter and any other deleterious substances such as clay lumps and organic matter and shall meet the requirements listed in Table A9.1.5-1 below unless otherwise specifically stated in the Contract Documentation.”.*

**A9.1.8       WORKMANSHIP**

**A9.1.8.4     Surface regularity**

**a) Measured using inertial laser profilometers**

*In the 6<sup>th</sup> paragraph add the following prior to “The applicable Full Payment Bracket ...”:*

“For the Asphalt Base the values in Payment Bracket 6 in Table A9.1.8-3 shall be applied as the payment adjustment factors for the Asphalt Base on the contract or section, and for the Asphalt Surfacing”.

*In the 6<sup>th</sup> paragraph add the following after “...assessment of the base as per Clause A5.3.8.5c) of Chapter 5 for granular bases”:*

“, and this clause A9.1.8.4a) for Asphalt bases.”

*In the 7<sup>th</sup> paragraph, delete: “under 1”.*

*Add the following after the 8<sup>th</sup> paragraph:*

“Where the asphalt surfacing is placed on a surface, other than a granular or asphalt base, constructed by the Contractor through mill and replace or patching, the surface regularity of the replaced or patched surface shall be measured before the surfacing is placed. Should the IRI values per 100m section so determined be better than the IRI values of the original surfacing for the particular 100m section, the measured values shall be used for the  $IRI_{b\ Ave}$  in the above calculation. Should the IRI values per 100m section so determined be worse than the IRI values of the original surfacing for the particular 100m section, the IRI values of the original surfacing shall be used for the  $IRI_{b\ Ave}$  in the above calculation.”

*In the 9<sup>th</sup> paragraph, delete : “surfacing”.*

*For Table A9.1.8-3, delete “surfacing” in the heading and add the following additional Payment Bracket to Table A9.1.8-3*

<b>“Target <math>IRI_{100m\ Ave}</math> (m/km)”</b>	<b>Payment Bracket 9</b>
< 0.80	1.050
0.81 to 0.90	1.050
0.91 to 1.00	1.050
1.01 to 1.10	1.050
1.11 to 1.20	1.050
1.21 to 1.30	1.050
1.31 to 1.40	1.050
1.41 to 1.50	1.050
1.51 to 1.60	1.050
1.61 to 1.70	1.025
1.71 to 1.80	1.010
1.81 to 1.90	1.000
1.91 to 2.00	0,990
2.01 to 2.10	0,975
2.11 to 2.20	0,955
2.21 to 2.30	0,930
2.31 to 2.40	0,900
2.41 to 2.50	0.865
>2.51	Reject”

**COTO CHAPTER 10: SURFACE TREATMENTS****SECTION 10.1: GENERAL REQUIREMENTS FOR SURFACE TREATMENTS****PART A: SPECIFICATION****A10.1.3 GENERAL****A10.1.3.2 Weather limitations**

*Delete the 1<sup>st</sup> sentence of the 2<sup>nd</sup> paragraph, and replace with the following:*  
 “No seal work will be allowed in the Seal Embargo Period defined in the Contract Documentation, unless otherwise specified in the Contract Documentation.”.

**A10.1.3.14 Nominal rates of application for tender purposes**

*In the 1<sup>st</sup> sentence of the 2<sup>nd</sup> paragraph, after the wording: “...used in the various types of seals”, add the following: “, as specified in the Contract Documentation”.*

e)

**g) Cover sprays**

*Replace the 1<sup>st</sup> paragraph with the following:* “The nominal application rate of a diluted emulsion cover spray (50/50) as specified, shall for tender purposes be 0,8 l/m<sup>2</sup> residual cold bitumen.”.

**A10.1.5 MATERIALS****A10.1.5.7 Precoating fluid**

*Add the following new paragraph:* “The precoating fluid shall be a low viscosity bitumen-based product containing petroleum cutters and a chemical adhesion agent. It shall comply with the specifications as provided in the SABITA Manual 30: Requirements for stone precoating fluids.”.

**A10.1.6 CONSTRUCTION EQUIPMENT****A10.1.6.1 Binder distributor**

*In the last paragraph replace the 1<sup>st</sup> sentence with the following:* “The transverse distribution of spray flares shall be field verified according to SANS 3001-BT25 and Clause A20.1.5.9 of Chapter 20 and by visual observations to ensure a uniform transverse distribution of binder.”.

**A10.1.6.2 Chip spreaders**

*In the last paragraph delete the 2<sup>nd</sup> bullet and replace with the following:*  
 “- of spreading Grade C aggregate, Graded aggregate and Sand- or Grit seals.”.

**PART C: MEASUREMENT AND PAYMENT**

Item	Description	Unit
<b>C10.1.2</b>	<b>Single seals including a cover spray, if specified (indicate grade of aggregate and type of binder) spreading the aggregate by (state: walk behind spreader or by hand):</b>	

*Replace the 1<sup>st</sup> two item description paragraphs with the following:*  
 “The unit of measurement for item C10.1.1 and C10.1.2 shall be square metre of completed and accepted seal in accordance with the approved method statement and additional instructions.”.

The nominal rates for single seals indicated in A10.1.3.14(a) and for cover sprays indicated in A10.1.3.14(g), shall apply.”.

**C10.1.3 Multiple stone seals including a cover spray, if specified using:**

*Replace the 1<sup>st</sup> sentence of the 2<sup>nd</sup> paragraph of the item description, with the following:*  
“The nominal rates for multiple stone seals indicated in A10.1.3.14(b) and for cover sprays indicated in A10.1.3.14(g), shall apply.

**C10.1.4 Embargo period effects**

*In the 1<sup>st</sup> paragraph of the item description, delete reference to: “C10.1.6.1”, and replace with: “C10.1.4.1”.*

*In the 2<sup>nd</sup> paragraph of the item description, delete reference to: “C10.1.6.2”, and replace with: “C10.1.4.2”.*

**C10**

**C10.1.11 Application of cover spray**

*In the 2<sup>nd</sup> paragraph of the item description, delete reference to: “A10.1.3.15”, and replace with: “A10.1.3.14”.*

**C10.1.12 Application of cover spray by hand**

*In the 2<sup>nd</sup> paragraph of the item description, delete reference to: “A10.1.3.15”, and replace with: “A10.1.3.14”.*

**COTO CHAPTER 11: ANCILLARY ROAD WORKS****SECTION 11.2: NON-STRUCTURAL GABIONS****PART C: MEASUREMENT AND PAYMENT***Add the following pay item:*

Item	Unit
<b>"C11.2.4 Geotextile (Type and grade indicated)</b>	<b>m<sup>2</sup>"</b>

**SECTION 11.4: ROAD RESTRAINT SYSTEMS****PART A: SPECIFICATION****A11.4.1 SCOPE***Delete the last paragraph, and replace with the following:*

"Moveable vehicle restraint systems required for traffic accommodation during construction and truck mounted attenuators are also specified in Clauses A1.5.6.1, A1.5.6.3 and A1.5.7.11 of Chapter 1."

**PART C: MEASUREMENT AND PAYMENT**

Item	Unit
------	------

**C11.4.2 Performance based vehicle restraint systems**

*Where the Concrete barrier system is utilised as temporary restraint systems for Traffic Accommodation and scheduled under C1.5 in the Pricing Schedule, the unit of measure shall be metre.month.*

**SECTION 11.6: ROAD SIGNS****PART A: SPECIFICATION****A11.6.7 EXECUTION OF THE WORKS****A11.6.7.5 Erecting road signs****b) Excavation and backfilling**

*In the 1<sup>st</sup> sentence of the 2<sup>nd</sup> paragraph, before "Section A13.4 of Chapter 13", add the following:*

*"Section A13.2, Section A13.3 and".*

**PART C: MEASUREMENT AND PAYMENT**

Item	Unit
------	------

**C11.6.1 Road signboards with painted or coloured semi-matt background. Symbols, lettering, and borders in semi- matt black or in Class I retro-reflective material, where the sign board is constructed from:**

*Add the following new pay item:*

**"C11.6.1.13 Moveable barricade/road sign combination (signboard material, background, symbol retro-reflective class and size indicated)**  
**number (No)**



The unit of measurement for item C11.6.1.13 shall be the number of moveable barricades, complete with road signs provided.  
The tendered rate for item C11.6.1.13 shall include full compensation for providing and erecting each moveable barricade and signs and shall also include full compensation for moving the barricade as and when required.”

**SECTION 11.7: ROAD MARKINGS AND ROAD STUDS**

**PART A: SPECIFICATION**

**A11.7.5 MATERIALS**

**A11.7.5.2 Materials**

**a) Marking materials**

*(iii) Thermoplastic road marking material*

*In the 4<sup>th</sup> paragraph, delete “mcd/m<sup>2</sup>.lux” and replace with “mcd/m<sup>2</sup>/lux”.*

**PART C: MEASUREMENT AND PAYMENT**

Item	Unit
<b>C11.7.3 Thermoplastic road marking</b>	
<i>Amend the retro-reflective luminance unit to be “mcd/m<sup>2</sup>/lux”.</i>	

COTO CHAPTER 12: GEOTECHNICAL APPLICATIONS

SECTION 12.5: SHOTCRETE

PART A: SPECIFICATION

A12.5.7 EXECUTION OF THE WORKS

Preconstruction trial panels

Add “A12.5.7.21” before the heading “Preconstruction trial panels”.

PART C: MEASUREMENT AND PAYMENT

Item	Unit
------	------

C12.5.4 Shotcrete (of specified thickness or volume):

Amend the unit for item C12.5.4.4 Dental shotcrete, to “cubic metre (m³)”.

SECTION 12.6: MECHANICALLY STABILISED EARTH AND GABIONS

PART A: SPECIFICATION

A12.6.8 WORKMANSHIP

A12.6.8.1 MSE Walls

b) Concrete facings

Replace the letter “W” with “durability” in the first sentence.

SECTION 12.10: HARD EXCAVATION BY BLASTING

PART A: SPECIFICATION

A12.10.5 MATERIALS

A12.10.5.1 Explosives

b) Controlled bulk blasting

Add the following at the end of the 2<sup>nd</sup> paragraph:  
“The use of pumped emulsions for controlled bulk blasting will only be permitted if emulsion ingress into rock fissures is prevented and the emulsion is encapsulated and separated from the blast hole.”.

PART C: MEASUREMENT AND PAYMENT

Item	Unit
------	------

C12.10.1 Excavation in hard rock using controlled blasting techniques

Add the following at the end of the pay item specification:

“Where the excavated material is not to be utilised in earthworks or layerworks, the volume measured for payment shall be the tight volume of excavated material.”.

Add the following new pay item:

Item	Description	Unit
------	-------------	------

C12.10.8	Ground vibration, air blast and fly rock monitoring	lump sum
----------	---	----------

The unit of measurement for the monitoring as required shall be the lump sum.  
The tendered rate shall include for the monitoring of all blasts as per the specification and shall include the services of an independent specialist, providing and operating all equipment necessary to successfully monitor all blasting operations and for compilation of all reports.”

**SECTION 12.11: GEOSYNTHETICS**

**PART A: SPECIFICATION**

**A12.11.5 MATERIALS**

*Add the following sub-clause:*

**“A12.11.5.4 Grade Classification**

The Grade classification for Geosynthetics is specified in the Contract Documentation.”

## **COTO CHAPTER 13: STRUCTURES**

### **SECTION 13.1: FOUNDATIONS**

#### **PART A: SPECIFICATION**

##### **A13.1.7 EXECUTION OF THE WORKS**

###### **A13.1.7.2 Excavation**

###### **b) General**

**Amend the first paragraph to read as follows:**

*“This work shall include excavations not provided for elsewhere in these specifications, which are required for founding the structures as well as for excavation required in respect of demolition, extension or modification of existing bridges and culverts, as well as general siltation earthworks clearing and waterway channelling earthworks at existing bridges and culverts.”*

#### **PART B: LABOUR ENHANCEMENT**

##### **B13.1.7 EXECUTION OF THE WORKS**

###### **B13.1.7.4 Utilization of excavated material**

*Delete reference to: “100 m” and replace with “50 m”.*

### **SECTION 13.2: FALSEWORK, FORMWORK AND CONCRETE FINISH**

#### **PART A: SPECIFICATION**

##### **A13.2.7 EXECUTION OF THE WORKS**

###### **A13.2.7.3 Removing the falsework and formwork**

*Add the following point 3 under item (b) (i) :*

*“3. A minimum of 80% of the specified 28-day concrete strength.”*

### **SECTION 13.3: STEEL REINFORCEMENT**

#### **PART A: SPECIFICATION**

##### **A13.3.8 WORKMANSHIP**

###### **A13.3.8.4 Tolerances**

###### **b) Concrete cover**

*Delete reference to “Clause A13.4.8.1a)(iv)” and replace with: “Clause A13.4.8.1a)(v)”.*

### **SECTION 13.4: CONCRETE**

#### **PART A: SPECIFICATION**

##### **A13.4.2 DEFINITIONS**

###### **Fresh phase of concrete**

*Add the following at the end of the definition of “Fresh phase of concrete”:*

*“This is also known as the plastic phase.”*

Add the following definition between “Fresh phase of concrete” and “Hardened phase of concrete”:

“**Hydration or curing phase** – this is concrete that is no longer a semi-liquid but has not yet reached a solid state.”

**A13.4.7 EXECUTION OF THE WORKS**

**A13.4.7.12 Placing and Compaction**

**b) Placing**

Delete the 3<sup>rd</sup> sentence of the 1<sup>st</sup> paragraph and replace with the following:

“The Contractor shall not be permitted to pour unless the specific method statement for that pour has been accepted by the Engineer.”

**PART C: MEASUREMENT AND PAYMENT**

Item	Unit
------	------

**C13.4.1.2 Durable Concrete (class D) cubic metre(m³)**

Replace paragraph (a) with:

“Indicate part of structure, class code and 28-day characteristic cylinder strength/characteristic compressive cube strength, nominal aggregate size and environmental exposure e.g., Deck slab D32/40-20-XC4”

Item	Unit
------	------

**C13.4.3.2 Durable Concrete (class D) cubic metre(m³)**

Replace paragraph (a) with:

“Indicate part of structure, class code and 28-day characteristic cylinder strength/characteristic compressive cube strength, nominal aggregate size and environmental exposure e.g., Deck slab D32/40-20-XC4”

**SECTION 13.8: ANCILLARY STRUCTURAL ELEMENTS**

**PART A: SPECIFICATION**

**A13.8.7 EXECUTION OF THE WORKS**

**A13.8.7.2 Drainage for structures**

**d) Crushed stone in drainage strips behind walls**

Delete “19 mm nominal size” and replace with “20 mm nominal size”.

**PART C: MEASUREMENT AND PAYMENT**

Add the following new payments item:

Item	Unit
------	------

**C13.8.18 Bitumen impregnated burlap metre(m)**

The unit of measurement shall be the linear metre of burlap, of specified width, installed over culvert joints over the outer surfaces of the top slabs and culvert sides. The tendered rate shall include full compensation for all material labour and equipment to supply and attach the burlap, as shown on the drawings.”

Item	Unit
<b>C13.8.19 Additional items required for the buried joint as per the drawings</b>	<b>Lump Sum</b>

The unit of measurement shall be a lumpsum to provide the materials as specified and installed. These are all reinforcement grids under the asphalt layer, the PVC plastic sheeting, Jointex, Buthene seal or similar, all tempered hardboard, 3 play Malthoid and all steel R16 galvanised tie bars with Denso tape as specified on the drawings for the jockey slab buried joint. The tendered rate shall include full compensation for all material labour and equipment to supply and install the materials, as shown on the drawings.”

COTO CHAPTER 14: REPAIR AND REHABILITATION OF STRUCTURES

SECTION 14.2: CORROSION SURVEY METHODS AND TESTING OF NEAR SURFACE CONCRETE PROPERTIES

PART C: MEASUREMENT AND PAYMENT

Item	Unit
------	------

C14.2.1 Delamination Survey

Add the following at the end of the pay item specification:

“The tendered rate for delamination survey using extracted core samples, shall also include the establishment of coring equipment, the moving of the coring equipment, the coring of samples and the filling and repairing of the cored holes.”

Item	Unit
------	------

C14.2.3 Concrete compressive strength

Add the following at the end of the pay item specification:

“The tendered rate for concrete compressive strength testing using extracted core samples, shall also include the establishment of coring equipment, the moving of the coring equipment, the coring of samples and the filling and repairing of the cored holes.”

Add the following new payment items:

Item	Unit
------	------

C14.2.9 Establishment of site for core drilling ..... Lump Sum

The tendered lump sum shall include full compensation for the establishment on the site and subsequently removing all the equipment required for conducting the core drilling. This cost does not vary with the quantity of work to be done.

The tendered lump sum shall include full compensation for establishment on the site and the subsequent removal of all special equipment and plant for drilling the cores, the cost of which does not vary with the actual amount of work to be done.

This work will be paid for by way of a lump sum, 70 % of which will become payable when all equipment is on the site and the first core has been drilled. The remaining 30 % will become payable after all holes have been grouted and equipment removed from site.

Item	Unit
------	------

C14.2.10 Moving equipment and assembling it at each location where cores are to be drilled ..... Number (No)

The unit of measurement shall be the number of locations to which the core-drilling equipment is to be moved and at which it has to be assembled.

The tendered rate shall include full compensation for the cost of moving and assembling the equipment.

Item	Unit
------	------

C14.2.11 Drilling of 100mm dia. concrete cores ± 150mm deep in concrete..... Number (No)

The unit of measurement shall be the number of cores drilled.

The tendered rate shall include full compensation for drilling, storing and transporting the cores to the laboratory for testing.

Item	Unit
C14.2.12    Microscopic analysis of concrete .....	Number (No)

The unit of measurement shall be the number of cores tested, analysed, and reported on.

The tendered rate shall include full compensation for all labour, material and equipment required to execute the work including all testing and reporting by an approved laboratory.

- The tendered rate shall include full compensation for performing the following testing:
- (a)    Visual characterisation/crack profiling.
  - (b)    Density measurement of concrete.
  - (c)    Scanning electron microscopy (SEM) and Energy dispersive spectroscopy (EDS) in accordance with ASTM C1723-16 for:
    - (i)    Micro-crack profiling.
    - (ii)    Characterise concrete mix.
    - (iii)    Elemental mapping; and
    - (iv)    Chloride profiling and carbonation depth analysis.
  - (d)    Alkali Silica Reaction (ASR) testing

The tendered rate shall also include the provision of a technical report of findings for all cores confirming the degree of damage and identifying sections that are beyond repair. The report shall make suggestions and recommendation of the repairs to the Engineer for consideration.

**SECTION 14.3:                    DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE**

**PART A:    SPECIFICATION**

**A14.3.7    EXECUTION OF THE WORKS**

**A14.3.7.3    Demolition of entire structural members**

**a)    Concrete members**

*Add the following after the 3<sup>rd</sup> paragraph:*  
“If the concrete is to be re-used and not removed to a disposal site, the requirements shall be indicated in the Contract Documentation.”

**SECTION 14.7:                    PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE**

**PART C:    MEASUREMENT AND PAYMENT**

*Add the following new payment items:*

Item	Unit
C14.7.5    Application of cement based waterproofing slurry	
(i)    To all areas as directed by the Engineer on site .....	square metre (m <sup>2</sup> )

The unit of measurement shall be the square meter of all surface area to be coated, as specified. For payment purposes, the surface area shall be measured once only, irrespective of the number of layers of protective coating to achieve the specified application rate.

The tendered rate shall include full compensation for the cleaning and preparation of the substrate, in accordance with the specifications of the product supplier. The rate is fully inclusive, but not limited to cover all labour, materials, equipment, additional safety



measures, storage, mixing, application and curing of the protective coating, as well as cleaning and the disposal of unused or rejected materials and all incidentals required to execute the work as specified, all to the satisfaction of the Engineer.

**CHAPTER 15 BRIDGE MONITORING INSTALLATION****SECTION 15.1 BRIDGE MONITORING INSTALLATION****PART A: SPECIFICATION****A15.1.1: SCOPE**

This section covers the requirements for the installation of the bridge monitoring equipment as per the Structural Monitoring Drawings. (Drawing Number: 20568-S-118) The scope of work consists of the installation and commissioning of all the equipment and instrumentation required for the Structural Health Monitoring System for the Groot Nyl River Bridge.

The instrumentation will be sourced and supplied under a separate SANRAL research project (1002-58600-2018 P7a2) and the installation of the sensors will be done by researchers on this project. The logging and analysis of data from this structural health monitoring system is also included as part of the research project.

The Contractor will need to provide general assistance to the researchers during the sensor installation. Assistance will be required from the Contractor by providing access to the site and bridge for the sensor installation; providing adequate notification of the construction program to allow for the timely installation of the sensors; allowing for time and space on the bridge to allow for the installation of the sensors before casting; taking care during casting and construction to ensure that no sensors are damaged. The Contractor shall ensure that the construction programme accommodates the sensors installation in order that the sequence of events during the construction phase is not compromised at any stage.

The Contractor shall be responsible for the supply and installation of all ancillary components linked to the Structural Health Monitoring system which include:

- (a) Ducting
- (b) Power supply system (including solar panels, mounting brackets, batteries)
- (c) Reference structures (see Drawing Number: 20568-S-118)
- (d) Concrete for additional testing (these additional tests will be done at the laboratories of University of Pretoria)
- (e) Watertight storage cupboards
- (f) Grouting of ducts
- (g) Permanent weather station
- (h) The installation of the Structural Health Monitoring System will assist with the following:
- (i) Verifying and adjusting the design parameters during the construction process and defects liability period.

Medium term monitoring for the first 7 years after construction for further monitoring and research by the Employer. The Contractor will not be responsible for this monitoring, however, is required to leave the system in a workable condition after construction.

As part of the Structural Health Monitoring System, the following is required to be measured:

- (a) The movement of the abutment wall with respect to the base of the central abutment pile.
- (b) Deck temperatures to enable the calculation of the effective deck temperature.
- (c) The strain in the longitudinal and transverse directions of the deck.
- (d) Earth pressures behind the abutment and under the approach slabs.
- (e) The cable tension in the prestressing cables.
- (f) External temperature, atmospheric pressure, humidity, wind speed and wind direction at the Site during and after construction.

During the construction period, the Contractor shall utilise batteries to supply power to the monitoring equipment and instrumentation. The Contractor shall ensure that the batteries are always sufficiently charged to power the equipment for the entirety of the construction period. Before construction is finalised, and before the defects liability period commences, the Contractor shall install solar panels on the bridge fascia beams to supply sufficient charge to the batteries powering the equipment. The solar panels and batteries shall be

designed to provide a minimum 5-year maintenance-free period following construction completion.

The logging systems, batteries and cables tying into the logging system shall be enclosed in waterproof storage cupboards with a water tightness rating IP66. These storage cupboards are to be bolted to the deck concrete at suitable locations to be identified by the Contractor.

To be able to reference the data obtained from the Structural Monitoring System to specific events during construction, the Contractor shall create an accurate Site Diary indicating the timing of construction events including, but not limited to, the following events:

- (i) Date and time of concrete pours

**A15.1.2 EQUIPMENT**

The following equipment will be installed for the Structural Health Monitoring System for the Groot Nyl River Bridge:

- (a) Shape Accel Arrays placed in 2 x 15 m long in the centre of each abutment to monitor the abutment moment with reference to the base of the central pile.
- (b) Thermistor Strings placed in the deck to enable the calculation of the effective deck temperature.
- (c) Earth pressure cells placed behind the abutment and under the approach slab to measured changes in earth pressure over time.
- (d) Vibrating Wire Strain Gauges placed in the deck measuring strain in the longitudinal and transverse direction.
- (e) Cable Strand Meters placed on prestressing cable to monitor cable forces during launching; and
- (f) Weather Stations at each abutment to measure temperature, atmospheric pressure, humidity, wind speed and wind direction.

**A15.1.3 REFERENCE STRUCTURES**

The Contractor will be required to construct Reference Structures at the side of the bridge to be used to determine the free shrinkage and temperature effects on the concrete under site conditions. Details of these Reference Structures are provided in the Structural Monitoring Drawings.

The Reference Structures will be rectangular blocks cast from the same batch of concrete used for the deck of the bridge. These blocks shall be supported on a concrete support which will allow negligible friction to act on the surfaces of the References Structures.

**PART C: MEASUREMENT AND PAYMENT**

Item	Unit
<b>C15.1.1 Shape Accel Array installation:</b>	
(b) Installation of 15 m long Measurand Shape Accel Array with 500 mm segments including all sleeves and grouting, as per Structural Monitoring Drawing (Drawing Number: 20568-S-118.....	Lump Sum
The tendered rate shall include full compensation for assistance with the installation of a Measure Rand Shape Accel Array including the supply and installation of a 100mm dia. steel sleeve installed from the base of the central pile to the top of the abutment, and then the grouting of this sleeve with bentonite once the Shape Accel Array is installed. The supply of the Shape Accel Array is not part of this contract.	
Item	Unit
<b>C15.1.2 Vibrating Wire Strain Gauges:</b>	
(a) Installation of Vibrating wire strain gauges.....	Lump sum

The tendered rate shall include full compensation for supplying labour to assist with the installation of embedded vibrating wire strain gauges. The supply of the vibrating wire strain gauges is not part of this contract.

**Item** **Unit**

**C15.1.3                      Thermistor strings:**

(a) Installation of Thermistor strings.....Lump sum

The tendered rate shall include full compensation for supplying labour to assist with the installation of embedded thermistor strings. The supply of the thermistor strings is not part of this contract.

**Item** **Unit**

**C15.1.4                      Cable strand meter:**

(a) Installation of strand meter..... Lump sum

The tendered rate shall include full compensation for supplying labour to assist with the installation of the strand meters. The supply of the strand meters is not part of this contract.

**Item** **Unit**

**C15.1.5                      Pressure cells:**

(a) Installation of earth pressure cells.....number

The tendered rate shall include full compensation for supplying labour to assist with the installation of the earth pressure cells. The supply of the earth pressure cells is not part of this contract.

**Item** **Unit**

**C15.1.6                      Loggers:**

(a) Installation of loggers.....Lump sum

The tendered rate shall include full compensation for supplying labour to assist with the installation of the loggers. The supply of the loggers is not part of this contract.

**Item** **Unit**

**C15.1.7                      Batteries, chargers, and solar panels:**

- (a) 12Volt 102Ah deep cycle battery to charge loggers including battery box and blanket.....number
- (b) Optimate 6 trickle charger.....number
- (c) 300 W solar panel.....number

The tendered rate shall include full compensation for supplying and installation of the batteries, keeping spare batteries charged, and swapping charged batteries out every two months.

The tendered rate for Item PC15.1.7 (c) shall include full compensation for supplying and installation of a minimum 300 W solar panel, including all costs for mounting the panel on the location specified in the Structural Monitoring Drawings.

The Contractor shall install the solar panels, using the necessary brackets or equipment, such that the panels face an East-West direction when placed on the deck. The tendered lump sum shall include full compensation for supplying all labour, and equipment to install these solar panels in the desired directions and locations.

Item	Unit
<b>C15.1.8                      Watertight storage cupboards:</b>	
(a) Schneider Electric (or similar approved) 300x800x1000mm watertight stainless-steel box, water tightness rating IP66 bolted to concrete.....	number
The tendered rate shall include full compensation for supplying all the materials, labour, and equipment and install the watertight storage cupboard.	
<b>Item</b>	<b>Unit</b>
<b>C15.1.9                      Ducting in deck and piers for sensor cables:</b>	
(a) 110mm diameter KayDuct (or similar approved).....	metre (m)
(b) 110mm diameter steel pipe with end cap (4mm thick).....	metre (m)
The unit of measurement shall be the metre of duct for each type and size installed.	
The tendered rate shall include full compensation for supplying all material, labour, and equipment and install the ducting.	
<b>Item</b>	<b>Unit</b>
<b>C15.1.10                      Grouting of ducting in deck and piers for sensor cables:</b>	
(a) Grouting of ducts with bentonite.....	cubic metre (m <sup>3</sup> )
The unit of measurement shall be cubic metre of bentonite grout.	
The tendered rate shall include full compensation for supplying all material, labour, and equipment to grout the sensor ducts with bentonite.	
<b>Item</b>	<b>Unit</b>
<b>C15.1.11                      Bridge monitoring reference structures:</b>	
(a) Bridge monitoring reference structures completed as per Structural Monitoring Drawing Number: 20568-S-118.....	Lump sum
The tendered lump sum shall include full compensation for supplying all material, labour, and equipment to construct the concrete reference structures as per the Structural Monitoring Drawings cast with concrete from the relevant structural pour. The tendered lump sum shall include full compensation for the concrete, formwork and reinforcement required to cast the necessary structures.	
<b>Item</b>	<b>Unit</b>
<b>C15.1.12                      Material testing:</b>	
(a)    Compression cubes (150x150mm) .....	number
(b)    Concrete E value (150mm dia. cylinder) .....	number
(c)    Split cylinder (150mm diameter cylinder) .....	number
(d)    Modulus of rupture (100x100x300 Beam) .....	number
(e)    Concrete coefficient of thermal expansion .....	number
(f)    Concrete shrinkage .....	number
(g)    Concrete creep (150mm dia. cylinder) .....	number

The tendered rate shall include full compensation for supplying all the materials, labour, and equipment to make the concrete specimens as per the required SANS testing procedure.

Item	Unit
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<b>C15.1.13</b>	<b>Weather station:</b>
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(a) ClimaVUE50 weather Station (or similar approved).....	number
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The tendered lump sum shall include full compensation for supplying and installing a CimaVUE50 (or similar approved) weather station. The weather station must be able to monitor solar radiation. Price to include connecting the weather station to the Campbell Scientific logging system.

Item	Unit
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<b>C15.1.14</b>	<b>Bridge monitoring handling fee:</b>
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(a) Contractors charges and profit associated with the bridge monitoring .....	lump sum
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The tendered lump sum shall include full compensation for the Contractor’s charges and profits associated with the bridge monitoring

## **COTO CHAPTER 20: QUALITY ASSURANCE**

### **SECTION 20.1: TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP**

*Replace all references to "TMH5" in this section with: "SABITA Manual 37 / TMH5".*

#### **PART A: SPECIFICATION**

##### **A20.1.2 DEFINITIONS**

###### **Independent site laboratory**

*In the definition of "Independent site laboratory", add the following:*

"Independent Site laboratory in COTO is equivalent to the combined laboratory in the Employer documentation"

##### **A20.1.4 PUBLISHED TEST METHODS**

###### **A20.1.4.8 Testing of asphalt**

*Add the following new paragraph:*

"Sabita Manual 39: Laboratory Testing Protocols for Binders and Asphalt, shall be implemented together with the asphalt tests listed."

*Delete reference to: "Sabita Manual 35 for Design and Use of Asphalt in Road Pavements: Determining the Richness Modulus of EME asphalt mixes."  
and replace with "Sabita Manual 33 for Design Procedure for High Modulus Asphalt (EME): Determining the Richness Modulus of EME asphalt mixes."*

##### **A20.1.7 ACCEPTANCE CONTROL BY STATISTICAL JUDGEMENT PRINCIPLES**

###### **A20.1.7.2 Taking samples**

###### **c) Stratified random sampling**

*Add the following new paragraph:*

"Where the SARDS Laboratory module is used, the sampling locations must be as per the software. The Engineer may specify additional sampling locations."

###### **d) Minimum samples per lot**

*Add the following new paragraph:*

"Where the SARDS Laboratory module is used, the number of samples per lot must be as per the software, as a minimum. The Engineer may specify additional numbers of samples. The Number of samples must be sufficient to meet the requirements of TMH5."

#### **PART C: MEASUREMENT AND PAYMENT**

##### **C20.1.5 Financial contribution for an independent site/commercial laboratory**

*Delete reference to: "/commercial".*

Add the following new pay item:

“Item	Unit
<b>C20.1.6      Payment of independent site laboratory</b>	
C20.1.6.1      Direct payment by contractor ..... prime cost (PC) sum a)      Handling cost and profit in respect of item C20.1.6.1 ... percentage (%)	

The contractor shall pay the appointed site laboratory monthly for the amount as certified by the Engineer.

The charge or mark-up tendered or allowed for is a percentage of the amount actually paid under the prime cost item. The percentage shall cover all the Contractors’ sourcing, handling, profit, and payment of the service provider in providing the services. The Contractor shall forfeit his mark-up when the service provider is not paid in time.”



## **SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED**

CONTRACT SANRAL R.033-120-2019/1

THE IMPROVEMENT OF NATIONAL ROAD R33 SECTION 12 FROM THE N1 (KM 77.0) TO SECTION 13 MODIMOLLE (KM 0.6) (TOTAL 12.3km)

### **SECTION B: SPECIFICATION DATA**

#### **Notes to tenderer:**

1. In certain clauses, the Standard Specifications allow a choice to be specified in the Contract Documentation or Project Specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternatives or additional requirements applicable to this contract are contained in this Section B: Specification Data.
2. The number of each clause and each payment item in this part of the project specifications follows the numbering format of the COTO standard specifications. Where, however, a clause has been amended under Section A2, the clause number is prefixed with a "P" in this Section.

**COTO CHAPTER 1: GENERAL**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
1			GENERAL	
	A1.1		GENERAL PREAMBLE	
		PA1.1.2	DEFINITIONS	
			Conditions of Contract	The Conditions of Contract for Construction for Building and Engineering Works designed by the Employer as published by the International Federation of Consulting Engineers First Edition 1999, shall apply.
			Site / Site of the Works	The limits of construction is provided in Clause C4.1.1 Section F, Part C4 Project Information as well as on the key plan, Drawing No 20568/KP/01
	C1.1		GENERAL PREAMBLE	
	A1.2		GENERAL REQUIREMENTS AND PROVISIONS	
		A1.2.3	GENERAL	
			A1.2.3.3 Environmental management	The requirements of the Environmental Officer are indicated in Section C. The contractor shall comply with the requirements of Volume 7.
			A1.2.3.4 Extension of time for delays caused by rainfall	
			c) Method 3 (Critical path method without consequential delays)	Method 3 (Critical path method without consequential delays) is specified. The value of "N" is 68. In calculations of payment for approved extensions of time granted for delays caused by rainfall, payment will be made utilising the applicable payment items for which the unit of measurement is "month" but excluding payment items with negative rates and non-applicable payment items such as pay item C1.3.1.4.
			A1.2.3.5 Handing“-over of the Site of the Works	<p>The conditions for handing-over of the Site of the Works are as follows:</p> <ul style="list-style-type: none"> <li>a) Sequence Immediately with temporary widening for accommodation of traffic to allow for contraflow construction. The widening is based on the final road footprint.</li> <li>b) Temporary deviations Temporary deviations may not exceed 2km's. A temporary deviation will be constructed at the River Bridge.</li> <li>c) Half or partial width sections The maximum length of <b>4km</b> per section with a total number of <b>3</b> half or partial width sections allowed at a time. Two-way traffic is to be maintained at all times.</li> <li>d) Unrestricted sections The minimum length of existing or newly completed full width, unrestricted road</li> </ul>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA											
				sections to be open between sections shall be 4km.  e) Other All known services have been identified on the drawings. The contractor is to identify these services and mark them on site to ensure that they are not damaged during construction.											
			A1.2.3.9 Monthly reports	Other information to be included in monthly progress reports are as follows: a) Information as required in terms of Conditions of Contract Clause 4.21 b) Aerial progress footage (images and video) “A registered drone operator will be required due to the restrictions of operating a drone in the vicinity of a main road and the presence of overhead services.” c) Integrated Transport Information System (It is)											
			A1.2.3.10 Notices, signs, and advertisements	Details of the contract sign board is provided in Drawing No. 20568/TD/01.											
			A1.2.3.12 Ownership of assets and disposal of non-usable assets	The Non-usable assets to be disposed by the Contractor is listed in the following disposal plan:  Disposal plan <table><tr><th>Asset description</th><th>Estimated quantity</th><th>Disposal requirement</th></tr><tr><td>Guardrails</td><td>560m</td><td rowspan="2">Non-usable guardrails and posts as well road signs and posts shall be disposed of at an authorised disposal site</td></tr><tr><td>Road Signs</td><td>To be verified on site</td></tr><tr><td>Concrete Rubble</td><td>To be verified on site</td><td>Disposed by the Contractor</td></tr></table>	Asset description	Estimated quantity	Disposal requirement	Guardrails	560m	Non-usable guardrails and posts as well road signs and posts shall be disposed of at an authorised disposal site	Road Signs	To be verified on site	Concrete Rubble	To be verified on site	Disposed by the Contractor
Asset description	Estimated quantity	Disposal requirement													
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Road Signs	To be verified on site														
Concrete Rubble	To be verified on site	Disposed by the Contractor													
			A1.2.3.13 Prevention of damage to nearby properties and services	Structures that could be affected by excessive ground vibrations is listed in the following table: <table><tr><th>Structure</th><th>Type</th><th>Location</th></tr><tr><td>Services</td><td>Telkom including manholes</td><td rowspan="3">Ref to Drawing No. 20568/US/01 to 20568/US/12</td></tr><tr><td>Services</td><td>Eskom including manholes</td></tr><tr><td>Services</td><td>Water line including manholes and chambers</td></tr></table>	Structure	Type	Location	Services	Telkom including manholes	Ref to Drawing No. 20568/US/01 to 20568/US/12	Services	Eskom including manholes	Services	Water line including manholes and chambers	
Structure	Type	Location													
Services	Telkom including manholes	Ref to Drawing No. 20568/US/01 to 20568/US/12													
Services	Eskom including manholes														
Services	Water line including manholes and chambers														
			PA1.2.3.15 Routine maintenance	The Contractor shall be responsible for: - All the routine maintenance responsibilities											

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>The Contractor shall take over the specified maintenance responsibility on the date of Access to site.</p> <p>The backfilling for patching shall be done in accordance with the requirements of Chapter 8 A8.8.7.1. The backfill material mix shall comply with Clause A4.1.5.15 of Chapter 4.</p>
			<b>A1.2.3.18 Stakeholder liaison</b>	Additional requirements related to structured engagement with project Stakeholders and affected Communities, as well as guidance on the selection and the enhanced utilisation and development of Targeted Labour and Targeted Enterprises is provided in Section D1000.
			<b>A1.2.3.20 Road safety audits</b>	A Work zone traffic management audit as well as a Pre-opening stage road safety audit, shall be carried out.
			<b>A1.2.3.21 Water</b>	Water may not be extracted from the adjacent rivers and streams.
			<b>A1.2.3.22 Wayleaves/Agreements and Permits</b>	<p>The Contractor shall be responsible for applying for the following wayleaves:</p> <ul style="list-style-type: none"> <li>• Eskom</li> <li>• Telkom</li> <li>• Municipal Power lines</li> <li>• Municipal Water lines</li> <li>• Magali's Water</li> </ul>
		<b>A1.2.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>PA1.2.7.1 Programme of work</b>	
			<b>a) General</b>	A scheme 2 programme shall apply.
			<b>b) Scheme 2</b>	<p>The programme shall be drawn up or be compatible with MS Projects 2021</p> <p>Additional schedules, other than required in terms of Conditions of Contract Clause 8.3, to be provided are:</p> <ul style="list-style-type: none"> <li>(i) A description of all the major stages of the execution of the Works.</li> <li>(ii) A general description of the methods which the Contractor intends to adopt in the execution of the Works.</li> <li>(iii) Details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel, and Sub-Contractors, and of each type of Contractor's Equipment, required on the Site, for each major stage of the execution of the Works.</li> <li>(iv) the forecast cashflow within the defined contract period relative to the programme.</li> <li>(v) if a revised programme, identification of any significant change(s) to the previous programme submitted by the Contractor; and</li> <li>(vi) the Contractor's proposals to overcome the effects of any delay(s) on progress of the Works.</li> </ul>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA																																				
				<table><tr><th>PROJECT STAGE</th><th>START DATE</th><th>END DATE</th></tr><tr><td>CONTRACT AWARD</td><td>-</td><td>-</td></tr><tr><td>SITE HANDOVER</td><td>Month 1</td><td>Month 1</td></tr><tr><td>MOBILISATION</td><td>Month 1</td><td>Month 3</td></tr><tr><td>ACCOMMODATION OF TRAFFIC AND TEMPORARY WIDENING</td><td>Month 4</td><td>Month 7</td></tr><tr><td>CONSTRUCITON OF TEMPORARY BYPASS FOR RIVER BRIDGE</td><td>Month 4</td><td>Month 5</td></tr><tr><td>CONSTRUCTION OF RIVER BRIDGE AND APPROACHES</td><td>Month 5</td><td>Month 23</td></tr><tr><td>CONSTRUCITON OF FIRST HALF WIDTH SECTION</td><td>Month 8</td><td>Month 14</td></tr><tr><td>SWITCH OVER</td><td>Month 15</td><td>Month 15</td></tr><tr><td>CONSTRUCTION OF SECOND HALF WIDTH SECTION</td><td>Month 16</td><td>Month 22</td></tr><tr><td>ROAD MARKING FOR FULL WIDTH</td><td>Month 23</td><td>Month 23</td></tr><tr><td>FINISHING OFF PROJECT</td><td>Mar-24</td><td>Mar-24</td></tr></table>	PROJECT STAGE	START DATE	END DATE	CONTRACT AWARD	-	-	SITE HANDOVER	Month 1	Month 1	MOBILISATION	Month 1	Month 3	ACCOMMODATION OF TRAFFIC AND TEMPORARY WIDENING	Month 4	Month 7	CONSTRUCITON OF TEMPORARY BYPASS FOR RIVER BRIDGE	Month 4	Month 5	CONSTRUCTION OF RIVER BRIDGE AND APPROACHES	Month 5	Month 23	CONSTRUCITON OF FIRST HALF WIDTH SECTION	Month 8	Month 14	SWITCH OVER	Month 15	Month 15	CONSTRUCTION OF SECOND HALF WIDTH SECTION	Month 16	Month 22	ROAD MARKING FOR FULL WIDTH	Month 23	Month 23	FINISHING OFF PROJECT	Mar-24	Mar-24
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			A1.2.7.4 Work on, over, under or adjacent to utilities	The contractor is to comply with the relevant authority's requirements or specifications for working adjacent to power and telephone lines. The contractor is to engage with Transnet prior to any work adjacent to the railway bridge.																																				
	A1.3		CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS																																					
		A1.3.3	GENERAL																																					
			A1.3.3.1 Construction camps	No area has been identified nor is any SANRAL owned land/property available for construction camps. The contractor shall make his own arrangements for site camp																																				
	A1.4		FACILITIES FOR THE ENGINEER																																					
		A1.4.3	GENERAL	The contractor shall provide adequate, suitable facilities for the Engineer's staff. The facilities shall be presented to the Engineer for approval. The minimum requirements for the Engineer's facilities are provided on Drawing no. 20568/TD/02																																				
		A1.4.7	EXECUTION OF THE WORKS																																					
			A1.4.7.1 Offices and laboratories																																					
			a) General	<p>The site laboratory shall be supplied with three-phase electricity. The laboratory shall have sole use of a generator supplied to them.</p> <p>The general office shall have a separate generator for their use.</p>																																				

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>b) Offices</b>	As specified in the specifications and indicated on Schedule of Quantities.
			<b>c) Laboratories</b>	As specified in the specifications and indicated on Schedule of Quantities. Ref to Drawing No 20568/TD/02.
			<b>f) Ablution unit</b>	A separate shower and change room are to be provided. Ref to Drawing No 20568/TD/02.
			<b>A1.4.7.2 Housing</b>	
			<b>a) Prefabricated houses</b>	The Contractor shall provide details of any prefabricated housing (living / office / laboratory units) to the Engineer for written approval prior to purchasing / delivery.
			<b>A1.4.7.3 Services</b>	
			<b>b) Water, electricity and gas</b>	<p>A 3 Phase 20 KVa generator shall be provided for the Engineers office capable of delivering uninterrupted regulated electricity suitable for operating sensitive electronic equipment. The generator should be capable of running uninterrupted for 24 hours.</p> <p>A 3 Phase 20 KVa generator shall be provided for the laboratory capable of delivering uninterrupted regulated electricity suitable for operating sensitive electronic equipment and machinery. The generator should be capable of running uninterrupted for 24 hours.</p>
			<b>A1.4.7.5 Office staff</b>	An office secretary and a Technical assistant are required by the Engineer.
	<b>A1.5</b>		<b>ACCOMMODATION OF TRAFFIC</b>	
		<b>A1.5.3</b>	<b>GENERAL</b>	
			<b>A1.5.3.2 General requirements</b>	Traffic accommodation shall be done in accordance with Drawing No. 20568/TA/01 to 20568/TA/05.
			<b>A1.5.3.3 Lane width</b>	<p>The lane width for half width construction is reduced to a minimum of 3.25m as shown on 20568/TA/02.</p> <p>Temporary deviation lane width of 3.5m is used at the River Bridge as shown on Drawing No. 20568/TA/03</p> <p>Lane width provision across the culvert replacement structure (during half width construction) may be reduced to 3.5m.</p>
		<b>A1.5.6</b>	<b>CONSTRUCTION EQUIPMENT</b>	
			<b>A1.5.6.1 Traffic control facilities</b>	
			<b>A1.5.6.2 Illuminated traffic signs and safety devices</b>	
			<b>d) Sign mounted flashing lights</b>	For all night closures flashing lights are to be operational from dusk to dawn and during anytime with low visibility.
		<b>A1.5.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A1.5.7.3 Accommodation of traffic where the road</b>	The length of the half or partial width construction sections where the traffic can only

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>is constructed in half or partial widths</b>	<p>pass in one direction at a time shall not exceed 4 km.</p> <p>The number of one-ways sections under construction at any one time shall not exceed 3.</p> <p>No STOP/GO one-way traffic sections shall be in operation and two-way traffic shall be accommodated safely within the contract limits at all times.</p>
			<b>A1.5.7.6 Maintenance of existing roads used as detours</b>	<p>Due to the contraflow construction methodology the existing road will be used for the accommodation of two-way traffic. The contractor will be responsible for:</p> <ol style="list-style-type: none"> <li>1. Grass Cutting</li> <li>2. Drain Cleaning</li> <li>3. Cleaning Out Culverts</li> <li>4. Collection of Rubbish/ Litter</li> <li>5. Patching and pothole repairs</li> <li>6. Other road maintenance work as ordered/instructed by the Engineer</li> </ol>
			<b>A1.5.7.10 Construction of temporary deviations</b>	
			<b>d) Earthworks and pavement layers for temporary deviations</b>	Fill and pavement layers shall be as per Drawing No. 20568/TCS/01 to 20568/TCS/03
			<b>e) Surfacing of temporary deviations</b>	S1, 10mm
	<b>A1.7</b>		<b>LOADING AND HAULING</b>	
		<b>A1.7.7</b>	<b>EXECUTION OF THE WORKS</b>	The Contractor must provide the Engineer with the certified carrying capacity of each vehicle before any construction materials can be transported.

**COTO CHAPTER 2: SERVICES**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
2			<b>SERVICES</b>	
	<b>A2.1</b>		<b>GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES</b>	
		<b>A2.1.1</b>	<b>SCOPE</b>	
			<b>A2.1.1.1 Installation of new services</b>	All services not owned by SANRAL are to be installed or relocated by the service owner. New lighting is required at various positions along the route. The design will be completed by the Engineer. The procurement and management of the subcontractor shall be the responsibility of the main contractor. Provision also is made for relocation.
			<b>A2.1.1.2 Location, identification, protection and relocation of existing services</b>	<p>Various services such as electrical, optic fibre, telecommunications and SANRAL should either be protected or relocated as indicated on Drawing No. 20568/US/01 to 20568/US/12</p> <p>At the traffic circle at KM 85+280 is a Magalies Water Pipeline which will have to be lowered and installed in a box culvert. The contractor shall take cognisance of this in his planning and programming. The design will form part of the contractor's liability.</p> <p>New lighting facilities will be provided in the urban section of the project. The design will be completed prior to construction commencement and the contractor shall procure the services of an electrical contractor via a open tender process.</p>
		<b>A2.1.2</b>	<b>DEFINITIONS</b>	The contractor is to obtain valid Wayleaves for all existing services. Previously identified services are indicated on Drawing No. 20568/US/01 to 20568/US/12
		<b>A2.1.3</b>	<b>GENERAL</b>	
			<b>A2.1.3.1 Installation of new services</b>	New services in the form of lighting and supporting infrastructure will form part if this project. Provision is made in the document for the procurement and management of a lighting subcontractor. Provision is also made for relocation and protection of existing services. The SANRAL Standard Electrical Specifications is included in Part C5.
			<b>A2.1.3.2 Location, identification, protection and relocation of existing services</b>	<p>Various services such as electrical, optic fibre, telecommunications, SANRAL should either be protected or relocated as indicated on Drawing No. 20568/US/01 to 20568/US/12</p> <p>At the traffic circle between KM85+220 and KM85+325 is a Magalies Water Pipeline which will have to be lowered and installed in a box culvert. The contractor shall take cognisance of this in his planning and programming.</p>



CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>Provision is made under Pay Item C2.1.12 for the relocation and protection of the pipeline.</p> <p>The Contractor is to liaise with the specific service providers to establish the relocation or decommissioning of those affected services.</p>
			<b>a) Existing as-built records</b>	The Contractor is to consult the relevant existing services drawings and to obtain valid/up to date Wayleaves for all services
			<b>b) Location of existing services</b>	<p>The Contractor is to obtain co-ordinates from the Service Owners of the affected services.</p> <p>Ground Penetrating Radar (GPR) and/or hand excavations shall be carried out by the Contractor in order to locate the services on site.</p> <p>The exact location of the existing Magalies Water Pipeline between KM85+220 and KM85+325 is to be verified by the contractor prior to the commencement of the work. It is a requirement that the contractor shall expose and survey the existing pipeline.</p>
			<b>d) Protection of services</b>	
			<i>(i) Service owners</i>	The Contractor should consult the relevant Service Owners for lead times and notice periods for any affected services.
			<i>(ii) Protection</i>	<p>All known services are to be located on site and protected from any damage.</p> <p>Where works encroach on / near a service, the relevant service owner shall be notified.</p> <p>Protection requirements shall be agreed with the service owner and the Engineer.</p>
			<i>(iv) Relocation</i>	<p>Any work on or affecting existing services may only commence once the service owner has been notified and has given the necessary permission and / or wayleaves.</p> <p>Relocation of affected services shall take place as far as is practically possible at the beginning of the Contract but may be sequenced in a manner such that the production of other tasks are not delayed.</p> <p>The Contractor is to use the lead time up to Site Establishment to make suitable arrangements with the relevant Service Owners, as well as co-ordinate programme requirements with the Engineer.</p> <p>Where works programme requires phased work and / or relocations, this shall be co-ordinated by the Contractor with the Service Owner.</p> <p>The existing Magalies Water Pipeline between KM85+220 and KM85+325 is to be relocated. It is a requirement that the contractor shall</p>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				expose and survey the existing pipeline. The contractor shall procure and manage the services of a specialist subcontractor under Pay Item C2.1.1.3.
			<b>A2.1.3.3 Safety, Method Statements, safeguarding the works and accommodation of traffic</b>	The Contractor should consult the relevant Service Owners for details of required protective measures for the construction of permanent work for existing devices.
			<b>a) Safety and Method Statements</b>	Any safety requirement for installation of services over and above Clause A1.2.3.6 of Chapter 1 shall be established and strictly adhered to by the Contractor.
			<b>c) Accommodation of traffic</b>	<p>The Contractor shall ensure that the pedestrians and other non-motorized traffic are safeguarded and shall be able to cross the working area without being endangered.</p> <p>The pedestrians should not be able to enter areas where works are taking place.</p> <p>In addition, all trenches shall be suitably barricaded by PVC safety netting.</p>
			<b>A2.1.3.5 Programming for services</b>	
			<b>a) Trenching and installation sequence</b>	Trenching for services shall be undertaken before any surface treatments
			<b>d) Programme and delays</b>	The contract shall factor into his programming the relocation and protection of the Magalies Water Pipeline and the provision of new street lighting.
			<b>A2.1.3.6 Provision of record drawings and details</b>	It is a requirement for the surveyor to be registered with PLATO
			<b>A2.1.3.9 Limitations and restrictions</b>	
			<b>c) Installation under special conditions</b>	The Contractor shall strictly adhere to the specific conditions as specified in the Wayleave or any other relevant documentation.
			<b>e) Working widths</b>	Corridor widths are to be specified by the Service Owner and submitted to the Engineer for review.
		<b>A2.1.4</b>	<b>DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS</b>	
			<b>A2.1.4.1 Temporary works</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>A2.1.4.2 Alternative designs</b>	
			<b>b) Alternative design approvals</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>A2.1.4.3 Designs</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
		<b>A2.1.5</b>	<b>MATERIALS</b>	
			<b>A2.1.5.1 Trench backfill material</b>	Trench backfills to be approved by the Engineer before backfilling commences
			<b>A2.1.5.2 Soil cement and stabilised trench backfill material</b>	
			<b>a) Soil cement backfill</b>	Material from excavations shall be utilized for soil-cement backfill
			<b>b) Cement stabilised backfill</b>	As per requirement of the relevant Service Owners.  Alternatively, G5B material shall be utilized for cement stabilised backfill
		<b>A2.1.6</b>	<b>CONSTRUCTION EQUIPMENT</b>	
			<b>A2.1.6.1 Excavation equipment</b>	Trench excavation equipment to be suitable to excavate to required widths as per requirement of the relevant Service Owners. The affected services are shown on Drawing No. 20568/US/01 to 20568/US/12.
		<b>A2.1.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A2.1.7.1 Trenching for Services</b>	
			<b>f) Safe placement of excavated material</b>	Contractor to make use of available stockpile areas for temporary placement of excavated material for services. Excavations should be planned and the temporary placement of the excavated material shall be approved by the Engineer.
			<b>h) Excavation</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>j) Excavation using Labour Enhanced Construction Methods</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>k) Excavations outside the normal trench profile</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause
			<b>l) Timbering and shoring</b>	
			<i>(ii) Contract Specific Shoring Requirements</i>	The Contractor shall be responsible for supplying adequate shoring and shall be included for the costs of the relevant service relocation as specified in the contract documentation.
			<b>m) Soil cement backfilling</b>	Soil cement backfill (4% Cement) should be used for the bases of overhead service poles and anchor poles and for any other type of backfill indicated.
			<b>n) Erosion protection with sandbags</b>	Sandbags shall be used in trenches to prevent the ingress of water and / or erosion during construction of the completed works.
			<b>p) Preparation of the bottom of trenches</b>	The required level that trenches should be excavated to shall be as per Service Owner requirements and the Project Specifications
			<b>r) Dealing with water</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<i>(i) Contractor's obligations for dealing with water</i>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>A2.1.7.2 Reinstatement of existing roads and existing road furniture</b>	
			<b>a) General</b>	Reinstatement of existing roads shall match the existing layers unless otherwise instructed by the Engineer.
			<b>b) Reinstatement of existing road carriageways and other paved areas</b>	Reinstatement of existing roads shall match the existing layers unless otherwise instructed by the Engineer.
			<b>d) Reinstatement of unpaved areas</b>	Reinstatement of existing roads shall match the existing layers unless otherwise instructed by the Engineer.
			<b>A2.1.7.3 Railway reserves, bridge and other special crossings</b>	Where applicable, provision of service ducts with the parapets and sidewalks across bridge and culvert structures have been made and as detailed on the drawings.
			<b>A2.1.7.6 Ownership, removal and disposal of existing service materials</b>	Any existing service material (ducts, pipes, cables etc) recovered when existing services are removed remains the property of the Employer or Owner and shall be confirmed in writing.  Where required by the Employer or Owner that the Contractor shall become the owner of specific recovered service materials, The Contractor shall be responsible for the disposal of the materials and for providing the Engineer with a full record of the disposal of the materials for control purposes".
		<b>A2.1.8</b>	<b>WORKMANSHIP</b>	
			<b>A2.1.8.2 Compaction</b>	
			<b>a) Relative density compaction control</b>	Relative density compaction control shall be used for ALL compaction control and acceptance tests.  DCP tests shall not be accepted.
			<i>(ii) Areas subjected to vehicle traffic loads or within the road prism</i>	Areas over and above any road carriageways, lined drains or any paved footways, sidewalks or walkways where layers are backfilled in thickness (after compaction) that do not exceed 150mm and the material shall be compacted to a minimum of 93% of MDD or a minimum of 100% of MDD where sand is used.
			<b>c) DCP compaction control</b>	DCP tests shall not be accepted for any compaction acceptance control tests.
	<b>B2.1</b>		<b>GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES PART B: LABOUR ENHANCEMENT</b>	
		<b>B2.1.1</b>	<b>SCOPE</b>	Labour enhanced construction methods are not specified but should be encouraged, where possible.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
	<b>A2.2</b>		<b>DRY SERVICES</b>	
		<b>A2.2.1</b>	<b>SCOPE</b>	Refer to Drawing No. 20568/US/01 to 20568/US/12
			<b>A2.2.1.1 General note</b>	In certain SANS documents referred to in this Section the term “specified in the scope of work” is used. For the purposes of this specification the term shall be deemed to mean “specified in the Contract Documentation”.
		<b>A2.2.5</b>	<b>MATERIALS</b>	The requirements for ducts as per COTO are deemed sufficient and applicable.
			<b>A2.2.5.1 Ducts and sleeves</b>	
			<b>b) High Density Polyethylene (HDPE) ducts</b>	
			<i>(i) HDPE ducts installed by trenching</i>	Service ducts shall comply with the owner’s or the Engineer’s specification and may be rigid or pliable as and where applicable. Ducts shall be joined using suitable compression couplings or sleeve type couplings with rubber sealing O-rings.  HDPE ducts for telecommunications are present. They shall comply with certain requirements of ASTM F2160 and ASTM F2176
			<i>(ii) HDPE ducts installed by drilling</i>	HDPE ducts are required at intersections to make provision for future traffic signals.
			<b>h) Draw wires and marker tapes</b>	Draw wires shall be 2,5 mm diameter galvanised. Marker tapes shall comply with the service owner’s specifications .
			<b>A2.2.5.2 Bedding</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>A2.2.5.3 Backfill</b>	
			<b>a) Backfill for trenched (excluding micro or mini trenching)</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>b) Backfill for micro or mini trenching</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>A2.2.5.4 Cable duct markers</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
			<b>A2.2.5.5 Concrete</b>	All concrete required for duct installation shall comply with the applicable requirements of Section A13.4 of Chapter 13. Concrete shall be Class C16/20-20.
			<b>A2.2.5.7 Handhole, manhole and access chamber types and covers</b>	
			<b>a) Handhole, manhole and access chamber</b>	
			<i>(i) Telecommunications handholes, manholes and access chambers</i>	Handholes, manholes and access chambers shall comply with the owner’s specifications

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<i>(iv) Other handholes, manholes and access chambers</i>	Handholes, manholes and access chambers shall comply with the owner's specifications or as specified by the Engineer.
			<b>b) Covers and frames</b>	
			<i>(i) Telecommunications covers and frames</i>	Telecommunication covers and frames shall comply with SANS 558 and SANS 50124.
			<i>(ii) Other covers and frames</i>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
		<b>A2.2.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A2.2.7.2 Duct installation by methods other than by micro or mini trenching</b>	
			<b>a) Trench widths for duct installations</b>	Where more than one duct is to be installed in a trench it shall comply with the requirements of Clause 4.2.1 and Figure 1 of SANS 2001-DP3.
			<b>b) Bedding and compaction of bedding</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause .  DCP tests shall not be accepted for any compaction acceptance control tests.
			<b>d) Concrete bedding and encasement</b>	
			<i>(i) Concrete bedding</i>	Concrete bedding shall extend at least one third of the pipe diameter up on either side of the duct.  Concrete shall comply with strength class C16/20-20.
			<i>(ii) Concrete encasement</i>	Concrete encasement shall extend at least one third of the pipe diameter up on either side of the duct.  Concrete shall comply with strength class C16/20-20.
			<b>A2.2.7.4 Duct markers</b>	
			<b>b) Route markers</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause
			<b>c) Road crossing markers</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause
			<b>A2.2.7.6 Duct installation by micro and mini trenching</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause
		<b>A2.2.8</b>	<b>WORKMANSHIP</b>	
			<b>A2.2.8.2 Proving ducts</b>	
			<b>a) Standard proving requirements</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause
			<b>b) Other duct integrity requirements</b>	Other duct integrity requirements shall be as specified / required by the Owner.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
	<b>C2.2</b>		<b>DRY SERVICES PART C: MEASUREMENT AND PAYMENT</b>	
		<b>C2.2.6</b>	<b>Duct accessories (markers, marking, draw wires and end caps etc.)</b>	"The tendered rates shall include full compensation for the manufacture, delivery and installation of the markers, draw wires, end caps, plugs or other accessories complete as specified or for completing the marking on kerbs as specified"
		<b>C2.2.8</b>	<b>Covers and frames for duct handholes, manholes and access chambers</b>	"The tendered rates shall include full compensation for the manufacture, delivery and installation of the covers and frames complete as specified"
		<b>C2.2.9</b>	<b>Install duct handhole, manhole and access chamber covers and frames provided by others</b>	"The tendered rates shall include full compensation for the installation of the covers and frames complete as specified"
	<b>D2.2</b>		<b>DRY SERVICES PART D: GUARANTEES AND COMPLIANCE CERTIFICATES</b>	
		<b>D2.2.2</b>	<b>WARRANTIES FOR PRODUCT OR ELEMENT DESIGN AND INSTALLATION OF PROPRIETARY SYSTEMS</b>	The design and installation of proprietary dry service systems shall require that a warranty of 15 years be supplied by the Contractor.
	<b>A2.3</b>		<b>WET SERVICES</b>	
		<b>A2.3.1</b>	<b>SCOPE</b>	Wet Services are indicated on Drawing No. 20568/US/01 to 20568/US/12
			<b>A2.3.1.1 General note</b>	In certain SANS documents referred to in this Section the term "specified in the scope of work" is used. For the purposes of this specification the term shall be deemed to mean "specified in the Contract Documentation".
		<b>A2.3.5</b>	<b>MATERIALS</b>	
			<b>A2.3.5.1 Sewers</b>	
			<b>b) Manholes and chambers</b>	Covers and Frames shall be as per the service owner specifications.
			<b>A2.3.5.3 Bedding, fill blanket and backfill material for sewers and water mains</b>	The class of bedding shall be as per the service owner specifications.
			<b>A2.3.5.4 Marker posts</b>	Markers shall be as per the service owner specifications.
	<b>D2.3</b>		<b>WET SERVICES PART D: GUARANTEES AND COMPLIANCE CERTIFICATES</b>	
		<b>D2.3.1</b>	<b>SCOPE</b>	Refer to Drawing No. 20568/US/01 to 20568/US/12
	<b>A2.4</b>		<b>ENERGY AND OTHER SERVICES</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
		<b>A2.4.1</b>	<b>SCOPE</b>	<p>The purpose of Section A2.4 is therefore partly to provide a structured framework for the Contract Documentation for civil construction work related to energy services or any other types of services not dealt with elsewhere in Chapter 2.</p> <p>In certain SANS documents referred to in this section the term “specified in the scope of work” is used. For the purposes of this specification the term shall be deemed to mean “specified in the Contract Documentation</p>



**COTO CHAPTER 3: DRAINAGE**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
3			<b>DRAINAGE</b>	
	<b>A3.1</b>		<b>DRAINS</b>	
		<b>A3.1.5</b>	<b>MATERIALS</b>	
			<b>A3.1.5.2 Subsoil Drainage Materials</b> <b>a) Pipes</b>	U-PVC 100 mm diameter. Pipes shall be perforated, except for outlets, which shall be unperforated.
		<b>A3.1.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A3.1.7.4 Subsoil drainage</b> <b>a) Construction of subsoil drainage systems</b>	
			<i>(ii) With polymer film lining to trenches for subsoil drainage systems</i>	0.15mm thick As shown on Drawing No. 20568/TD/42
			<b>A3.1.7.5 Manholes, outlet structures and cleaning eyes</b>	As shown on Drawing No. 20568/TD/43
	<b>B3.1</b>		<b>DRAINS</b>	
		<b>B3.1.6</b>	<b>CONSTRUCTION EQUIPMENT</b>	
	<b>D3.1</b>		<b>DRAINS</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
	<b>A3.2</b>		<b>CULVERTS</b>	
		<b>A3.2.3</b>	<b>GENERAL</b>	
			<b>A3.2.3.1 Types of culverts</b>	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.
	<b>A3.3</b>		<b>CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS</b>	
		<b>A3.3.5</b>	<b>MATERIALS</b>	
			<b>A3.3.5.2 Drainage structure materials</b> <b>d) Joint sealant</b>	Refer to Drawing No. 20568/TD/30 and 20568/TD/31
		<b>A3.3.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A3.3.7.1 Drainage structures</b> <b>a) Prefabricated concrete kerbing and channelling</b>	Refer to Drawing No. 20568/TD/30 and 20568/TD/31
			<b>f) Cast in situ chutes on cut slopes</b>	Chute positions are shown on Drawing No. 20568/TD/34 and 20568/TD/35

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>i) Stone pitched open drains</b>	Refer to Drawing No. 20568/TD/39 to 20568/TD/41
	<b>B3.3</b>		<b>CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS</b>	
	<b>D3.3</b>		<b>CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS PART D: GUARANTEES AND COMPLIANCE CERTIFICATES</b>	All precast materials shall be in accordance with the relevant SANS specifications.

**COTO CHAPTER 4: EARTHWORKS AND PAVEMENT LAYERS: MATERIALS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
<b>4</b>			<b>EARTHWORKS AND PAVEMENT LAYERS: MATERIALS</b>	
	<b>A4.1</b>		<b>BORROW MATERIALS</b>	
	<b>A4.2</b>		<b>CUT MATERIALS</b>	
		<b>PA4.2.3</b>	<b>GENERAL</b>	
			<b>A4.2.3.2 Contractor prepared plans for cuttings</b>	<p>The Contractor shall be responsible for the compiling and implementation of the M&amp;U Plan.</p> <p>The volume along the route is a total of 50 000m<sup>3</sup>. The cuttings are generally minor.</p>
		<b>A4.2.7</b>	<b>EXECUTION OF WORKS</b>	
			<b>A4.2.7.1 Excavation operations</b>	
			<b>a) Control at the cuttings, designated excavations and box cuts</b>	The cuttings are generally minor. A full-time experienced materials manager with at least 5 years' experience shall be employed by the Contractor.
			<b>h) Excavation of material in cuttings</b>	<p>Benching shall always be started at the bottom of the existing cut progressing to the top of the formation in steps not exceeding 1,0m in height measured vertically.</p> <p>No specialized slope protection measures is required.</p> <p><del>No additional payment will be made for cutting of benches and shall be included in the rates provided.</del></p> <p>A full-time excavation controller with at least 5 years' experience as a General Foreman shall be employed by the Contractor and shall be employed upon written approval of the Engineer.</p>
			<b>i) Excavation of material in box cuts</b>	<p>Cross-section drawings for dimensions of cuts are included in, Drawing No. 20568/XS/01 to Drawing No. 20568/XS/35.</p> <p>The steps into the existing pavement structure shall be in a minimum of 150mm steps vertically and horizontally.</p>
			<b>k) Selection and the use of the cut material</b>	<p>Test pits in cuts and for cut material shall be done prior to using the materials and must be factored into the program.</p> <p>Volume 6, contains the test pit data.</p>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				Careful selection of reclaimed cut material shall be employed.  Unsuitable material shall not be re-used in the permanent works but shall be spoiled as specified.
	<b>A4.3</b>		<b>EXISTING ROAD MATERIALS</b>	
		<b>A4.3.3</b>	<b>GENERAL</b>	
			<b>A4.3.3.1 Employer identified existing road materials</b>	Part C4 and Volume 6 provide details on existing road materials.
		<b>A4.3.5</b>	<b>MATERIALS</b>	
		<b>A4.3.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A4.3.7.4 Milling</b>	As instructed by the engineer. Loose materials shall be removed by means of sweeping or blowing.
			<b>A4.3.7.9 Removal of existing pavement blocks</b>	<b>The paving blocks listed is not to be reused.</b>
			<b>A4.3.7.12 Stockpiling of material</b>	
	<b>A4.4</b>		<b>COMMERCIAL MATERIALS</b>	
		<b>A4.4.3</b>	<b>GENERAL</b>	
			<b>A4.4.3.1 Employer identified commercial materials</b>	
			<b>a) Materials from commercial suppliers</b>	
			<b>b) Materials from private or non-commercial suppliers</b>	No private or non-commercial suppliers have been identified by the Employer.
			<b>c) Materials from the Employer's own sources</b>	The Employer source is located on the R101 approximately 10km from the R101 and R33 intersection. The Locality is indicated in Part C4: Project information and Volume 6.  The material shall not be free issue. The tenderer will purchase the materials from the Contractor working on the R101. The Contractors, tendered rate for this activity will be the selling rate for this source. The Engineer and Employer will confirm this rate prior to using this source. The cost of obtaining the material shall be made through payment item C4.4.3. All  The quality of materials available is considered suitable up to and including lower subbase layers.
		<b>A4.4.5</b>	<b>MATERIALS</b>	
			<b>A4.4.5.4 Non-traditional stabilising or soil treatment agents (para 1)</b>	The section between km 77 and 78 shall be used for NME2 base course.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>The products shall comply to TRH 4 requirements of being:</p> <ol style="list-style-type: none"> <li>1) Non toxic</li> <li>2) A guaranteed shelf life on-site (e.g., in flow bins if applicable) exceeding (at least) 4 (four) months. (The shelf life can normally be increased to at least 6 to 12 months through the circulation of a quality NME mix once a week using a normal circulation pump.)</li> <li>3) Stability on site, <ol style="list-style-type: none"> <li>a) At least 4 months without separation,</li> <li>b) At least 4 months without increase in viscosity</li> </ol> </li> </ol>
	<b>C4.4</b>		<b>COMMERCIAL MATERIALS PART C: MEASUREMENT AND PAYMENT</b>	
	<b>A4.5</b>		<b>ALTERNATIVE MATERIALS</b>	
			<b>A4.5.5.3 Industrial operations material</b>	
			<b>a) Slag from the production of ferrous and non-ferrous materials</b>	<p>The acceptable expansion limit for steel slag meant for use in road pavement construction is 1.5% or less when assessed from the hot water bath expansion test.</p>

## COTO CHAPTER 5: EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
5			<b>EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION</b>	
	<b>A5.1</b>		<b>ROADBED</b>	
		<b>A5.1.2</b>	<b>DEFINITIONS</b>	
			<b>Batter</b>	Slope gradients for batters shall not be steeper than 1:1.
		<b>A5.1.3</b>	<b>GENERAL</b>	
			<b>A5.1.3.1 Roadbed material Investigation</b>	<p>Trial pits and laboratory tests results for existing road layers are included in Volume 6.</p> <p>The test results and geotechnical investigation indicated collapsible soils, which shall be treated with impact compaction as indicated in Part C4 and Volume 6.</p>
		<b>A5.1.5</b>	<b>MATERIALS</b>	
			<b>A5.1.5.2 Topsoil</b>	Topsoil shall be obtained from existing cuttings and fills.
			<b>A5.1.5.3 Collapsing soil material</b>	<p>Part C4 and volume 6 indicated the areas that will be treated by means of HEIC or impact compaction.</p> <p>Refer to Volume 6 for test results.</p>
		<b>A5.1.6</b>	<b>CONSTRUCTION EQUIPMENT</b>	High energy impact compactors (HEIC) shall be equipped with functioning continuous impact response metering and GPS.
		<b>A5.1.7</b>	<b>EXECUTION OF WORKS</b>	
			<b>A5.1.7.1 Clearing and grubbing</b>	
			<b>A5.1.7.2 Removal and conservation of topsoil from roadbed</b>	Material obtained from clearing and grubbing shall be stockpiled at Contractors designated sites.
			<b>A5.1.7.3 Normal roadbed treatment</b>	
			<b>a) Construction overview</b>	The roadbed shall be ripped and recompacted at 150mm deep to minimum density of 93% of MDD (100% for sand).
			<b>b) Removal of unsuitable roadbed material</b>	The Contractor shall identify suitable spoil sites for unsuitable road bed material soil. Where the material can be spread within the road reserve without impeding water drainage this can be done.
			<b>c) Percentage of Max Dry density (MDD)</b>	Suitable roadbed material shall be ripped at 150mm deep and recompacted to 93% of MDD.
			<b>e) Compaction of collapsible soil</b>	
			<i>(i) General</i>	Impact rolling will be used to treat collapsible soils.
			<i>(ii) Soil collapse construction</i>	The DCP shall be used as general quality management after the number of roller passes

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				has been determined by means of a trial section.  For tender purposes the roller pass number shall be 20 roller passes.
			<i>(iii) Non wetting-up roadbed collapse</i>	The equipment shall be NEIC rollers. The amount of collapse shall be determined by means trial section to determine the number of roller passes to ensure collapse of the materials.
			<b>g) Inactive clay and normal clay</b>	
			<i>(i) Material modification</i>	Not allowed.
			<i>(ii) Lime modification</i>	Not allowed.
			<i>(iii) Removal of material</i>	Depth of removal shall be 450mm.
			<b>h) Active Clay</b>	Active clay shall be removed to a depth as instructed by the Engineer and replaced with rockfill.
			<i>(i) Alternative 1 – roadbed construction using lime – Phase 1</i>	Not allowed.
			<i>(i) Alternative 1 – roadbed construction using lime – Phase 3</i>	Not allowed.
			<i>(ii) Alternative 2 – Roadbed construction by removal of active clay</i>	Heaving clay in the roadbed shall be removed to a minimum depth as instructed by the Engineer and replaced with a pioneer layer.  Unsuitable material shall be disposed of as described in clause A1.6.7.7.
			<b>i) Construction of a pioneer layer</b>	The pioneer layer shall be constructed by means of end tipping, flattening the loads and rolled the layer till stable. A roller of least 20ton with variable Hz will be used on the layer.
			<b>A5.1.7.4 Special drainage measures, dewatering</b>	Subsoil drainage systems shall be installed as indicated Drawing no. 20568/TD/42.
		<b>A5.1.8</b>	<b>WORKMANSHIP</b>	
			<b>A5.1.8.2 Compaction requirements</b>	Minimum 6 samples per lot collected in accordance with a stratified random sampling procedure as defined under Clause A20.1.1.
	<b>C5.1</b>		<b>ROADBED PART C: MEASUREMENT AND PAYMENT</b>	
		<b>C5.1.13</b>	<b>Construction of a levelling layer</b>	The volume of the levelling layer shall be computed as 70% of the loose volume in the haul trucks.
	<b>A5.2</b>		<b>FILL</b>	
		<b>A5.2.3</b>	<b>GENERAL</b>	
			<b>A5.2.3.1 Fill Dimensions and shape</b>	Refer to Drawing no. 20568/DCS/01 to Drawing no. 20568/DCS/35. The slope batter is 1:2 fill for the steep fills nearing the Bridge at km 82 and surrounding.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>The remainder of the batters is as per the cross section, which is less steep.</p> <p>It is proposed that the major fill at the river bridge be considered to be one of the critical fills to complete. The construction of a temporary bypass at this bridge will be a physical constraint to considered.</p>
			<b>A5.2.3.2 Fill adjacent to existing fill</b>	The provisions of Clause A5.2.7.4 shall apply.
			<b>A5.2.3.3 Fill layer thickness</b>	Fill layer thicknesses shall not exceed 200mm.
			<b>A5.2.3.4 Fill compaction classification</b>	
			<b>a) MDD compaction</b>	
			<i>(ii) Normal fill and Coarse Fill</i>	95% of MDD
			<i>(iii) Fill widening</i>	95% of MDD
		<b>A5.2.5</b>	<b>MATERIALS</b>	
		<b>A5.2.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A5.2.7.3 Benching for fill construction</b>	<p>Method A shall apply. The benches of the fill height more than 1m shall be 300mm in height and 300mm stepped into the existing fill formation. For fills less than 1m in height and the last 1m of a fill the benches shall be 200mm in height and 200mm steps into the existing fill formation.</p> <p>.</p>
			<b>A5.2.7.4 Widening of fills</b>	<p>No additional specifications other than those contained in the contract documentation are applicable to this sub-clause.</p> <p>The Contractor shall identify designated spoil sites. Non-Hazardous organic material may be disposed of in a suitable manner within the road reserve with the written consent of the Employer or his agent.</p> <p>A method statement shall be provided by the Contractor and approved by the Employer or his agent before spoil material shall be spoiled, whether in the road reserve or elsewhere as identified by the Contractor.</p>
		<b>A5.2.8</b>	<b>WORKMANSHIP</b>	
			<b>A5.2.8.2 Materials Quality and compaction requirements</b>	The test positions shall be determined by means of the random stratified method.
			<b>Table A5.2.8-1</b>	Normal fill and coarse fill shall be compacted to minimum 93% of MDD.
	<b>A5.3</b>		<b>ROAD PAVEMENT LAYERS</b>	
		<b>A5.3.3</b>	<b>GENERAL</b>	
			<b>A5.3.3.4 Compaction of pavement layer material</b>	The compaction densities for the pavement layers are inter alia shown on Drawing no. 20568/CS/01 and 20568/CS/02.



CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA																					
				<div>For pavement layers the following compaction shall apply:</div> <table><tr><td>Layer</td><td>Compaction</td></tr><tr><td>G1 Base</td><td>88% ARD</td></tr><tr><td>Subbase upper</td><td>97% MDD</td></tr><tr><td>Subbase lower</td><td>95%MDD</td></tr><tr><td>Selected</td><td>93% MDD</td></tr><tr><td>Fill</td><td>95% MDD</td></tr><tr><td>Roadbed</td><td>90% MDD</td></tr><tr><td>NME Base</td><td>102% MDD</td></tr></table>	Layer	Compaction	G1 Base	88% ARD	Subbase upper	97% MDD	Subbase lower	95%MDD	Selected	93% MDD	Fill	95% MDD	Roadbed	90% MDD	NME Base	102% MDD					
Layer	Compaction																								
G1 Base	88% ARD																								
Subbase upper	97% MDD																								
Subbase lower	95%MDD																								
Selected	93% MDD																								
Fill	95% MDD																								
Roadbed	90% MDD																								
NME Base	102% MDD																								
			A5.3.3.7 Joints between pavement layers																						
			a) Location of joints	Joints in asphalt surfacing shall not fall within the wheel path of a travelled lane.																					
			b) Longitudinal joints	Depth of sawcut joint shall be to the full depth of each bound layer. This shall be a nominal depth of 150mm.																					
			A5.3.3.8 Pavement Layer Drainage	Subsoils shall be installed in all cuttings as indicated on Drawing no. 20346/TD/42.																					
		A5.3.5	MATERIALS																						
			A5.3.5.1 Material information	<div>The pavement material properties are indicated on Drawing no. 20568/TCS/01 and 20568/TCS/02</div> <div>The following is neat/ unstabilized materialized and the minimum materials property requirement for each layer as per table below:</div> <table><tr><th>Layer</th><th>Property</th><th>Table</th></tr><tr><td>Base</td><td>Crushed stone G1</td><td>A4.1.5-5</td></tr><tr><td>Upper Subbase</td><td>At least G5b stabilized to C3</td><td>A4.1.5-4 A4.4.5-2</td></tr><tr><td>Lower Subbase</td><td>At least G6 stabilized to C4</td><td>A4.1.5-4 A4.4.5-2</td></tr><tr><td>Selected</td><td>At Least G7</td><td>A4.1.5-3</td></tr><tr><td>Fill</td><td>At least G9</td><td>A4.1.5-3</td></tr><tr><td>NME2</td><td>At least G5b</td><td>PCA4.4.5-3 A4.1.5-4</td></tr></table> <div>Material properties refer to relevant Sections in Chapter 4.</div> <div>Mechanical modification: For the lower subbase, the existing road pavement layers shall require mechanical modification in areas as dictated by the levels. This shall be done as per clause A5.4.7.2.b).</div>	Layer	Property	Table	Base	Crushed stone G1	A4.1.5-5	Upper Subbase	At least G5b stabilized to C3	A4.1.5-4 A4.4.5-2	Lower Subbase	At least G6 stabilized to C4	A4.1.5-4 A4.4.5-2	Selected	At Least G7	A4.1.5-3	Fill	At least G9	A4.1.5-3	NME2	At least G5b	PCA4.4.5-3 A4.1.5-4
Layer	Property	Table																							
Base	Crushed stone G1	A4.1.5-5																							
Upper Subbase	At least G5b stabilized to C3	A4.1.5-4 A4.4.5-2																							
Lower Subbase	At least G6 stabilized to C4	A4.1.5-4 A4.4.5-2																							
Selected	At Least G7	A4.1.5-3																							
Fill	At least G9	A4.1.5-3																							
NME2	At least G5b	PCA4.4.5-3 A4.1.5-4																							
			A5.3.5.2 Pavement Layer thickness and																						

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA																	
			compaction requirements																		
			a) Pavement layer thickness requirements	The compacted pavement layer thickness is indicated on Drawing no. 20568/TCS/01 to 20568/TCS/03.																	
			b) Gravel and soil pavement layer compaction requirements (G4B to G9 material)	The compaction requirements are indicated on Drawing no. 20568/CS/02 and the relevant pay-items in the Schedule of Quantities.  Where layer densities are omitted, the densities as per Table A5.3.5-1 shall prevail.																	
			c) Crushed stone pavement layer compaction requirements (G1 to G4A and G5A material)	The compaction requirements are indicated on Drawings number 20346/CS/02 and the relevant pay-items in the Schedule of Quantities.  Where layer densities are omitted, the densities as per Table A5.3.5-2 shall prevail.																	
		A5.3.7	EXECUTION OF WORKS																		
			A5.3.7.3 Construction of gravel pavement layers																		
			a) Construction	The position of longitudinal construction joints are indicated on Drawings no. 20568/TCS/01 and 20568/TCS/02.  The longitudinal joints shall comprise a series of steps that are 150 mm wide and vertically the depth of each applicable layer.  No longitudinal construction joint shall be directly under a wheel path / track.																	
			A5.3.7.12 Construction of trial sections																		
			a) Trial Sections	Trial sections shall be for the full lane width or minimum 3,7 m wide and 150 m in length.																	
		A5.3.8	WORKMANSHIP																		
			PA5.3.8.4 Construction tolerances for pavement layers	<div>The tables below indicate the layer tolerances for the layers level and with thicknesses less than 150mm.</div> <div>Add to Table A5.3.8-1: <b>Level tolerances (H = road elevation)</b></div> <table><tr><th>Layer</th><th>H<sub>90</sub> mm</th><th>H<sub>max</sub> mm</th></tr><tr><td>Subbase 100mm</td><td>10</td><td>13</td></tr><tr><td>Subbase 125mm</td><td>12</td><td>15</td></tr></table> <div>Add to Table A5.3.8-3: <b>Layer thickness tolerances (D = thickness)</b></div> <table><tr><th>Layer</th><th>D<sub>90</sub> mm</th><th>D<sub>max</sub> mm</th><th>D<sub>ave</sub> mm</th></tr><tr><td>Subbase 100mm</td><td>12</td><td>16</td><td>3</td></tr></table>	Layer	H <sub>90</sub> mm	H <sub>max</sub> mm	Subbase 100mm	10	13	Subbase 125mm	12	15	Layer	D <sub>90</sub> mm	D <sub>max</sub> mm	D <sub>ave</sub> mm	Subbase 100mm	12	16	3
Layer	H <sub>90</sub> mm	H <sub>max</sub> mm																			
Subbase 100mm	10	13																			
Subbase 125mm	12	15																			
Layer	D <sub>90</sub> mm	D <sub>max</sub> mm	D <sub>ave</sub> mm																		
Subbase 100mm	12	16	3																		

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA			
				Subbase 125mm	15	20	4
			d) Width tolerances	The road edge widths are shown on Drawing No 20568/PL/01 to 20568/PL/13			
			f) Surface texture				
			PA5.3.8.5 Surface regularity	Surface regularity shall be assessed on by means of using a profiler.			
			c) By using a profiler	The payment items for adjustment shall be: C5.3.2.1(aa) and PC5.5.16.4 (d)			
	A5.4		STABILISATION				
		A5.4.3	GENERAL				
			A5.4.3.2 Work in restricted areas	No additional payment for treatment and stabilization in restricted areas will be made.			
		A5.4.5	MATERIALS				
			A5.4.5.1 General	The materials to be stabilised are indicated on Drawings no. 20568/CS/02.  The layers and materials to be stabilized are: NME base (insitu with G5b top up) Upper subbase (G5b) Lower subbase (G6)			
			A5.4.5.2 Material for modification or pre-treatment	The following materials are considered with mechanical modification and pretreatment.  The insitu Lower subbase shall be mechanically modified in areas where the road levels require. Imported material of at least G6 quality shall be used.  The insitu NME base from km 77 to 78 shall be mechanically modified in areas where the road levels require. Imported material of at least G5b quality shall be used.			
			b) Cementitious pre-treatment of material before stabilization				
			A5.4.5.3 Cementitious stabilising agents	Type: CEM II A-L 32,5N Nominal application rate: 4% by mass			
		A5.4.6	CONSTRUCTION EQUIPMENT				
		A5.4.7	EXECUTION OF THE WORKS				
			A5.4.7.1 Construction of a trial section				
			A5.4.7.2 Mechanical modification of pavement layer material	Lower subbase, shall be mixed / modified in areas as levels require with Employer source materials.			

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>A5.4.7.3 Chemical pre-treatment and stabilization</b>	
			<b>e) Applying and mixing in the cementitious agent using a recycler</b>	Refer to Drawing No. 20568/TCS/01 and 20568T/CS/02 for outer edge lines
			<b>A5.4.7.7: Protection and curing of chemically stabilised layers</b>	The protection and curing method used shall be: <ul style="list-style-type: none"> <li>• Method a) Water curing on instruction by Engineer</li> <li>• Method b) Damp protective layer curing if subsequent layer is granular in nature.</li> <li>• Method c) Membrane curing for recycled / subbase layers where the subsequent layer is a bituminous base layer..</li> </ul>
			<b>c) Membrane curing</b>	0,8 l/m <sup>2</sup> or as instructed by the Engineer
			<b>d) Prime coat curing</b>	0,8 l/m <sup>2</sup> or as instructed by the Engineer
	<b>A5.5</b>		<b>RECONSTRUCTION OF PAVEMENT LAYERS</b>	
		<b>A5.5.2</b>	<b>DEFINITIONS</b>	
			<b>Rehabilitation</b>	Repair of the existing road pavement for temporary works shall be by means of patching.
			<b>Uniform pavement sections</b>	There are 7 uninform pavement sections: <ul style="list-style-type: none"> <li>• Section 1: Km 77 to km 77.8</li> <li>• Section 2: km 77.8 to km 81.08</li> <li>• Section 3: km 81.08 to km 85</li> <li>• Section 4: km 85 to 86.27 (Round about)</li> <li>• section 5: km 86.27 to 86.66</li> <li>• Section 6; KM 86.66 TO 88.7</li> <li>• Section 7:km 88.7 to 89.3 (SECTION 13 KM 0.6)</li> </ul> <p>These sections represent the insitu treatment sections.</p>
		<b>A5.5.3</b>	<b>GENERAL</b>	
			<b>A5.5.3.1 Traffic accommodation</b>	Refer to Drawing no. 20568/TA/01 to 20568/TA/04
			<b>A5.5.3.2 Material selection</b>	The materials to be reclaimed from the exiting pavement base shall be used in the lower subbase layer along the route.
			<b>A5.5.3.4 Existing bituminous seal and/or asphalt layers</b>	The existing seal shall be recycled into the existing base and used as lower subbase in the rural section. This depth of seal is approximately 20mm thick. The pulverised layer shall meet the pavement thickness (100mm or 125mm) as per the construction drawings.  In the urban section the existing asphalt shall be pulverized into the existing base and used

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				in the upper pavement layer / lower subbase. <b>The depth of the asphalt layer is approximately 40mm.</b> The depth of the layer to be milled is 160mm
		<b>A5.5.5</b>	<b>MATERIALS</b>	
			<b>A5.5.5.1 Existing crushed stone pavement materials</b>	To be mechanically modified and blended with commercially sourced to form 150mm G5 layer to be stabilised to C4. Lower subbase to be compacted to 95% MDD.
			<b>A5.5.5.5 Materials shortfall and make-up material</b>	To be commercially sourced, or the employer sources if testing is favourable.
		<b>A5.5.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A5.5.7.1 Patching</b>	
			<b>a) Patch demarcation</b>	Where the existing road is used to accommodate traffic, the following patching types shall be done:  1) Bituminous asphalt surface patching. 2) ETB base patching with asphalt surfacing.  The final position and extent of patch repairs will be as instructed by the Engineer.
			<b>c) Backfilling patch excavations</b>	This shall be an Emulsion Treated Base (BSM2) for large patches or ETB with G2 materials for smaller patches, using insitu with top up materials sourced commercially.
			<b>A5.5.7.3 Treatment of exposed pavement layer</b>	The exposed layer shall be shall only be considered for temporary works patches.  The treatment method shall be as for (a) stabilized exposed layer.
			<b>A5.5.7.4 In situ pavement layer reconstruction preparation</b>	
			<b>b) Establishing construction levels – significant level changes</b>	The cross sectional profile is indicated on Drawing No. 20568/CS/01 and 20568/CS/02. The design levels are indicated on Drawing No. 20568/LS/01 to 2056/LS/13.
			<b>e) Pre-pulverising existing pavement layer material</b>	Pre-pulverising shall be done on the entire project existing pavement road profile from km 77 to km 89.3.  In areas where the existing pavement level is higher than the final road lower subbase level, the materials shall be loaded and moved to the nearest point where the lower subbase requires materials. This shall be the widening adjacent to the insitu load position in most cases to minimise and haul. Use of pre-pulverised material for the lower subbase on the existing pavement footprint will only be

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>considered if the profile widening is addressed first, and excess remains.</p> <p>In situ layer shall be stabilized to C4 lower subbase in these areas.</p> <p>In the Urban section the insitu pre-pulverized material shall be loaded and moved to the rural area section to be used in lower subbase. The closest point of usage shall be between km 81 and 86, for the material moved from km 86 to 89. From km 89 to km 89.3 the insitu pre-pulverised material will be used in the widening from km 89 to km 89.3 as the lower subbase and selected layer.</p> <p>Where cross-mixing is ordered, the material. shall be bladed by grader or utilising other. mixing equipment to achieve a uniform blend of material throughout the layer. The layer shall be compacted and shaped before being in situ recycled.</p> <p>Any surplus material generated shall be taken to stockpile for re-use.</p>
			<b>A5.5.7.5 In situ pavement layer reconstruction</b>	
			<b>a) Final recycler construction equipment checks</b>	Check sheet provided in C4 appendix 12.
	<b>C5.5</b>		<b>RECONSTRUCTION OF PAVEMENT LAYERS PART C: MEASUREMENT AND PAYMENT</b>	
		<b>C5.5.5</b>	<b>Construction of a trial section using a recycler</b>	150mm upper subbase and 150mm lower subbase for a length of 150m and width of 3.7m
		<b>C5.5.13</b>	<b>Cross mixing of material</b>	As instructed by the Engineer to maximum width of 6m and depth of 150mm.
		<b>C5.5.20</b>	<b>Material shortfall or make-up material</b>	Shall be quantified by means of cross sections.

**OTO CHAPTER 6: CONCRETE LAYERS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
6			<b>CONCRETE LAYERS</b>	
	<b>A6.2</b>		<b>SEGMENTAL BLOCK PAVING LAYERS</b>	
		<b>A6.2.5</b>	<b>MATERIALS</b>	
			<b>A6.2.5.1 Paving blocks</b>	The paving blocks shall be of class 25MPa type S-A and thickness 60mm.
			<b>A6.2.5.4 Concrete beams, kerbs and channelling</b>	Prefabricated kerbing and channelling shall comply with the requirements of Section A3.3 / B3.3 of Chapter 3.
		<b>A6.2.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A6.2.7.1 Preparing the underlying layers.</b>	The underlying layers shall be prepared in accordance with Chapter 4 and 5 of the specifications.
			<b>A6.2.7.4 Laying of the blocks.</b>	The laying pattern and dimensions is indicated on the following Drawings No. 20568/LP/01 to 20568/LP/13. Block shall be laid in a 45 degree herringbone pattern.

**COTO CHAPTER 8:     PRETREATMENT AND REPAIR OF EXISTING LAYERS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
8			<b>PRETREATMENT AND REPAIR OF EXISTING LAYERS</b>	
	<b>A8.1</b>		<b>PRIME COAT</b>	
		<b>A8.1.3</b>	<b>GENERAL</b>	
			<b>A8.1.3.1 Weather limitations</b>	The limiting moisture contents for treated layers before priming shall be 50% of OMC of the top third of the layer.
		<b>A8.1.5</b>	<b>MATERIALS</b>	
			<b>PA8.1.5.1 Bituminous material</b>	The priming material shall be one of the following as specified in Part C: Measurement and Payment: C8.1.1.3: Inverted Bitumen Emulsion and MC-30 cut-back bitumen
		<b>A8.1.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A8.1.7.5 Opening to traffic</b>	Blinding of the subbase and base layers shall be done at all intersections.
		<b>A8.4.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A8.4.7.1 Continuous graded asphalt</b>	Where the required asphalt thickness exceeds 25mm at any position, no hand placement shall be allowed, except on the patching done the temporary works.



## COTO CHAPTER 9: ASPHALT LAYERS

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
9			ASPHALT LAYERS	
	A9.1		ASPHALT LAYERS	
		A9.1.2	DEFINITIONS	
			Asphalt mix types	<p>The following mix types will be used:</p> <p>St-E20 (PG64E-16{SBS})  Stone skeletal mix – For Base  Asphalt mix: Hot-mix asphalt  NMPS: 20 mm  For use in: Extreme heavy traffic loading and speed conditions (“E”)  Binder Modifier: Homogeneous modified (SBS)</p> <p>Sa-E14 (PG64E-16){EVA})  Sand skeletal mix – Continuous for surfacing  Designated: “Sa”  Asphalt mix: Hot-mix asphalt  NMPS: 14 mm  For use in: Extreme heavy traffic loading and speed conditions (“E”)  Binder Modifier: Homogeneous (EVA)</p> <p>Sa - V7(PG58E-22)</p> <p>Sand skeleton mix (i.e. continuously graded mix - levelling course)  Designated: “Sa”  Asphalt mix: Hot-mix asphalt  NMPS: 7 mm  For use in: Extreme heavy traffic loading and speed conditions (“E”)  Binder Modifier: none</p>
			Aggregate	<b>Stone Skeleton Class 1 aggregate</b> <b>Sand Skeleton Class 2 aggregate</b>
		A9.1.3	GENERAL	
			A9.1.3.1 Nominal mix proportions and application rates	
			Table A9.1.3-1: Nominal Mix Proportions of Stone Skeletal Mixes for Tender Purposes Bitumen (type and grade according to Project Documentation) (%)	<p>The bitumen type and grade is indicated under A9.1.2.</p> <p>The preliminary mix design base binder (%) shall be as indicated in Table A9.1.3-1</p>
			Table A9.1.3-2: Nominal Mix Proportions of Sand Skeletal Mixes for Tender Purposes	<p>The bitumen type and grade is indicated under A9.1.2.</p> <p>The preliminary mix design base binder (%) shall be as indicated in Table A9.1.3-1</p>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA													
			Bitumen (type and grade according to Contract Documentation) (%)														
			b) Bond coat and rolled-in chippings	<table><tr><td>Product</td><td>Nominal application rate</td></tr><tr><td>Suprabond</td><td>0.18l/m²</td></tr></table>	Product	Nominal application rate	Suprabond	0.18l/m²									
Product	Nominal application rate																
Suprabond	0.18l/m²																
		A9.1.4	DESIGN BY THE CONTRACTOR														
			A9.1.4.1 Mix Designs	The mix types and design levels are indicated under A9.1.2.													
			A9.1.4.2 Mix design requirements	<p>The following mix types will be used: Type = Stone Skeleton Mixes:</p> <p>St-E20 (PG64E-16{SBS}) Stone skeletal mix - Asphalt mix: Hot-mix asphalt NMPS: 20 mm Mix Design Level = Level III Binder Type = PG64E-16{ SBS} Nominal Thickness = 120mm Traffic= 10-30MESA Speed= 20-80km/h</p> <p>Type = Sand Skeleton Mixes:</p> <p>Sa-E14 (PG64E-16){EVA} Surfacing Continuous Mix Design Level = Level III NMPS = 14 Binder Type = PG64E-16(EVA) Nominal Thickness = 50mm Traffic= 10-30MESA Speed= 20-80km/h</p> <p>For the base and surfacing layers, the following preference testing shall be conducted additional to the requirements of SABITA Manual 35.</p> <p>Hamburg Wheel Tracking Test (HWTT)</p> <table><tr><td>Temp °C</td><td>Rep</td><td>Rut (mm)</td></tr><tr><td>50</td><td>20000</td><td>3</td></tr><tr><td>60</td><td>20000</td><td>6</td></tr><tr><td>64</td><td>20000</td><td>6</td></tr></table> <p>Note, the Plant trial shall also include (HWTT).</p> <p>Limits exceeding the above will only be considered by the approval by the Engineer.</p> <p>MMLS at 50 and 60°C shall be conducted on the trial section. The rut shall be less than &lt;2mm simulating traffic speed at 40km/h.</p> <p>- Levelling course Mix Design Level = Level II</p>		Temp °C	Rep	Rut (mm)	50	20000	3	60	20000	6	64	20000	6
Temp °C	Rep	Rut (mm)															
50	20000	3															
60	20000	6															
64	20000	6															

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>NMPS = 7            Binder Type = PG64E-16            Nominal Thickness = 20-40mm            Traffic= 10-30MESA            Speed= 20-80km/h</p> <p>Warm mix technology is not prescribed but will be considered if proposed by the Contractor. Note the payment item indicate no payment adjustment if proposed by the contractor.</p>
		<b>A9.1.5</b>	<b>MATERIALS</b>	
			<b>A9.1.5.2 Bituminous binders for asphalt mixes</b>	<p>Maximum pavement Design temperature Tmax = 64°C            Minimum grading temperature = -16°C            Traffic Speed = 20-80 km/h with &lt;20km/h at traffic signals and stops.            E80 Axles = &gt; 10 –30 million E80s            Fuel spillage consideration</p> <p>For Stone type (black base)            -Binder type PG64E-16{SBS}</p> <p>For sand type (Surfacing)            -Binder type PG64E-16(EVA)</p> <p>For sand type (levelling course)            -Binder type PG64E-16</p> <p>The Contractor shall submit a full PG certificate with raw data files of the proposed binder to the Engineer prior to commencing mix designs.</p> <p>The Contractor shall obtain from the Engineer the format of the additional PG certificate that need to be submitted. All data shall be submitted in this format.</p> <p>The type as well as percentage of modifier is not prescribed, however, the contractor shall indicate in the pricing schedule what polymer he shall be using.</p> <p>The contractor shall submit for the Engineer a SARA analysis of the base binder, and a full FTIR analysis at each stage of the aging process. This shall be repeat at all stages if the crude is changed.</p> <p>The %JNR recovery less than the 45% shall only be considered on the approval by the Engineer.</p> <p>No change in crude shall be implemented if not first approved by the Engineer.</p>
			<b>PA9.1.5.4 Aggregates</b>	
			<b>A9.1.5.5 Fillers</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>Table A9.1.5-7: Filler requirements</b>	Baghouse fines shall be limited to 2% by mass.
			<b>A9.1.5.8 Mix properties</b>	Design Level III is applicable for the following mixes:  St-E20 (PG64E-16{SBS})- Base Sa-E14 (PG64E-16{EVA})- <b>Surfacing</b>  Design Level II is applicable for:  Sa - V7(PG58E-22)
		<b>A9.1.6</b>	<b>CONSTRUCTION EQUIPMENT</b>	
			<b>A9.1.6.5 Rollers</b>	Only oscillating type vibratory compaction equipment may be used on bridge decks.
		<b>A9.1.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A9.1.7.11 Surfacing of bridge decks</b>	Surfacing Sa-E14 (PG64E-16{EVA}) Sand skeletal mix - Asphalt mix: Hot-mix asphalt NMPS: 14 mm For use in: Extreme heavy traffic loading and speed conditions ("E") Binder Modifier: Homogeneous (SBS)  Levelling course: Sa - V7(PG64E-22) Sand skeleton mix (i.e. continuously graded mix - levelling course) Designated: "Sa" Asphalt mix: Hot-mix asphalt NMPS: 7 mm For use in: Extreme heavy traffic loading and speed conditions ("E") Binder Modifier: SBS  St-E20 (PG64E-16{SBS}) Stone skeletal mix - Asphalt mix: Hot-mix asphalt NMPS: 20 mm For use in: Extreme heavy traffic loading and speed conditions ("E") Binder Modifier: Homogeneous (SBS)
		<b>A9.1.8</b>	<b>WORKMANSHIP</b>	
			<b>A9.1.8.8 Sampling</b>	
			<b>b) Coring of completed layers</b>	The Contractor shall provide suitable coring machines capable of cutting 100mm or 150mm diameter cores from the completed asphalt layers.



## COTO CHAPTER 10: SURFACE TREATMENTS

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA									
10			SURFACE TREATMENTS										
	A10.1		GENERAL REQUIREMENTS FOR SURFACE TREATMENTS										
		A10.1.3	GENERAL										
			PA10.1.3.2 Weather limitations	<p>The Seal Embargo Period is the period during the months of 1 May to 30 August.</p> <p>During this period, winter seals consisting of a winter grade binder S-E1, would be considered for</p> <p>1) Temporary widenings / traffic accommodation, the following shall apply:</p> <p>a. No traffic on the seal for 1 week</p> <p>b. Seal to be rolled daily for a week, only when surface temperature has been reached.</p> <p>2) Permanent works, however taking the following shall apply:</p> <p>a. Seal only when road surface reaches temperature</p> <p>b. No traffic on the seal for 1 week</p> <p>c. Seal to be rolled daily for a week, only when surface temperature has been reached.</p>									
			PA10.1.3.14 Nominal rates of application for tender purposes	<p>The following Seal types are to be utilised:</p> <table><tr><th>Type</th><th>Aggregate</th><th>Binder</th></tr><tr><td>S2</td><td>20mm / 10mm</td><td>PG58E-22 (SBS) {S-E2} {S-E1} for winter grade</td></tr><tr><td>S1</td><td>10mm</td><td>PG58V-22 Temporary work</td></tr></table> <p>Nominal rates as per table A10.1.3-2 to A10.1.3-4 shall apply.</p>	Type	Aggregate	Binder	S2	20mm / 10mm	PG58E-22 (SBS) {S-E2} {S-E1} for winter grade	S1	10mm	PG58V-22 Temporary work
Type	Aggregate	Binder											
S2	20mm / 10mm	PG58E-22 (SBS) {S-E2} {S-E1} for winter grade											
S1	10mm	PG58V-22 Temporary work											
		A10.1.5	MATERIALS										
			A10.1.5.10 Single sized aggregate										
			a) Grading	The Aggregate Grade is indicated in the Pricing Schedule									

**COTO CHAPTER 11: ANCILLARY ROAD WORKS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
11			<b>ANCILLARY ROAD WORKS</b>	
	A11.1		<b>PITCHING, STONework, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION</b>	
		A11.1.5	<b>MATERIALS</b>	
			A11.1.5.6 Geotextiles	Grade A3 / U34
	A11.2		<b>NON-STRUCTURAL GABIONS</b>	
		A11.2.7	<b>EXECUTION OF WORKS</b>	
			A11.2.7.2 Constructing gabion boxes and mattresses	
			g) Assembly	The assembly details are indicated on Drawing No. 20568/TD/40 and 20568/TD/41
	A11.3		<b>GUIDE BLOCKS AND KILOMETRE MARKERS</b>	
	A11.4		<b>ROAD RESTRAINT SYSTEMS</b>	
		PA11.4.1	<b>SCOPE</b>	
		A11.4.5	<b>MATERIALS</b>	
			A11.4.5.2 Materials	
			c) Guardrail posts	The timber guardrail posts shall be treated with Creosote that complies with SANS 616.
		A11.4.7	<b>EXECUTION OF THE WORKS</b>	
			A11.4.7.2 Construction of guardrails on timber posts	No additional specifications other than those contained in the contract documentation are applicable to this sub-clause and as detailed in Drawing no. 20568/TD/16, 20568/TD/17 and 20568/TD/19.
	A11.5		<b>FENCING</b>	
		A11.5.5	<b>MATERIALS</b>	
			A11.5.5.2 Straining posts, stays, standards and droppers	The timber used shall be treated with Creosote that complies with SANS 616.
			A11.5.5.12 Alternative materials	Refer to Drawing no. 20568/TD/04 and 20568/TD/05 for materials required for pedestrian, security or game fences.
		A11.5.7	<b>EXECUTION OF THE WORKS</b>	
			A11.5.7.7 Erecting special purpose fencing	The specification, materials and standards for erecting fences shall be in accordance with the provisions of Drawing no.20568/TD/04 and 20568/TD/05.
			A11.5.7.11 Temporary fencing and gates	The specification, materials and standards for Erecting fences shall be in accordance with the provisions of Drawing no.20568/TD/04

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				and 20568/TD/05. Temporary fences shall erected along the deviation at the river bridge.
	<b>A11.6</b>		<b>ROAD SIGNS</b>	
		<b>A11.6.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A11.6.7.1 Classification of Materials</b>	Overbreak in width or depth will be filled by the Contractor and shall not be measured separately for payment.
			<b>A11.6.7.2 Manufacturing of road signboards and supports</b>	
			<b>d) Galvanizing</b>	No painting required.
			<b>A11.6.7.3 Road sign faces and painting</b>	
			<b>b) Preparing surfaces and applying paint and retro-reflective sheeting</b>	No painting required.
			<b>PA11.6.7.5 Erecting road signs</b>	
			<b>a) Position</b>	The position of road signs are indicated in Drawing no. 20568/RM/01 to 20568/RM/15.
			<b>b) Excavation and backfilling</b>	Excavation and backfilling shall be in accordance with the provisions as indicated on Drawing no. 20568/TD/21, 20568/TD/25 and 20568/TD/26. Backfilling with concrete shall be as instructed by the Engineer.
			<b>A11.6.7.7 Dismantling, storing and re-erecting existing road signs</b>	Dismantled road signs shall be re-used.  Dismantling of signs will include sign panels and ground mounted sign supports.
	<b>C11.6</b>		<b>ROAD SIGNS PART C: MEASUREMENT AND PAYMENT</b>	
	<b>A11.7</b>		<b>ROAD MARKINGS AND ROAD STUDS</b>	
		<b>A11.7.5</b>	<b>MATERIALS</b>	
			<b>PA11.7.5.2 Materials</b>	
			<b>a) Marking materials</b>	
			<b>(ii) Retro-reflective road marking</b>	Water Borne Paint shall be the base type of the paint.
			<b>(iii) Thermoplastic road marking material</b>	Application of the permanent road marking will be performed once 12-month defects liability period has ended.
			<b>b) Road studs</b>	The road studs shall be in accordance with Table A11.7.5-1 with the following applications: RSA-1 for the Yellow Shoulder line RSA-1 for the Centre line dividing lanes
	<b>A11.8</b>		<b>LANDSCAPING AND PLANTING PLANTS</b>	
		<b>A11.8.5</b>	<b>MATERIALS</b>	
			<b>A11.8.5.2 Materials</b>	



CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>b) Fertiliser/soil-improvement material</b>	The type of fertilizer/soil-improvement material to be used shall be Superphosphate or Limestone ammonium nitrate, 2:3:2 (22) and 3:2:1 (25).
			<b>Grass sods</b>	Grass sods shall be harvested in September, Planted in October and watered until fully established establishment.
		<b>A11.8.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A11.8.7.3 Grassing</b>	
			<b>c) Hydroseeding</b>	The types and mixtures of seeds per hectare to be used shall be as stated under A11.8.5.2.
			<b>f) Sowing by hand</b>	The types and mixtures of seeds per hectare to be used shall be as stated under A11.8.5.2.
			<b>g) Other methods of grassing</b>	Other specific methods of grassing to be used shall be approved by the Engineer.
			<b>A11.8.7.6 Alternative slope and erosion protection</b>	Erosion blankets shall be used to ensure that that grassing is established without major erosion.

**COTO CHAPTER 12: GEOTECHNICAL APPLICATIONS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
12			<b>GEOTECHNICAL APPLICATIONS</b>	
	<b>A12.1</b>		<b>PILING</b>	
		<b>A12.1.3</b>	<b>A12.1.3.1 Method Statements</b>	The method statements shall be prepared and submitted to the Engineer for approval 4 weeks before the commencement of the anticipated facet of work. No permanent works can commence without the Engineer's approval.
			<b>A12.1.3.2 Materials and materials design</b>	As detailed on the drawings.
			<b>A12.1.3.4 Pile type and piling layout</b>	As detailed on the drawings (900 dia. Auger piles).
		<b>A12.1.5</b>	<b>MATERIALS</b>	
			<b>A12.1.5.2 Concrete and grout</b>	As detailed on the drawings.
			<b>A12.1.5.6 Reinforcement steel</b>	As detailed on the drawings.
			<b>A12.1.5.10 Steel tubes</b>	Temporary steel casings will be required due to high water levels and upper soft material layers.
		<b>A12.1.6</b>	<b>CONSTRUCTION EQUIPMENT</b>	
			<b>A12.1.6.1 General</b>	Temporary cased 900mm diameter auger piles to be used to found the substructures of the bridge. The piles will be socketed 3m deep into hard rock using coring equipment. Refer to geotechnical report for expected hardness of rock details. The expected pile depth is 13.0m.
			<b>A12.1.6.2 Installation equipment</b>	Drilling rigs shall contain computer-controlled monitoring and control systems.
			<b>A12.1.6.12 Equipment for precast-, steel tube- or sectional steel piles</b>	Not applicable.
		<b>A12.1.7</b>	<b>EXECUTION OF WORKS</b>	
			<b>A12.1.7.1 Test Piles</b>	Tests piles are not required.
			<b>A12.1.7.5 Construction Tolerances</b>	Construction tolerances as per Clause A12.1.8.1
			<b>A12.1.7.6 Piling Materials</b>	Refer to the geotechnical report.
			<b>A12.1.7.7 Cast in situ concrete piles</b>	
			<b>b) Formation of holes for piles</b>	Temporary cased 900mm diameter auger piles. Refer to foundation drawing for more detail regarding the position and depth of the required piles.
			<b>e) Installation requirements</b>	
			<i>(i) Under slurry piles</i>	Not applicable.
			<i>(iv) Oscillator piles</i>	Not applicable.
			<i>(vi) Driven cast in situ piles</i>	Not applicable.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
		<b>A12.1.8.</b>	<b>WORKMANSHIP</b>	
			<b>A12.1.8.1 Tolerances</b>	Construction tolerances as per Clause A12.1.8.1
			<b>A12.1.8.2 Concrete and grout</b>	As detailed on the drawings.
			<b>A12.1.8.3 Core drilling</b>	As detailed on the drawings.
			<b>A12.1.8.4 Load tests on piles</b>	
			<b>a) Static load testing</b>	
			<i>(ii) Loading</i>	Not applicable.
			<i>(iv) Testing self-drilling micro piles</i>	Not applicable.
			<b>c) Pile Integrity testing</b>	<u>Pile integrity testing and Cross-Hole Sonic Logging (CHSL) should be undertaken on all piles.</u>
	<b>C12.1</b>		<b>PILING</b>	
			<b>(ii) Notes on measurement and pay items</b>	Will be measured according to the relevant pay items.
	<b>D12.1</b>		<b>PILING</b>	
		<b>D12.1.2</b>	<b>GENERAL</b>	
	<b>A12.6</b>		<b>MECHANICALLY STABILISED EARTH AND GABIONS</b>	
		<b>A12.6.3</b>	<b>GENERAL</b>	
			<b>A12.6.3.2 Method Statements</b>	The method statements shall be prepared and submitted to the Engineer for approval 4 weeks before the commencement of the anticipated facet of work. No permanent works can commence without the Engineer's approval.
			<b>A12.6.3.3 Materials and materials design approvals</b>	
		<b>A12.6.4</b>	<b>DESIGN BY CONTRACTOR / PERFORMANCE BASED SYSTEMS</b>	
			<b>A12.6.4.1 General</b>	Not applicable.
		<b>A12.6.5</b>	<b>MATERIALS</b>	
			<b>A12.6.5.1 Materials for MSE walls</b>	Not required
			<b>A12.6.5.2 Materials for gabions</b>	
			<b>i) Alternative materials</b>	None
		<b>A12.6.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A12.6.7.1 MSE walls and slopes</b>	Not required
			<b>A12.6.7.2 Gabions</b>	
			<b>c) Constructing gabions</b>	
			<i>(iii) Assembly</i>	As detailed on the drawings

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
		<b>A12.6.8</b>	<b>WORKMANSHIP</b>	
			<b>PA12.6.8.1 MSE Walls</b>	Not required
	<b>D12.6</b>		<b>MECHANICALLY STABILISED EARTH WALLS AND GABIONS</b>	
		<b>D12.6.1</b>	<b>GENERAL</b>	
	<b>A12.7</b>		<b>TRENCHLESS METHODS</b>	
		<b>A12.7.3</b>	<b>GENERAL</b>	
			<b>A12.7.3.1 Services and obstructions</b>	<p>Before any work can commence the Contractor shall verify the actual position of any services or obstructions. Should an unidentified obstruction be encountered which prohibits further advance of equipment, the Engineer and Contractor shall jointly devise a method for penetration/ avoidance/possible relocation. The cost of additional operations required for this task shall be agreed between Engineer and Contractor prior to commencement. Protection of services must be a priority.</p>
			<b>A12.7.3.2 Method Statements</b>	<p>The method statements and typical drawings submitted by the Contractor with his tender submission, describing key facets such as method, key plant, materials, personnel and, programme constraints of the envisaged construction process, shall form the basis for the detailed method statements required for the works to be executed on the project.</p> <p>These method statements shall be prepared and submitted to the Engineer for approval for each facet of the work at the start of construction, within time scales specified. The onus lies with the Contractor to ensure that the information is gathered, and associated activities are completed expeditiously so as to avoid any delays in the commencement, continuation and completion of the required works. Unless otherwise specified or provided for in the Contract Documentation no permanent works shall be commenced until the Engineer's approval has been obtained. Due allowance shall be made for obtaining alternative materials, resubmissions and redesigns, all to the required/approved standards, methods and practises in attending to these requirements. Particular attention shall be paid to the early submission of materials-, concrete- and grout mix designs where parameters at various ages may be specified. No consideration for extension of the contract period will be entertained for delays incurred in meeting these requirements.</p> <p>Trials, if applicable, shall be conducted and based on outcomes thereof, may require that changes be made to the relevant method statements. Once approved in writing by the</p>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>Engineer, these shall become the method statements in accordance whereby the relevant portion of the works shall henceforth be executed. Notwithstanding, the Engineer may require revision from time to time if circumstances during construction arise which warrants change.</p> <p>The Contractor shall, however, remain responsible for all work-methods, materials, plant and equipment used, notwithstanding acceptance by the Engineer.</p> <p><b>PLANT</b></p> <p><b>(a) General</b></p> <p>The Contractor shall provide and use suitable equipment for handling pipes and placing them in position for jacking, for jacking the pipes, for the lubrication of the outer surface of the pipeline, and for excavation within the pipe.</p> <p><b>(b) Jacks</b></p> <p>Each set of jacks shall be fitted with a suitably calibrated pressure gauge in good working order and such that the actual jacking forces can be read at any time during the jacking operation. To transfer the load from the jacks to the pipes, suitable thrust plates shall be provided for placing against the ends of the pipes.</p> <p><b>(c) Shield</b></p> <p>A suitable shield for fitting to the front of the lead pipe shall be provided by the Contractor to protect workmen and prevent collapse of the face or roof of the excavation ahead of the jacked structure. The shield shall be directionally adjustable.</p> <p><b>(d) Lighting</b></p> <p>The contractor shall provide adequate lighting for the execution of the Works.</p>
			<b>A12.7.3.3 Materials and materials design approvals</b>	All materials used in the works shall meet the appropriate standards and shall be subject to the approval of the Engineer. The Contractor shall submit details and product certificates where appropriate to the Engineer two weeks before ordering and delivery to site.
	<b>A12.8</b>		<b>GROUND DRAINAGE</b>	Not applicable
	<b>A12.11</b>		<b>GEOSYNTHETICS</b>	
		<b>A12.11.3</b>	<b>GENERAL</b>	
		<b>A12.11.5</b>	<b>MATERIALS</b>	
			<b>A12.11.5.1 General</b>	<p>The uses of geosynthetics include, but may not be limited to:</p> <ul style="list-style-type: none"> <li>• Subsoil drains (Grade A2)</li> <li>• Gabion baskets/mattresses (Grade A4)</li> <li>• Stabilisation of the fill (Clause A12.11.3)</li> </ul>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA														
				Geosynthetic materials for subsoil drainage to be tested by an approved testing facility.														
			PA12.11.5.4 Grade Classification	<p>Table A12.11.5-1 shall be used for determining the grade of the geosynthetics:</p> <p>TABLE A12.11.5-1: Grade Classification of Geosynthetics</p> <table><tr><th rowspan="2">Property</th><th colspan="2">Grade</th></tr><tr><th>2</th><th>3</th></tr><tr><td>Penetration load (CBR) (minimum), N Test Method: SANS 12236: 2013</td><td>2400</td><td>1500</td></tr><tr><td>Puncture resistance (maximum), mm Test Method: SANS 13433: 2013</td><td>26</td><td>27</td></tr><tr><td>Water percolation (minimum), l/m<sup>2</sup>/s Test Method: SANS 11058: 2013</td><td>20</td><td>20</td></tr></table>	Property	Grade		2	3	Penetration load (CBR) (minimum), N Test Method: SANS 12236: 2013	2400	1500	Puncture resistance (maximum), mm Test Method: SANS 13433: 2013	26	27	Water percolation (minimum), l/m <sup>2</sup> /s Test Method: SANS 11058: 2013	20	20
Property	Grade																	
	2	3																
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## COTO CHAPTER 13: STRUCTURES

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
13			<b>STRUCTURES</b>	
	<b>A13.1</b>		<b>FOUNDATIONS</b>	
		<b>A13.1.3</b>	<b>GENERAL</b>	
			<b>A13.1.3.2 Channel preservation</b>	
			<b>a) Work on, over, in or adjacent to watercourses</b>	
			<i>(i) General</i>	Refer to the Environmental Management Plan / Programme and Water Use License. (EMPI / EMPr / WUL)  Flow of streams/rivers to be maintained at all times. Where construction works are required in the river or stream, the contractor shall provide an alternative relief culvert and ensure that water flows continuously under the structure.
			<i>(iv) Water quality requirements</i>	Refer to the Environmental Management Plan / Programme and Water Use License. (EMPI / EMPr / WUL) s per environmental approval.
			<b>A13.1.3.4 Method Statements</b>	Method statements for each facet of the work will be submitted to the engineer for review at least 2 weeks prior to the commencement of the works. No part of the permanent works can commence without the Engineer's approval.
			<b>A13.1.3.5 Hold points</b>	Hold points for each facet of work shall include: <ul style="list-style-type: none"> <li>• Approval of method statements</li> <li>• Approval of wayleaves</li> <li>• Setting out</li> <li>• Approval of insitu conditions (foundation excavation levels, insitu compaction test results, etc)</li> <li>• Mix design</li> <li>• Formwork design</li> <li>• Fixing of reinforcement</li> <li>• Concrete placement</li> <li>• Stripping shutters &amp; props</li> </ul>
		<b>A13.1.5</b>	<b>MATERIALS</b>	
			<b>A13.1.5.8 Soil cement</b>	Soil cement to be handled and compacted with similar technique to concrete and must consist of G6 quality material and 6% cement content.
		<b>A13.1.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.1.7.1 Work access and drainage</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>a)General</b>	<p>Method statement for work access and drainage will be submitted to the engineer for review at least 2 weeks prior to the implementation thereof.</p> <p>The contractor may not commence with construction until written permission has been obtained from the Engineer.</p> <p>A method statement is required for all lateral support system design and installation (if required).</p> <p>After construction works in streams and rivers, all construction materials, temporary works and platforms, river diversions shall be removed, and the stream/river restored to its original state.</p> <p>Rehabilitation of bridges over rail requires approvals from Transnet. A method statement is required for works over the railway line.</p>
			<b>A13.1.7.2 Excavation</b>	
			<b>a) General</b>	<p>The expected excavation profile is indicated on the drawings.</p>
			<b>g) The safety and protection of excavations</b>	<p>Contractor shall take all necessary precautions to safeguard stability and safety of excavations adjacent to road formations.</p> <p>Adequate lateral support must be provided in order not to undermine adjacent roads.</p> <p>The contractor shall give due attention to: Execution of excavation work under supervision of Contractor's Competent Person (CCP):</p> <ul style="list-style-type: none"> <li>• Stability of excavations and need to provide sufficient suitable shoring or bracing</li> <li>• Provision of an effective barrier or fence along the perimeter to safeguard workers and where appropriate, vehicles</li> <li>• Prevention of run-off and surface drainage water from entering the excavations</li> <li>• Where demolition and construction in half widths is required, the contractor is to implement measures to maintain the stability of the remaining portion of structure in use.</li> </ul>



CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				All excavations must be barricaded from pedestrians and vehicles. Construction hazards signage must be installed and kept in place until the end of construction
			<b>j) Work on, over, under or adjacent to railway lines</b>	The contractor is to ensure that the relevant rail authorities have been notified of repair work and to further ensure that all required permits and approvals are in place prior to any construction work being done to the railway structure as well as on, over and adjacent to the railway lines.
			<b>A13.1.7.5 Backfill and fill near structures</b>	
			<b>a) General</b>	Backfill behind abutments, return/wing walls and reinforced concrete retaining walls shall only take place when passive backfill is in place and until the concrete is more than 14 days old.  Backfill behind walls of precast culverts and in-situ cell or frame structures, to be done simultaneously on both sides of the structure, with a maximum difference in level of 150mm, and only after the top slab has been cast, cured, and gained 50% of the specified strength.
			<b>b) Backfill</b>	Backfill is measured to top of original ground surface.
			<b>d) Fill within restricted area</b>	Restricted fill area is all fill areas within a 3m distance from a structure wall, column or slab.
			<b>A13.1.7.6 Foundation fill</b>	Borehole/Test pit profiles are indicated on the drawings as well as the expected founding level.  <b>Rock (for rock fill):</b> Stones/rock shall not be a sedimentary type rock, and shall be hard, angular veld or quarry stones of such quality that they will not disintegrate on exposure to water or weathering. Cobbles and river boulders shall on account of their rounded shape, not be used. The rock shall be free from soil, shale, mudstone, basalt and dolomitic soft rock or organic material. Rock for rockfill must be uniform, with a maximum largest stone/rock dimension of 250mm, and at least 85% of the rocks shall have an average least dimension of 150mm. Neither the breadth nor the thickness of a single stone shall

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>be less than one-third its length, i.e it should not be flaky</p> <p><b>Crushed stone foundation fill:</b> Crushed stone used for construction of crushed stone foundation fill shall be 20mm stone used and approved for concrete works.</p> <p>Mass concrete: Concrete class C12/15-20 Concrete blinding: Concrete class C12/15-20.</p> <p>Imported backfill material to be G5 quality obtained from commercial sources.</p>
	<b>B13.1</b>		<b>FOUNDATIONS</b>	
		<b>B13.1.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>B13.1.7.2 Excavation</b>	
			<b>a) General</b>	Major Culverts: The footprint at founding level of the excavation profile will follow the perimeter of the imported foundation fill. It shall be 1m wider than the footprint of the concrete floor slab, as indicated on the drawings.
	<b>D13.1</b>		<b>FOUNDATIONS</b>	No additional requirements.
	<b>A13.2</b>		<b>FALSEWORK, FORMWORK AND CONCRETE FINISH</b>	
		<b>A13.2.3</b>	<b>GENERAL</b>	
			<b>A13.2.3.1 Method Statements</b>	<p>Method statements for each facet of the work will be submitted to the engineer for review at least 2 weeks prior to the commencement of the works.</p> <p>No part of the permanent works can commence without the Engineer's approval.</p>
			<b>A13.2.3.2 Hold points and approvals</b>	<p>Hold points for each facet of work shall include:</p> <ul style="list-style-type: none"> <li>• Approval of method statements</li> <li>• Temporary works design for the falsework. It must include load capacity and technical specifications of all elements making up the falsework. Must also include preparation of founding material and bearing pressure under supports (if applicable)</li> <li>• Condition of forms</li> <li>• Setting out of formwork</li> <li>• Completion of the erection of falsework and formwork</li> <li>• Approved Falsework, Formwork and concrete finish checklist.</li> <li>• Completion of the stripping of formwork for the inspection of the finish</li> </ul>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				The hold points requiring the Engineer's approval will be agreed as part of the approval process of the Contractor Quality Management Plan.
		<b>A13.2.5</b>	<b>MATERIALS</b>	
			<b>A13.2.5.3 Formwork</b>	
			<b>a) Tongue-and-groove boarding</b>	No tongue-and-groove boarding shall be used for formwork on this project.
			<b>c) Void formers</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
		<b>A13.2.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.2.7.2 Formwork</b>	
			<b>a) General</b>	All visible corners must be chamfered 25mm x 25mm unless shown otherwise on the drawings.
			<b>b) Formed surfaces: Classes of finish</b>	
			<i>(i) General</i> 3. Class F3 surface finish	Steel forms may be used to form class F3 surface finishes.
			<b>d) Formwork for open joints</b>	Open joints widths do not exceed 150mm
			<b>A13.2.7.3 Removing the Falsework and Formwork</b>	
			<b>b) Technical criteria for falsework and formwork removal</b>	<p>The Contractor is to refer to Section A13.2.7.3 of COTO for the stripping time of formwork unless otherwise stated on the construction drawings.</p> <p>(i) Stripping time for culvert roof slabs: The minimum period for the falsework and formwork for the culvert roof slabs is 7 days, on condition that the concrete attained 80% of its specified strength by that time.</p>
	<b>D13.2</b>		<b>FALSEWORK, FORMWORK AND CONCRETE FINISH</b>	
		<b>D13.2.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D13.2.3.2 Performance specifications</b>	No additional requirements.
	<b>A13.3</b>		<b>STEEL REINFORCEMENT</b>	
		<b>A13.3.3</b>	<b>GENERAL</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>A13.3.3.1 Method Statements</b>	The method statements for each facet of the work will be submitted to the engineer for review at least 3 weeks before the first casting of the concrete is programmed to occur. The engineer will respond to the submission within 10 working days
			<b>A13.3.3.2 Hold points and approvals</b>	<p>Should there be any discrepancy or ambiguity faced by the contractor regarding the installation of reinforcement, a hold point is deemed necessary which requires the Engineer's approval.</p> <p>A hold point inspection is also necessary once the contractor completes the installation of reinforcement for each facet of work. Approval of the engineer for completeness is required before concrete is poured.</p> <ul style="list-style-type: none"> <li>• Approval of cover blocks</li> <li>• Approval of reinforcement supplier</li> <li>• Approved steel reinforcement checklist</li> <li>• Any other hold points agreed to between</li> <li>• the Engineer and the Contractor.</li> </ul>
		<b>A13.3.5</b>	<b>MATERIALS</b>	
			<b>A13.3.5.1 Steel bars</b>	The type of reinforcing bar is indicated with the symbols R, Y or Z on the drawings in accordance with SANS 282.
		<b>A13.3.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.3.7.3 Placing and fixing</b>	The position of the reinforcement is shown on the drawings. Spacing ladders for use with sliding formwork are not applicable to this project.
			<b>A13.3.7.4 Cover and supports</b>	Cover to reinforcement and positioning of stools are as detailed on the drawings.
			<b>A13.3.7.5 Laps and joints</b>	The positions of laps, joints, splices and mechanical couplings are shown on the reinforcement drawings
		<b>A13.3.8</b>	<b>WORKMANSHIP</b>	
			<b>A13.3.8.2 Welding</b>	If welding of reinforcement is required, permission must be sought from the Engineer
			<b>PA13.3.8.4 Tolerances</b>	
			<b>c) Spacing between bars</b>	The spacing between closely spaced parallel bars is not to be less than the maximum size of the aggregate used in the concrete plus 5.0mm
	<b>D13.3</b>		<b>STEEL REINFORCEMENT</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
		<b>D13.3.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D13.3.3.2 Performance specifications</b>	<p>All steel reinforcement must comply with the specifications set out in SANS 920:2011. A certificate must accompany each batch of reinforcement from an approved recognised laboratory.</p> <p>The Engineer may also request independent tests to confirm the compliance of the reinforcement used.</p>
	<b>A13.4</b>		<b>CONCRETE</b>	
		<b>A13.4.3</b>	<b>GENERAL</b>	
			<b>A13.4.3.1 Method Statements</b>	<p>Method statements for the casting of the different structure elements are required, and must include items such as placing, compaction, curing, of the concrete. Method statements for each facet of the work shall be submitted 4 weeks prior to the programmed commencement of the facet of work. No part of the permanent works can commence without the Engineer's approval.</p>
			<b>A13.4.3.2 Hold points and approvals</b>	<p>Hold points for each facet of work shall include:</p> <ul style="list-style-type: none"> <li>• Approval of method statements</li> <li>• Approval of concrete mix designs</li> <li>• Setting out</li> <li>• Completion and approval of the erection of falsework and formwork</li> <li>• Completion and approval of the reinforcement fixing</li> <li>• Approval of curing compound and curing method.</li> <li>• Approval of pre-concreting checklist</li> </ul> <p>The hold points requiring the Engineer's approval will be agreed as part of the approval process of the Contractor Quality Management Plan.</p>
		<b>A13.4.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>PA13.4.7.12 Placing and Compaction</b>	
			<b>a) Placing</b>	Pumping of concrete will be permitted as per approved method statements.
			<b>g) Construction joints</b>	Construction joints will be allowed only where indicated on the drawings or where approved by the Engineer.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>h) Curing and surface protection</b>	The method of curing, inclusive of proposed curing periods, to be submitted together with the contractor's detailed concreting method statement to the Engineer for approval. Minimum curing period is 7 days from the day concrete is cast.
			<b>i) Pipes, ferrules and conduits</b>	Minimum cover over pipes and fittings embedded in the concrete are not to be less than the cover to reinforcement in the area under consideration.  Ends of ferrules used for bracing formwork to the thoroughly cleaned out before being closed off with a non-expansive concrete grout of equal or higher strength to the surrounding concrete.
	<b>D13.4</b>		<b>CONCRETE</b>	
			<b>D13.4.3.1 Performance specifications</b>	Compliance certificates for all materials used for each concrete mix must be made available by the contractor for the Engineer's approval. Statistical analysis for concrete strength and durability indices of concrete samples will be carried out as per chapter 20
	<b>A13.5</b>		<b>PRESTRESSING</b>	
		<b>A13.5.3</b>	<b>GENERAL</b>	
			<b>A13.5.4.1 Method Statements</b>	Method statements for each facet of the work shall be submitted 8 weeks prior to the programmed commencement of the facet of work. No part of the permanent works can commence without the Engineer's approval.
			<b>A13.5.4.2 Hold points and approvals</b>	Hold points for each facet of work shall include: <ul style="list-style-type: none"> <li>• Approval of drawings prepared by the prestressing specialist</li> <li>• Installation of ducts, anchors and bursting reinforcement</li> <li>• Commencement of stressing of cables of strands/cables</li> <li>• Completion of stressing prior to grouting</li> </ul>
			<b>A13.5.4.3 Technical data</b>	The following technical data is shown on the drawings: <ul style="list-style-type: none"> <li>a) Tendon alignment</li> <li>b) Tendon system</li> <li>c) Tensioning the tendons</li> <li>d) Tensioning force</li> </ul>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				e) Extension f) Prestressing losses in tendons g) Anchorages h) Bursting reinforcement i) Pre-camber
		<b>A13.5.5</b>	<b>MATERIALS</b>	
			<b>A13.5.5.2 Prestressing steel</b>	
			<b>f) Galvanising</b>	Galvanised prestressing steel shall not be permitted to be used on this project.
			<b>A13.5.5.4 Sheaths</b>	Galvanised sheathing shall not be permitted to be used on this project
		<b>A13.5.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.5.7.3 Post-tensioning</b>	
			<b>e) Tensioning</b>	
			<i>(ii) Tensioning sequence</i>	The sequence of tensioning to be followed and the details of partial tensioning of tendons where required are shown on the drawings.
			<i>(iii) Assembling the equipment, and safety precautions</i>	The calibration certificates for the jacking equipment shall be submitted to the engineer 2 weeks prior to commencing stressing of the cables/bars
	<b>A13.7</b>		<b>JOINTS</b>	
		<b>A13.7.3</b>	<b>GENERAL</b>	
			<b>A13.7.3.1 Method Statements</b>	The method statements shall be prepared and submitted to the Engineer for approval 3 weeks before the commencement of the anticipated facet of work. No permanent works can commence without the Engineer's approval.
			<b>A13.7.3.2 Hold points and approvals</b>	The hold points requiring the Engineer's approval will be agreed as part of the approval process of the Contractor Quality Management Plan
		<b>A13.7.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.7.7.1 Filled and unfilled joints</b>	
			<b>b) Filled joints</b>	The dimensions and filler material to be used for filled joints are indicated on the drawings.
			<b>c) Unfilled joints</b>	The dimensions for unfilled joints are indicated on the drawings.
			<b>d) Concrete nosings forming the edges of expansion joints shall be constructed as follows</b>	Not required.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>A13.7.7.2 Asphaltic plug proprietary type expansion joint systems</b>	Not required.
			<b>A13.7.7.3 Sealing the joints</b>	
			<b>a) General</b>	Sealed joints must be watertight
			<b>b) Preparing the joints</b>	The primer must be applied inside of the temperature range specified.
			<b>A13.7.7.4 Proprietary expansion joints</b>	
			<b>b) Dimensions</b>	Not applicable.
			<b>c) Installing the expansion joints</b>	Not applicable.
	<b>D13.7</b>		<b>JOINTS</b>	
		<b>D13.7.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D13.7.3.2 Performance specifications</b>	No additional requirements.
	<b>A13.8</b>		<b>ANCILLARY STRUCTURAL ELEMENTS</b>	
		<b>A13.8.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.8.7.1 Barriers, parapets, railings and sidewalks</b>	
			<b>a) Concrete barriers and parapets</b>	As specified on the drawings.
			<b>b) Steel railings</b>	Not applicable
			<b>d) Numbers for structures</b>	
			<i>(i) Number plates</i>	As specified on the drawings.
			<i>(ii) Painted numbers</i>	Not applicable.
			<i>(iii) Numbers shaped in concrete</i>	Not applicable.
			<b>f) Service Ducts in Sidewalks and Structures</b>	As indicated on the drawings.
			<b>h) Transition blocks</b>	Not required
			<b>PA13.8.7.2 Drainage for structures</b>	
			<b>a) Weep holes, drainage pipes and channels</b>	As indicated on the drawings.
			<b>c) Synthetic filter fabric</b>	Non-woven geotextile, Grade A4. Placement as specified on the drawings.
			<b>d) Crushed stone in drainage strips behind walls</b>	As specified on the drawings.
			<b>A13.8.7.3 Bolt groups for electrification brackets</b>	Not required.
	<b>D13.8</b>		<b>ANCILLARY STRUCTURAL ELEMENTS</b>	



CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
		<b>D13.8.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D13.8.3.2 Performance specifications</b>	No additional requirements.
	<b>A13.9</b>		<b>STRUCTURAL STEELWORK FOR MINOR STRUCTURES</b>	
		<b>A13.9.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.9.7.1 Fabrication and assembly</b>	
			<b>a) General</b>	Steel required to be formed to another shape aside from flat and straight is indicated on the drawings where applicable.
			<b>f) Hollow sections</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
			<b>(m) Corrosion Prevention</b>	
			<i>(i) Painting</i>	Galvanised steel shall be painted where indicated on the drawings.
			<i>(ii) Sprayed metal coatings</i>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
			<b>A13.9.7.2 Erection</b>	
			<b>a) General</b>	The method of erection shall be submitted to the Engineer for approval.
	<b>D13.9</b>		<b>STRUCTURAL STEEL WORK FOR MINOR STRUCTURES</b>	
		<b>D13.9.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D13.9.3.2 Performance specifications</b>	Performance-based specifications are not applicable.

**COTO CHAPTER 14: REPAIR AND REHABILITATION OF STRUCTURES**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
14			<b>REPAIR AND REHABILITATION OF STRUCTURES</b>	
	<b>A14.1</b>		<b>ACCESS FOR BRIDGE REHABILITATION</b>	
		<b>A14.1.3</b>	<b>GENERAL</b>	<p>Rope access will not be permitted.</p> <p>Special attention is required for access to the piers (concrete columns) within the waterway – specifically to areas below the water surface as well as keeping the working areas below the water surface free from flooding.</p> <p>Access proposals from the contractor will be considered provided that the minimum traffic accommodation restrictions are not compromised.</p> <p>The contractor shall refer to the accommodation of traffic drawings provided and the SARTSM for the traffic control and safety measures required to protect the access to the structures. The contractor shall submit details of his proposed accommodation of traffic and safety measures in his method statement for approval by the engineer.</p> <p>Where required, the contractor shall provide safe access to pedestrians for the full duration of the construction period. A minimum of 1 m wide and 2.1 m high walkway clearance must be maintained.</p> <p>The Contractor shall submit to the Engineer at least 14 days before work on the existing structure is scheduled for construction a detailed analysis showing the effect of the stresses that may be induced on the permanent works by the Contractor's chosen method of access and construction.</p>
	<b>D14.1</b>		<b>ACCESS FOR BRIDGE REHABILITATION</b>	
		<b>D14.1.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D14.1.3.2 Performance specifications</b>	Performance-based specifications are not applicable.
	<b>A14.2</b>		<b>CORROSION SURVEY METHODS AND TESTING OF NEAR SURFACE CONCRETE PROPERTIES</b>	
		<b>A14.2.1</b>	<b>SCOPE</b>	Microscopic analysis of concrete cores: (a) Visual characterisation/crack profiling;

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				(b) Density measurement of concrete; (c) Scanning electron microscopy (SEM) and Energy dispersive spectroscopy (EDS) in accordance with ASTM C1723-16 for: (i) Micro-crack profiling; (ii) Characterise concrete mix; (iii) Elemental mapping; and (iv) Chloride profiling and carbonation depth analysis. (d) Alkali Silica Reaction (ASR) test
		<b>A14.2.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.2.7.4 Ingress of aggressive chemicals or environmental agents</b>	
			<b>a) Carbonation depth</b>	
			<i>(i) Extraction of core sample</i>	Concrete cores shall be drilled and extracted in accordance with the requirements of SABS 865:1994. The ends of all concrete cores shall be capped and not ground flat and true. The location at which cores are to be drilled will be as directed by the Engineer on site.
	<b>D14.2</b>		<b>CORROSION SURVEY METHODS AND TESTING OF NEAR SURFACE CONCRETE PROPERTIES</b>	
	<b>A14.3</b>		<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>	
		<b>A14.3.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.3.7.1 Sequence of execution</b>	<p>The method sequence of work and areas to be demolished are dependent on the Contractor programme.</p> <p>Demolition and repairs must be done in stages to ensure the cross-sectional areas of the respective elements are adequate to safely resist the applied loads and stresses.</p> <p>The Contractor's competent person (Pr.Eng Pr. Tech Eng) shall submit a method statement together with the concrete test reports showing the proposed repair method and sequence of repairs for the Engineer's review and acceptance. Repair work shall not proceed without the prior approval by the Engineer.</p>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>The Contractor shall request approvals from the Engineer:</p> <ul style="list-style-type: none"> <li>• Prior to breaking away any damaged concrete; and</li> <li>• Prior to the application of any repair materials, to confirm agreement of the repair area and depths for payment purposes.</li> </ul> <p>For any other hold points specified by the Engineer during construction for quality assurance purposes.</p>
			<b>A14.3.7.4 Removal of concrete from structural elements</b>	
			<b>a) Cutting back concrete to a new finished surface</b>	The final cut-back surface and the cut-back dimension to provide the prescribed concrete cover to the newly finished surface is shown on the drawings
			<b>b) Cutting back concrete to expose reinforcement</b>	The dimensions and outline of the reinforcement bars to be exposed from the concrete is shown on the drawings
			<b>A14.3.7.5 Removal of structural steel elements from existing structures</b>	Not required on this project
	<b>D14.3</b>		<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>	
	<b>A14.4</b>		<b>SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS</b>	
		<b>A14.4.3</b>	<b>GENERAL</b>	
			<b>A14.4.3.1 Method Statements</b>	Concrete repairs (particularly of supporting concrete elements) must be done in stages to ensure the cross-sectional area of the supporting element is adequate to safely resist the applied loads and stresses. The contractor's competent person (Pr.Eng Pr. Tech Eng) shall submit a method statement together with the concrete test reports showing the proposed repair method and sequence of repairs for the Engineer's review and acceptance. Repair work shall not proceed without the prior approval by the Engineer.
			<b>A14.4.3.2 Hold points and approvals</b>	<p>The contractor shall request approvals from the Engineer:</p> <ul style="list-style-type: none"> <li>• Prior to breaking away any damaged concrete; and</li> </ul>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<ul style="list-style-type: none"> <li>Prior to the application of any repair materials (repair mortars, grouts, epoxies, etc.), to confirm agreement of the repair area and depths for payment purposes.</li> <li>Etc. for any other hold points specified by the Engineer during construction for quality assurance purposes.</li> </ul>
		<b>A14.4.5</b>	<b>MATERIALS</b>	
			<b>A14.4.5.2</b> <b>Cementitious mortar or concrete</b>	
			<b>d) Performance requirements for cementitious mortar or concrete</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
			<b>A14.4.5.5 Proprietary cementitious repair systems</b>	
			<b>d) Curing of repaired surface</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
		<b>A14.4.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.4.7.3 Batching and Mixing</b>	
			<b>d) Proprietary cementitious repair compounds</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
		<b>A14.4.8</b>	<b>WORKMANSHIP</b>	
			<b>A14.4.8.1 Tolerances</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
			<b>A14.4.8.2 Testing</b>	
			<b>d) Acceptance testing</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
	<b>D14.4</b>		<b>SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS</b>	
		<b>D14.4.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D14.4.3.2 Performance specifications</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
	<b>A14.5</b>		<b>ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION</b>	
		<b>A14.5.5</b>	<b>MATERIALS</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>A14.5.5.1 Anchoring adhesive</b>	Anchoring adhesives to be submitted to the Engineer for approval prior to any use.
			<b>A14.5.5.2 Grout</b>	
			<b>c) Working characteristics of grout</b>	
			<i>(ii) Strength development, cure time and environmental conditions</i>	The compressive strength required within 24-hours is specified on the drawings.
			<b>A14.5.5.3 Crack injection and crack filling</b>	
			<b>e) Mechanical properties of cured injectable adhesive</b>	
			<i>(i) Moisture resistance</i>	The adhesive needs to comply with Class F1 as defined in EN 1504-5.
		<b>A14.5.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.5.7.2 Grouting</b>	
			<b>e) Batching and mixing</b>	No additional specifications other than those contained in the contract documentation are applicable to this subsection.
	<b>D14.5</b>		<b>ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION</b>	
		<b>D14.5.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D14.5.3.1 Performance specifications</b>	Performance-based specifications are not applicable.
	<b>A14.7</b>		<b>PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE</b>	
		<b>A14.7.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.7.7.4 Protective surface treatment</b>	Protective treatments to exposed areas have been indicated in the Bill of Quantities
	<b>A14.9</b>		<b>REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS</b>	
		<b>A14.9.3</b>	<b>GENERAL</b>	Traffic accommodation details have been provided in accordance with SADC Road Traffic Signs Manual Volume 2 Chapter 13 and indicated on the drawings
		<b>A14.9.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.9.7.3 Repair of expansion joints</b>	Repair of bridge expansion joints details are as shown on the drawings

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>A14.9.7.4 Repair of handrails</b>	
			<b>b) Non-metallic handrails</b>	The replacement of handrail stanchions and railings are as shown on the drawings
			<b>A14.9.7.8 Replacement and refurbishment of ancillary elements</b>	Details concerning the replacement or refurbishment of ancillary bridge elements are as shown on the drawings

**COTO CHAPTER 20: QUALITY ASSURANCE**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
<b>20</b>			<b>QUALITY ASSURANCE</b>	
	<b>A20.1</b>		<b>TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP</b>	
		<b>A20.1.3</b>	<b>TESTING METHODS</b>	
			<b>A20.1.3.3 The Costs of Testing</b>	
			<b>a) Material and workmanship for quality control</b>	Testing will be undertaken by an independent site laboratory as indicated under A20.1.3.3 a)(i)3.



**SANRAL STANDARD SPECIFICATION SECTIONS**

SECTION	CL	SUB-CLAUSE	SPECIFICATION DATA
SECTION C		ENVIRONMENTAL MANAGEMENT PLAN	
	C1004	ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS	
		(d) The Designated / Dedicated Environmental Officer (DEO)	DEO means: Full-Time Dedicated Environmental Officer
	C1007	ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES	
		(h) On site plant	
	C1012	PROJECT SPECIFIC CONDITIONS	The Employer will consider monitoring and reporting in terms of a sustainability rating tool and the Contractor will be required to engage through its appointed DEO with the ECO to provide all the relevant information.
SECTION D		STAKEHOLDER AND COMMUNITY LIAISON AND TARGETED LABOUR AND TARGETED ENTERPRISES UTILISATION AND DEVELOPMENT	
	D1002	DEFINITIONS AND APPLICABLE LEGISLATION	
		D1002.01 Definitions	
		(r) Target Area(s)	For Targeted Labour: <b>Modimolle Local Municipality</b>
		(w) Targeted Labour	Target Group for Targeted Labour: a. black designated groups (As per latest PPPFA Regulations); b. black people; c. women; d. people with disabilities
	D1003	TARGET GROUP PARTICIPATION	
		D1003.04 Contract Participation Goal (CPG)	
		CPG for Targeted Labour:	Minimum of 8% of the Final Contract Value by the end of the contract to Targeted Labour  The Final Contract Value is defined in clause D1003.04

		Targeted Labour minimum contributions by the following Target Groups:	
		a. black designated groups;	30% of targeted labour value
		(i) Black people who are youth	
		(ii) Black people who are persons with disabilities	0.5% of targeted labour value
		b. Black women;	30% of targeted labour value
		<b>CPG for Targeted Enterprise</b>	Minimum percentage of the greater of either 40% or the C1.1.1 Form of Offer stated percentage, of the Final Contract Value by the end of the contract to Targeted Enterprises  The Final Contract Value for purposes of this clause, is defined in clause D1003.04.
		Targeted Enterprise minimum contribution by the following Target Groups:	
		i) Targeted Enterprise with ≥51% ownership by Youth	Minimum of 5% of the Final Contract Value
		ii) Targeted Enterprise with ≥51% ownership by Women	Minimum of 5% of the Final Contract Value
		iii) Targeted Enterprise with ≥51% ownership by Military veterans	Minimum of 1% of the Final Contract Value
		iv) Targeted Enterprise with ≥51% ownership by Disabled persons (Differently abled)	Minimum of 0.5% of the Final Contract Value
		v) Targeted Enterprise with CIDB 1 or 2 grading	Minimum of 1.5% of the Final Contract Value
		vi) Targeted Enterprise with CIDB 3 or 4 grading	Minimum of 1.5% of the Final Contract Value

	<b>D1008</b>	<b>WORK SUITABLE FOR EXECUTION BY TARGETED ENTERPRISES</b>	<ul style="list-style-type: none"> <li>a. Erection and maintenance of the Contractor's camp site</li> <li>b. Clearing and grubbing.</li> <li>c. Removal of trees.</li> <li>d. Provision of traffic control facilities.</li> <li>e. Management of traffic control facilities and traffic safety as part of the accommodation of traffic.</li> <li>f. Construction and clearing of drains.</li> <li>g. Installation of prefabricated culverts including inlet and outlet structures.</li> <li>h. Concrete channelling and concrete linings for open drains.</li> <li>i. Construction of concrete paving, kerbs and channels.</li> <li>j. Construction of small concrete and other structures.</li> <li>k. Pitching, stonework and protection against erosion.</li> <li>l. Construction of gabions.</li> <li>m. Patching and repairing edge breaks.</li> <li>n. Erection of guardrails.</li> <li>o. Landscaping.</li> <li>p. Fencing.</li> <li>q. Road signs.</li> <li>r. Road markings.</li> <li>s. Finishing the road and road reserve.</li> <li>t. Site Security Services.</li> <li>u. Haulage of materials</li> <li>v. Supply of plant.</li> <li>w. Supply of fuel.</li> <li>x. Specialised subcontract work such as: <ul style="list-style-type: none"> <li>i) Construction of concrete pavements.</li> <li>ii) Laying of asphalt using asphalt pavers.</li> <li>iii) Structural concrete such as culvert and bridges.</li> <li>iv) Crushing of materials.</li> <li>v) Precast manufacture.</li> <li>vi) Batch plant erection and operations.</li> <li>vii) Earthworks, layerworks construction.</li> <li>viii) Structural steel fabrication, erection.</li> <li>ix) Pipe jacking</li> <li>x) High pressure water line</li> <li>xi) Lighting</li> </ul> </li> </ul> <p>From the above work items, the following have been identified as suitable for execution by CIDB CE1 and CE2 Targeted Enterprises:</p> <ul style="list-style-type: none"> <li>a. Provision of traffic control facilities</li> <li>b. Landscaping</li> <li>c. Fencing</li> <li>d. Road signs</li> <li>a. Erection of guardrails</li> <li>b. Removal of trees</li> <li>c. Construction and clearing of drains.</li> <li>d. Clearing and grubbing.</li> <li>e. Construction and clearing of drains.</li> <li>f. Laying of culverts</li> <li>g. Laying of kerb and channels</li> </ul> <p>Any other work identified by the Employer to be executed in the Target Area.</p>
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SECTION E		REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS	
	E1018	PROJECT SPECIFIC CONSTRUCTION REQUIREMENTS	
SECTION F			

**SECTION C: ENVIRONMENTAL MANAGEMENT PLAN**

SECTION C: ENVIRONMENTAL MANAGEMENT PLAN

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**C1001 SCOPE**

The South African National Roads Agency SOC Limited (SANRAL) recognises environmental management as a key component of road infrastructure development and as part of its Environmental Sustainability Framework has developed this Environmental Management Plan (EMP) as a tool for continual improvement in environmental performance.

This EMP prescribes the methods by which proper environmental controls are to be implemented by the Contractor for construction and maintenance projects. The duration over which the Contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the Conditions of Contract for Construction for Building and Engineering Works Designed by SANRAL published by the Federation Internationale des Ingenieurs-Conseils (FIDIC) as the Defects Notification Period (maintenance period).

The provisions of this EMP are binding on the Contractor during the life of the contract. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract, particularly the conditions of any environmental authorisation and associated site-specific Environmental Management Programme (EMPr). In the event that any conflict occurs between the terms of the EMP and the project specifications or environmental authorisation, the terms herein shall be subordinate.

The EMP is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any changes to the EMP and/or environmental authorisation cannot occur without being submitted to SANRAL who will manage the process of amending the EMP.

The EMP identifies the following:

- Relevant parties and their responsibilities.
- Construction activities that will impact on the environment.
- Specifications with which the Contractor shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance.

**C1002 DEFINITIONS**

**Alien Vegetation:** undesirable plant growth which includes but is not limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA), 1983 and the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). Other vegetation deemed to be alien are those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

**Construction Activity:** any action taken by the Contractor, his sub-contractors, suppliers or personnel during the construction process as defined in the contract documents.

**Environment:** the surroundings within which the contract exists and comprises land, water, atmosphere, micro-organisms, plant and animal life (including humans) in any part or combination thereof as well as any physical, chemical, aesthetic or cultural inter-relationship among and between them.

**Environmental Aspect:** any component of a contractor's construction activity that is likely to interact with the environment.

**Environmental authorisation:** a written statement from a Competent Authority, with the general and specific conditions and the EMPr recording its approval of an application for a planned undertaking that triggers listed activities in the Environmental Impact Assessment (EIA) regulations of the National Environmental Management Act (NEMA).

**Environmental Impact:** any change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.



**Environmental Impact Assessment (EIA):** a systematic process of identifying, assessing, and reporting environmental impacts associated with an activity and includes basic assessment and scoping and environmental impact reporting.

**Environmental Management Plan:** An Environmental Management Plan (EMP) is an environmental management tool used to ensure that adverse impacts of the construction and operation and decommissioning of a project are prevented and/or minimised, and that the positive benefits are enhanced.

**Environmental Management Programme (EMPr):** A project-specific Environmental Management Plan approved by a competent authority through an environmental impact assessment process.

**Road Reserve:** a corridor of land, defined by co-ordinates and/or proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

**Site:** the site is defined in the FIDIC Conditions of Contract and in the scope of works. It is bound by the limits of construction as shown in the drawings or the title of the project and extends to also include the following:

- Areas outside the construction zones where accommodation of traffic is placed.
- All borrow pits defined in the applications approved by the Department of Mineral Resources (DMR);
- All haul roads constructed by the Contractor for purposes of access.
- Any non-adjacent sites specified in the contract documentation.
- The Contractor's and his subcontractors' camp sites.

For the purposes of this EMP, the site includes areas outside of, but adjacent to, the road reserve that may be affected by construction activities.

**Spoil material:** is material that is unsuitable for construction of the road pavement and for which no other useful purpose can be found in additional works on the project (e.g., for the provision of protection berms). Such material requires spoiling at convenient areas to be identified by the Engineer and/or Contractor within the Site. Spoil material does not require removal to a designated landfill site unless it contains identifiable hazardous contaminants.

## **C1003 LEGAL REQUIREMENTS**

### **(a) General**

Construction shall be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the Contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the EMP are legally binding in terms of this contract. In the event that any rights and obligations contained in this EMP contradict those specified in the standard or project specifications then the latter shall prevail.

### **(b) Statutory and other applicable legislation**

The Contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

Major environmental legislation, as amended from time to time, includes but is not limited to the following:

(i) Conservation of Agricultural Resources Act (Act No. 43 of 1983)

This act provides for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and vegetation, as well as combating weeds and invader plants.

(ii) The Constitution (Act 6 of 1996)

The Constitution states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected through reasonable legislative and other measures to prevent pollution and ecological degradation; promote conservation and ensure ecologically sustainable development and use of natural resources.

(iii) Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)

This act makes provision for equitable access to, and sustainable development of, minerals and petroleum resources.

(iv) National Environmental Management Act (NEMA), (Act No. 107 of 1998)

This act supports the Bill of Rights within the Constitution and highlights principles of sustainable development including preservation of ecosystems and biological diversity and avoidance, minimisation and remediation of pollution and environmental degradation. It also sets the stage for the EIA Regulations.

(v) National Environmental Management: Air Quality Act (Act No. 39 of 2004)

This act provides reasonable measures for the prevention of pollution and ecological degradation; and provides for specific air quality measures; for national norms and standards regulating air quality monitoring, management, and control by all spheres of government.

(vi) National Environmental Management: Biodiversity Act (Act No. 10 of 2004)

This act makes provisions to accomplish the objectives of the United Nations' Convention on Biological Diversity. SANRAL may be required to apply for permits to conduct certain listed activities which, together with the listed threatened or protected species, may be identified by the Minister.

Section 73 (3) of this act empowers a competent authority to direct a person to take steps to remedy any harm to biodiversity resulting from the actions of that person or as a result of occurrence of listed invasive species occurring on land on which that person is the owner. Thus, SANRAL may be directed to remedy harm caused by listed invasive species.

(vii) National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

This act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes, and seascapes.

(viii) National Environmental Management: Waste Act (Act No. 59 of 2008)

This act aims to regulate waste management practices through provision of national norms and standards, specific waste measures, licensing and control of waste activities, remediation of contaminated land as well as providing for compliance and law enforcement.

(ix) National Forests Act (Act No. 84 of 1998)

This act makes provision for promoting the sustainable management and development of forests, and for the protection of certain forests and trees for environmental, economic, educational, recreational, cultural, health and spiritual purposes.

(x) National Heritage Resources Act (Act No. 25 of 1999)

This act provides for an integrated and interactive system for identification, assessment and management of South Africa's heritage resources, and empowers civil society to nurture and conserve their heritage resources.

(xi) National Water Act (Act No. 36 of 1998)

This act makes provision for the protection of surface water and groundwater and their sustainable management for the prevention and remediation of the effects of pollution, as well as for the management of emergency situations.

(xii) The South African National Roads Agency Limited and National Roads Act (Act No. 7 of 1998)

This Act makes provision for a National Roads Agency for the Republic to manage and control the Republic's national roads system and take charge, amongst others, of the development, maintenance, and rehabilitation of national roads within the framework of government policy.

## **C1004 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS**

Copies of this EMP shall be kept at the site office and must be distributed to all senior contract personnel who shall familiarise themselves with its contents.

Implementation of this EMP requires the involvement of several stakeholders, each fulfilling a different but vital role as outlined herein, to ensure sound environmental management during the construction phase of a project.

### **(a) SANRAL**

SANRAL and anyone acting on SANRAL's behalf is accountable for the potential environmental impacts of any activities that are undertaken and is responsible for managing these impacts.

### **(b) The Engineer**

The Engineer has been appointed by, and acts for, SANRAL as its on-site implementing agent and carries the responsibility to ensure that the Contractor undertakes its construction activities in such a way that SANRAL's environmental responsibilities are not compromised.

The Engineer will, within seven days of receiving a contractor's request for approval of a nominated Designated Environmental Officer (DEO), approve, reject or call for more information on the nomination. The Engineer will be responsible for issuing instructions to the DEO where environmental considerations call for action to be taken.

If in the opinion of the Engineer the DEO is not fulfilling his/her duties in terms of this EMP, the Engineer may, after discussion and agreement with SANRAL, exercise his powers under FIDIC general conditions of contract and instruct replacement of the DEO in writing and with stated reasons.

### **(c) The Contractor**

The Contractor is responsible for project delivery in accordance with the prescribed specifications, among which this EMP shall be included.

The Contractor shall receive and implement any instruction issued by the Engineer relating to compliance with the EMP including the removal of personnel or equipment.

Compliance with the provisions contained herein or any condition imposed by the environmental approvals shall become the responsibility of the Contractor through an approved Designated Environmental Officer (DEO). The Contractor shall nominate a person from among his site personnel to fulfil this function and submit to the Engineer for his approval the *curriculum vitae* of the proposed DEO. This request for approval shall be given, in writing, at least fourteen days before the commencement of any construction activity clearly setting out reasons for the nomination, and with sufficient detail to enable the Engineer to make a decision.

**(d) The Designated/Dedicated Environmental Officer (DEO)**

Once a nominated representative of the Contractor has been approved, he/she shall become the DEO and shall be the responsible person for ensuring that the provisions of this EMP are complied with during the life of the contract. The DEO shall submit regular written reports to the Engineer, but not less frequently than once a month.

The DEO may undertake other construction duties unless Section B: Specification Data, prescribes this position as 'Full-time' or 'dedicated' as opposed to the standard position being 'designated'. However, the DEO's environmental duties shall hold primacy over other contractual duties and the Engineer has the authority to instruct the Contractor to reduce the DEO's other duties or to replace the DEO if, in the Engineer's opinion, he/she is not fulfilling his/her duties in terms of the requirements of this EMP. Such instruction will be in writing clearly setting out the reasons why a replacement is required.

As a minimum the DEO shall have an accredited National Qualifications Framework (NQF) level 6 qualification in environmental or natural sciences or equivalent and a minimum of 2 years' experience in a similar role in construction or other environmental regulatory field.

In addition to the compliance duties relating to EMP the DEO shall also provide full cooperation whenever the Contractor is subjected to environmental audits.

**(e) Environmental Control Officer (ECO)**

The Environmental Control Officer (ECO) is an independent environmental specialist appointed by SANRAL or the Engineer to objectively and regularly monitor the Contractor's compliance with the conditions of the authorisations issued for the project and the approved EMP (that is this EMP augmented with specifics of the project). These are external audits, and the regularity is determined by the environmental authorisations.

**C1005 TRAINING**

**(a) Qualifications**

The (DEO) shall have the minimum qualifications as prescribed above and must be conversant with all legislation pertaining to the environment applicable to the contract. He/she must be appropriately trained in environmental management and possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The Contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees.

**(b) Content**

Apart from induction environmental training should, as a minimum, include the course content below and no induction or course should be given until the Engineer has been afforded the opportunity to appraise it and provide comment.

- (i) The importance of conformance with all environmental policies and the consequences of departure from standard operating procedures.
- (ii) Environmental impacts, actual or potential, caused by work activities, prevention measures to avoid them and mitigation measures when they occur.
- (iii) Work force roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements.
- (iv) The environmental benefits of improved personnel performance and
- (v) Consequences of non- compliance

**(c) Induction**

In the case of permanent staff, the Contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the Contractor shall inform the Engineer when and how he intends concluding his environmental training obligations.

**C1006 ACTIVITIES/ASPECTS CAUSING IMPACTS**

Typical environmental aspects and impacts associated with road construction are listed in Table 1: Aspects and Impacts Associated with Road Construction. Actual impacts will differ from project to project and, therefore, so may the mitigation measures employed. The most common aspects and impacts are addressed separately, and typical avoidance and/or mitigation measures described. The list and descriptions are not by any means exhaustive, and they shall be used for guideline purposes only.

**Table 1: Aspects and Impacts Associated with Road Construction**

<b>Aspect</b>	<b>Potential Impact</b>
Waste generation/storage	Water pollution; nuisance; visual impact
Water use and stormwater discharge	Change in flow regime and/or reduction in downstream availability; soil erosion; water pollution
Vehicle use and maintenance	Air pollution; noise
Chemical/fuel storage	Water/air/soil pollution; health impacts; accidents e.g., spills, fire
Site clearing; earthworks; layer-works; seal works	Change in landform; impact on heritage resources; noise; soil erosion; air pollution
River bridges; installing drainage structures	Water pollution; impact on river flows; noise
Land acquisition	Loss of land and/or livelihood; change in land use;
Acquisition of building material from borrow pits	Change in landform and use

**(a) General approach**

The role of the DEO cannot be underestimated and once approved he/she shall be on the site at all times, and before the Contractor begins each construction activity, he/she shall give to the Engineer a written statement setting out the following:

- (i) The type of construction activity about to be started.
- (ii) Locality where the activity will take place.
- (iii) Identification of the environmental aspects and impacts that might result from the activity.

- (iv) The methodology of impact prevention for each activity or aspect.
- (v) The methodology of impact containment for each activity or aspect.
- (vi) Identification of the emergency/disaster potential for each activity (if any) and the reaction procedures necessary to mitigate impact severity.
- (vii) Treatment and continued maintenance of impacted environment.

The Contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified, and the activity planned so as to prevent any impact from happening and shall demonstrate that he is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce method statements for each construction activity in compliance with the provisions of these project specifications.

The Contractor shall provide such information in advance of any or all construction activities provided that new submissions shall be given to the Engineer whenever there is a change or variation to the original.

The Engineer may provide comment on the methodology and procedures proposed by the DEO, but he shall not be responsible for the Contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the Contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

#### **(b) Spillages**

Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products. In the event of a spillage, the Contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill containment and treatment (whether hazardous or not) lies with the Contractor. The individual causing a spill, or who discovers a spill, must report the incident to his/her DEO or to the Engineer. The DEO will assess the situation in consultation with the Engineer and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil/water shall be determined by the Contractor in consultation with the DEO and the Engineer. Areas cleared of hazardous waste shall be re-vegetated according to the Engineer's instructions.

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the Engineer. The costs of containment and rehabilitation shall be for the Contractor's account, including the costs of specialist input as well as the sampling and testing of the water quality upstream and downstream of the spill. Water quality sampling and testing, and further treatment shall continue until upstream and downstream results correspond with each other.

#### **(c) Water use and control**

The Contractor's use of water shall take into consideration that it is a scarce commodity and shall be optimised. Authorisation shall be obtained from the Department of Water and Sanitation (DWS) before water is drawn from streams or new boreholes developed.

The Contractor shall also ensure that any stream deviations or diversions are undertaken in such a manner that the impact on the environment is minimised. Method statements shall be submitted to the Engineer for comment, detailing how the work will be undertaken, what risks are foreseen and what measures will be employed to minimise such risks. Notwithstanding any comments by the Engineer, no work on stream deviations or diversions shall be undertaken in accordance with GN 509 in GG 40229 of 26 August 2016 - General Authorisation in terms of

Section 39 of the National Water Act, 1998 (Act No. 36 Of 1998) for Water Uses as defined in sections 21(c) and (i) .

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users/receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion and flooding by dredging, daylighting, removal of debris and vegetation, etc. These shall also be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials, and bituminous products.

The Contractor shall submit to the Engineer his proposals for prevention, containment, and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions up to 1:5-year severity.

The Contractor shall submit to the Engineer the results of the baseline water quality test taken above and below the site of the proposed activity, and thereafter monthly testing results or at the frequency as may be specified by the Water Use Licence/General Authorisation, where applicable. No taking-over can be authorised until the water quality is shown to be at pre-construction levels or better.

**(d) Vegetation management**

The Contractor shall be responsible for the management of vegetation by protection of indigenous vegetation, especially identified protected species, and the prevention of alien vegetation germinating in areas disturbed by road construction activities within and outside the road reserve. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily. This responsibility shall continue for the duration of the defects notification period. The project specification may instruct the removal of CARA and/or NEMBA-listed category 1 and 2 alien species and planting of specified indigenous species.

**(e) Dust control**

Dust caused by construction activities shall be controlled by appropriate means and applied at sufficient frequency so as not to cause nuisance to adjacent habitation or affect farming activities or natural vegetation. Vegetation cover should also be kept for as long as possible to reduce the area of exposed surfaces. Dust emissions from batching and screening plants shall be subject to the relevant legislation and shall be the subject of inspection by the relevant authorities.

**(f) Noise control**

The Contractor shall endeavour to keep noise generating activities to a minimum. Noises that could cause a major disturbance, for instance blasting and crushing activities, should only be carried out during the hours prescribed by the conditions of contract (i.e., normal hours). Should such noise generating activities have to occur at any time outside normal hours the people in the vicinity of the noise-generating activity shall be warned about the noise well in advance and the activities kept to a minimum. Relevant legislation shall also be taken into consideration, and any practical mitigation measures adopted. No noise generating activity outside of normal hours, regardless of its proximity to residences, can take place without

application to the Engineer for approval. The application shall be accompanied by the noise containment measures proposed.

**(g) Energy consumption**

The Contractor shall take into consideration the impacts of high energy consumption, both from a cost and emissions point of view. Energy use shall be minimised, and where possible, alternative energy sources such as solar utilised.

Furthermore, the Contractor shall measure and keep records of the consumption of carbon units his chosen method of construction produces in the execution of his programme. In conjunction with the Engineer who will provide complete cooperation, a month-by-month output shall be compiled and efforts made to see how these outputs can be curtailed and reduced.

**C1007 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES**

The Contractor shall undertake “good housekeeping” practices during construction as stated in the COTO Standard Specifications for Roads and Bridges and the FIDIC conditions of contract. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

The construction activities addressed below shall become part of the Contractor's obligations regarding his programme of work and incorporated into the required method statements for workmanship and quality control.

**a) Site establishment**

**i) Site Plan**

The site refers to an area with defined limits on which the project is located. The Contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before any site establishment can begin, the Contractor shall submit to the ECO for his comments and to the Engineer for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the Contractor proposes to put in place.

The plans shall detail the locality as well as the layout of the waste management facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course. No camp establishment, including satellite camps, can be placed within 150 metres of an identified watercourse unless the Contractor has applied to DWS and received authorisation to do so. Regardless of the chosen site, the Contractor's intended mitigation measures shall be indicated on the plan. The site plan shall have been submitted and approved before establishment commences. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the ECO and the Engineer for consultation during rehabilitation of the site in order that rehabilitation is, as a minimum, done to a standard similar to pre-construction activities.



ii) Vegetation

The Contractor has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation.

The natural vegetation encountered on the site is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the Engineer. Only trees and shrubs directly affected by the works, and such others as may be indicated by the Engineer in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, the same species of indigenous trees as were occurring shall be re-established. Protected trees may not be removed without a permit from the Department of Forestry, Fisheries and Environment.

Contravention of a notice of listed protected tree species under the National Forests Act, 1998 is regarded as a first category offence that may result in a fine or imprisonment for a period up to three years, or to both a fine and imprisonment. The DEO must be conversant with the latest gazette of declared protected trees.

Rehabilitation shall be undertaken using only indigenous tree, shrub and grass species. Special attention shall be given to any search and rescue operation identified during the environmental assessment process and any removal to an on-site nursery for continuous nurturing and protection and later replanting.

Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding.

Fires shall only be allowed in facilities or equipment specially constructed for this purpose. The need for a firebreak shall be determined in consultation with the Engineer and the relevant authorities, and if required a firebreak shall be cleared and maintained around the perimeter of the camp and office sites.

iii) Water management

Water for human consumption shall be available at the site offices and at other convenient locations on site.

All effluent water from the camp/office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans, dams etc.). Only domestic type wastewater shall be allowed to enter this system.

iv) Heating and cooking fuel

The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

**b) Sewage management**

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of the Engineer, the local authorities, and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-aways, dry-composting toilets such as "enviro loos", or the use of chemical toilets which are supplied and maintained by a specialist service provider. The type of sewage management will depend on the

geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis. The positioning of the chemical toilets shall be done in consultation with the Engineer. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system and shall be approved by the Engineer in consultation with the ECO.

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The Contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the Engineer.

### c) **Waste management**

The Contractor's intended methods for waste management shall be outlined and implemented at the outset of the contract and shall be to the satisfaction of the Engineer. A waste inventory shall be drawn up of all waste streams that will possibly be generated by the site/project and an integrated approach shall be taken to its management. Records shall be kept of all waste disposed. Opportunities for avoiding, reducing, reusing and recycling of materials should be identified upfront, as should constraints for their implementation. All personnel shall be instructed to dispose of all waste in the proper manner.

#### i) Solid waste

Solid waste shall be stored in an appointed area in covered, tip-proof metal drums or similar container for collection and disposal. Disposal of solid waste shall be at a licensed landfill site or at a site approved by the relevant authority in the event that an existing operating landfill site is not within reasonable distance from the project area. No waste shall be burned or buried at or near the project area.

#### ii) Litter

No littering by construction workers shall be allowed and particular emphasis on litter control measures shall apply at stop/go facilities.

During the construction period, the various contractors' facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. At all places of work the Contractor shall provide litter collection facilities for later safe disposal at approved sites.

#### iii) Hazardous waste

Hazardous waste such as oils shall be disposed of at an approved landfill site and proof of such disposal kept by the Contractor. Special care shall be taken to avoid spillage of bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating surface water.

Under no circumstances shall the spoiling of bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected bituminous products shall be returned to the supplier's production plant. Any spillage of bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of the Engineer.

iv) Construction and demolition waste

The opportunity for recycling and reuse of construction and demolition waste as fill for road embankments, land reclamation and drainage control must first be explored and take priority before the option of declaring these materials a 'waste'.

The Contractor is encouraged to actively engage with authorities and landowners adjacent to the site and identify where such materials can be usefully deployed to repair existing environmentally damaged areas such as erosion dongas.

d) **Control at the workshop**

The Contractor's management and maintenance of his plant and machinery will be monitored according to the criteria given below.

i) Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials such as bitumen binders shall be stored in a secured, appointed area that is suitably fenced, bunded and has restricted entry. Storage of bituminous products shall only take place using suitable containers to the approval of the ECO and the Engineer.

The Contractor shall provide proof to the Engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected, the Contractor shall furnish the Engineer with details of the preventative measures he proposes to install in order to mitigate pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

ii) Fuel and gas storage

The Contractor shall take cognisance of the limits set by legislation for the storage of fuels and acquire the necessary authorisation for storage capacity beyond these. An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any leakage spillage or overflow of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. Any leakage, spillage or overflow of fuel shall be attended to without delay.

Gas welding cylinders and LPG cylinders shall be stored chained in a secure, well-ventilated area exterior to any building wall.

iv) Oil and lubricant waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by a specialist oil recycling company.

Drip trays shall be used to collect any lubricants or fuel spilled where any vehicle and machinery are repaired or refuelled. The lubricants and fuel collected shall be handled as specified above.

All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

**e) Clearing the site**

In all areas where the Contractor intends to or is required to clear the natural vegetation and soil, either within the road reserve, or at designated or instructed areas outside the road reserve, a plan of action shall first be submitted to the Engineer for his approval. Working areas shall be clearly defined and demarcated on site to minimise the construction footprint. 'No-go- areas' and other sensitive areas shall also be clearly demarcated on site, and staff must be made aware of them.

The plan of action shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the Engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during inspections.

**f) Soil management**

**i) Topsoil**

Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include all storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved waste disposal site. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water.

The Contractor shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be top-soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the Engineer. The Contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the road reserve that may have been affected by such negligence.

**ii) Subsoil**

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the Engineer, and if not used for road building it shall be stored and maintained separately from the topsoil so that neither stockpile is contaminated by the other. This soil shall be used for rehabilitation purposes by first spreading it over the excavated slopes without interfering with or contaminating the stockpiled topsoil.

Whilst in stockpile it shall be maintained free from erosion and weed infestation in the same way as for topsoil stockpile maintenance.

**g) Earthworks and layerworks**

This section includes all construction activities that involve the mining of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. Before any stripping prior to the commencement of construction, the Contractor shall have complied with the requirements of this EMP. In addition, the Contractor shall take cognisance of the requirements set out below.

**i) Quarries and borrow pits**

The Contractor's attention is drawn to the requirement of the Department of Mineral Resources, that before entry into any quarry or borrow pit, an Environmental Authorisation for the establishment, operation and closure of a quarry or borrow pit shall have been approved by the Department where applicable. It is the responsibility of the Contractor to ensure that he is in possession of the authorisation prior to entry into the quarry or borrow pit. The conditions imposed by the relevant authorisation are legally binding on the Contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific authorisation and this EMP, the former shall apply.

**ii) Excavation, hauling and placement**

The Contractor shall provide the ECO and the Engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail measures by which the impacts of pollution (noise, dust, litter, fuel, oil and sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment. The Contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition.

**iii) Spoil sites**

The Contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects notification period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the ECO for his/her comments and to the Engineer for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the ECO and the Engineer. No spoil site shall be located within 50m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.

The use of approved spoil sites for the disposal of any waste shall be prohibited. Spoil sites will be shaped to fit the natural topography. Depending on availability these sites shall receive a minimum of 75mm topsoil and be grassed with the recommended seed mixture. Appropriate grassing measures to minimise soil erosion shall be undertaken by the Contractor. This may include both strip and full sodding. The Contractor may motivate to the Engineer for other acceptable stabilising methods. The Engineer may only approve a completed spoil site at the end of the defects notification period upon receipt from the Contractor of a landowner's clearance notice.

**iv) Stockpiles**

The Contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary

stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the Engineer for his approval. The Contractor's proposed measures for prevention of environmental damage, containment and subsequent rehabilitation shall also be submitted.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the Contractor shall at all times ensure that they are positioned and sloped to create the least visual impact, constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment and kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated/deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the Contractor's cost until clearance from the Engineer and the landowner is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the Engineer within the road reserve, shall be subject to the same condition as other stockpiled materials. Excess materials from windrows, in situ milling or any leftover material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract documentation or under instruction from the Engineer.

The ECO shall comment on and the Engineer shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their closure only when they have been satisfactorily rehabilitated.

v) Blasting activities

Wherever blasting activity is required on the site (including quarries and/or borrow pits) the Contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives.

**h) On site plant**

i) Crusher, screening plants and concrete batching plants

Crushing plants and concrete batching plants, whether sited inside or outside of defined quarry or borrow pit areas, shall be subject to the requirements of the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the relative authorities during the life of the project. In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for those under section C1007(g)(i) of this EMP, with the exception that the Contractor shall provide additional measures to prevent, contain and rehabilitate against environmental damage from toxic/hazardous substances. In this regard the Contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant authority, as shall approval of closure. The Engineer will assist the Contractor in his applications to the relevant authority.

Screening activities shall be undertaken so that dust and noise is minimised. This can be done by carefully choosing the site for the activity, and by using slightly damp material.

Effluent from concrete batch plants and crusher plants shall be reused where possible or treated in a suitable designated sedimentation dam to the legally

required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the Engineer for approval.

ii) Asphalt Plant

Asphalt plants shall be subject to the applicable legislation that governs establishment and operation of batching plants. The Contractor shall be responsible to obtain the necessary permit from the relevant authority.

Operation of the plant shall conform to the same requirements as for a crushing plant or concrete batching plant under C1007(h)(i) above.

## **C1008 AREAS OF SPECIFIC IMPORTANCE**

Any area, as determined and identified within the project documents as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the specific environmental authorisation, as well as the approved EMP. The Contractor may offer alternative solutions to the Engineer in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection should not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall receive ad hoc treatment.

### **a) Archaeological sites**

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Engineer of such discovery. The South African Heritage Resource Agency (SAHRA) is to be contacted, and a SAHRA-registered archaeological consultant may undertake the necessary work involved in confirming the find and advising on how it should be preserved or removed. Work may only resume once clearance is given in writing by the archaeologist. (Read with FIDIC condition of contract clause 4.24)

If a grave or midden is uncovered on site then all work in the immediate vicinity of the graves/middens shall be stopped, and the Engineer informed of the discovery. The South African Heritage Resource Agency and the South African Police Services (SAPS) should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with SAHRA, be responsible for attempts to contact family of the deceased and for the place where the exhumed remains can be re-interred.

## **C1009 REHABILITATION**

The Contractor shall be responsible for the re-establishment of grass within the road reserve boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, construction has to be stored temporarily, and designated or instructed areas outside the road reserve. It also includes the area where site offices were erected which may require rehabilitation at the end of the contract. All construction material, including concrete slabs and barbecue (braai) areas shall be removed from the site on completion of the contract unless written approval from the relevant landowner demonstrates it is to be left in place.

Responsibility for re-establishment of vegetation shall extend until expiry of the defects notification period. However, SANRAL reserves the right to continue holding retention monies (or not releasing guarantees in lieu of retention) depending upon the state of cover at the end of the defects notification period. Such extension may continue until closure of the relevant quarry or borrow pit has been secured,

Rehabilitation of affected areas should be undertaken as early as possible when the relevant activities are done in order to reduce further environmental damage. All re-vegetation should be undertaken using indigenous vegetation. The standard of rehabilitation should be to the satisfaction of the Engineer and the relevant authorities. The Department of Minerals Resources will only issue closure certificates for borrow pits and quarries when they are satisfied with the rehabilitation undertaken. It should also be noted that in some cases there is a requirement for a final environmental audit covering the extent of the project.

#### **C1010 RECORD KEEPING**

The Engineer and the DEO will continuously monitor the Contractor's adherence to the approved impact prevention procedures and the DEO shall submit regular written reports to the ECO and to the Engineer at least once a month. The DEO will report the environmental compliance performance of the project at regular site meeting. The Engineer shall issue to the Contractor a notice of non-compliance whenever transgressions are observed. The DEO shall document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the Engineer in the monthly report.

Copies of all authorisations shall be kept on site and made available for inspection by visiting officials from SANRAL, relevant authorities or internal/external auditors.

#### **C1011 COMPLIANCE AND PENALTIES**

The Contractor shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings.

Any non-compliance/omissions with the procedures in this EMP, environmental authorisations and the approved EMPr constitute a breach of the Conditions of Contract. Regulatory financial penalties imposed on SANRAL shall be passed onto the defaulting parties.

#### **C1012 PROJECT SPECIFIC CONDITIONS**

The project requires the improvement of the cross sectional profile by adding climbing lanes and surfaced shoulders. A major component of the works is the jacking of a new 1.5 m diameter pipe adjacent to the existing culvert at Km50.32. The works also requires extensive erosion protection around the inlet and outlet structures. The scope of works is covered by SANRAL general authorisation which is in place. The conditions of the General authorisations are to be adhered to. The General Authorisation and General Authorisation in terms of the National Water Act, 1998 (Act No. 36 of 1998) is included as Annexure A.



SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.033-120-2019/1

FOR THE IMPROVEMENT OF NATIONAL ROAD R33 SECTION 12 FROM THE N1 (KM 77.0) TO  
SECTION 13 MODIMOLLE (KM 0.6)

**SECTION D: STAKEHOLDER AND COMMUNITY LIAISON, AND TARGETED LABOUR AND  
TARGETED ENTERPRISES UTILISATION AND DEVELOPMENT**

## SECTION D: STAKEHOLDER AND COMMUNITY LIAISON, AND TARGETED LABOUR AND TARGETED ENTERPRISES UTILISATION AND DEVELOPMENT

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**D1001 SCOPE**

Section D of the Specifications describes the structured engagement with project Stakeholders and affected Communities to the project. It also guides the selection and the enhanced utilisation and development of Targeted Labour and Targeted Enterprises.

**D1001.01 Principles for Project Liaison, Sub-contracting, and Labour Sourcing in SANRAL Projects (Fourteen Point Plan)**

The scope of the work described in this Section D of the Specifications shall be based on the Employer's 14 principles for project liaison, sub-contracting and labour sourcing in all SANRAL projects, which are stipulated below:

1. *SANRAL will establish a Project Liaison Committee (PLC) for every project to create a platform for project communication with the aim to facilitate successful, works execution, sub-contracting, procurement, participation with MOU partners, supply of material, services and goods and employment facilitation.*
2. *SANRAL will chair PLCs and provide secretarial support through the Consulting Engineer or its Agent. Representation on the PLC will comprise: SANRAL; the Contractor; the Consulting Engineer or SANRAL's Agent; business representatives; traditional authority representatives; provincial and municipal government representatives (not politicians); community representatives; and any other critical local stakeholder that may be deemed necessary by SANRAL. While serving on the PLC, PLC members must declare any conflict of interest and recuse themselves if requested by the PLC Chairperson.*
3. *The selection of a Project Liaison Officer (PLO) who will be employed by the Consulting Engineer, must be acknowledged, and supported by the PLC.*
4. *The definition of a target area (sometimes referred to as a local area or traffic area) will be determined by SANRAL in consultation with the PLC.*
5. *The setup of database for contractors, sub-contractors, consultants, and suppliers will be conducted with the input and support of the PLC. The final database will be disseminated to the PLC. The entities on the database must be assisted by the Consulting Engineer and the Contractor to be compliant with the relevant legislation required to conduct work for a SANRAL project.*
6. *The setup of databases for local labour in the target area will be done with the input and support of the PLC. The final list will be disseminated to the PLC. Entities on the database must be registered on the National Treasury Central Supplier Database (CSD). A system of labour selection from the database must be agreed at the PLC.*
7. *The databases for sub-contracting will be handed over to the Contractor for open tender processes. The labour database will be disseminated to the PLC and handed over to the Contractor to use for recruitment of local labour.*
8. *Tender processes for sub-contracting must be conducted by Contractor using government principles (e.g. public opening of received bids, announcement of bidders and prices). Winning bidders shall be tabled by the Contractor in the PLC meeting for information purposes.*
9. *Appeals to the tender process must be escalated to SANRAL for an independent review which will be facilitated by the Transformation Unit.*
10. *Capability assessments of sub-contractors and suppliers will be done with the input and support of the PLC, prior to the sub-contract tender stage commencing, to identify any deficiencies in skills and experience. For labour, skills assessments will be done at recruitment stage.*
11. *Sub-contractor development support and training must be coordinated and conducted prior to the sub-contract tender stage commencing, with the input and support of the PLC.*
12. *The PLC may identify works areas that are deliverable by local service providers, and areas where capabilities are not available locally. All works areas where capabilities are not available locally will be imported and local service providers will be given an opportunity to learn.*
13. *The PLC and Consulting Engineer must ensure that formal contracting arrangements between the main contractor and the sub-contractor are in place in all projects.*

14. *Communication will be streamlined through the PLC and used to manage expectations of local business and communities.*

These principles must be applied to facilitate better project level liaison with project Stakeholders and affected Communities. In addition, these principles serve to ensure communication and transparency in the execution of the Works and to facilitate inclusivity in the allocation of projects to benefit black business and local communities.

## **D1002 DEFINITIONS AND APPLICABLE LEGISLATION**

The definitions and legislation listed below informs the requirements of this Section D of the Specifications for Stakeholder and Community Liaison, Targeted Labour employment and Targeted Enterprise sub-contracting.

### **D1002.01 Definitions**

Unless inconsistent with the context, in these specifications, the following words, terms or expressions shall have the meanings hereby assigned to them:

#### **a) Business Coaching**

Business coaching establishes an atmosphere of mutual trust, respect, responsibility and accountability to motivate the emerging business owner and his team. To that end, the business coach must conduct an ethical and competent practice, based on appropriate professional experience and business knowledge.

#### **b) Community<sup>1</sup>**

South African Citizens, as defined in terms of the South African Citizenship Act, 1995 (Act 88 of 1995), who permanently reside within the Target and Project Area(s) of the project.

#### **c) Contract Participation**

A process by which the Employer implements Government's objectives by setting targets to enhance Targeted Labour and Targeted Enterprises' utilisation and development, which the Contractor shall achieve as a minimum.

#### **d) Contract Participation Goal (CPG)<sup>2</sup>**

- i) In the case of Targeted Enterprises, including manufacturers and suppliers, the amount equal to the value of goods, services and works for which the principal Contractor contracts to engage Targeted Enterprises in the performance of the Contract, expressed as a percentage of the tender value excluding escalation, contingency and value added tax associated with the targeting strategy that is identified in the Specification Data; or
- ii) In the case of Targeted Labour:
  - a. the sum of the wages and allowances, for which the principal Contractor, Sub-contractor or Targeted Enterprises contract to engage Targeted Labour in the performance of the Contract, expressed as a percentage of the contract amount associated with the targeting strategy that is identified in the Specification Data; or
  - b. the amount equal to the person days worked for which the principal Contractor, Sub-contractors or Targeted Enterprises contract to engage Targeted Labour expressed as a percentage of the total person days

<sup>1</sup> CIDB Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Work Contracts, 31 October 2017, as adapted from SANS 10845, Suite for Construction Procurement, 2015.

<sup>2</sup> Adapted from the CIDB Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Work Contracts, 31 October 2017, as adapted from SANS 10845-5:2015 and SANS 10845-8:20SANS 10845, Suite for Construction Procurement, 2015.

worked associated with the targeting strategy that is identified in the Specification Data.

**e) Contract Participation Goal Plan (CPG Plan)**

The plan which outlines how the Contractor intends to achieve the various CPG targets as stated in the Contract Data and includes the detail of the Targeted Enterprise work programme, as well as the contents and value of the work packages. See Appendix 8 for the CPG Plan template.

**f) Contract Participation Performance (CPP)**

The measure of the Contractor's progress in achieving the CPG.

**g) Contract Skills Development Goals (CSDG)<sup>3</sup>**

The number of hours or head count of skills development opportunities that a Contractor contracts to provide in relation to work directly related to the contract or order up to:

- i) completion in the case of a professional service contract;
- ii) the end of the service period in the case of a service contract; and
- iii) practical completion in the case of an engineering and construction works contract.

**h) Designated Group<sup>4</sup>**

Unless otherwise permissible in terms of procurement regulations or the PPPFA, "Designated Group" means:

- i) black designated groups;
- ii) black people;
- iii) women; or
- iv) people with disabilities;

**i) Domestic Sub-contractors**

A Domestic Sub-contractor is one in whose selection and appointment the Employer traditionally plays no part in other than simply giving consent when that is required under the terms of the main contract. The appointment of the sub-contractor is treated as something entirely for the benefit of Main Contractor and is a purely "domestic matter".

**j) Final Contract Value**

Final Contract Value as defined under Section D1003.04 - Contract Participation Goal (CPG) of the Specifications, also means Contract Price as defined in FIDIC, sub-clause 1.1.4.2, (excluding CPA, adjustments for reduced payments, Rise and Fall adjustments, penalties, and VAT)

**k) Guidance**

Guidance is anticipating where one might go wrong, or where one is doing a task in a complicated, inefficient or ineffective way, and giving help, advice and direction as to how to achieve a better result. Guidance is mostly given by a person in the direct reporting line but can be given by anyone. Guidance is not imparting skills but suggesting ways to improve performance.

<sup>3</sup> CIDB Standard for Developing Skills through Infrastructure Contracts, July 2020 (or latest version).

**l) Labour**

Persons:

- i) who are employed by the Contractor or a Sub-contractor in the performance of the Contract; and
- ii) whose monthly earnings are derived from hours worked for a fixed hourly rate which is adjusted from time to time by legislation (as a statutory minimum) and the Contractor's or Sub-contractor's employment policies;
- iii) but who are not Targeted Labour as stated in the Specification Data.

The personnel employed by the suppliers of goods and material are not defined as "Labour" for the purposes of this Contract.

**m) Mentoring**

Mentoring is a professional relationship in which an experienced businessperson assists another by giving advice and imparting their knowledge in developing special skills and knowledge that will enhance the less experienced businessperson's professional and personal growth. The objective is to equip the emerging business owner and his team to improve their decision-making skills, being focussed and make positive progress quickly.

**n) Mobilisation Period**

The period between the Commencement Date and the date of Access to Site), which period (duration) is stated in the Contract Data. This part of Section D of the Specifications describes the requirements of the Mobilisation Period.

**o) Project Area**

The area through which the road under construction traverse or which is adjacent to and/or in proximity to project operations.

Based on market research and/or requisite resources availability, Project Areas other than defined above may be identified where preference would be given to Targeted Enterprises for sub-contracting opportunities.

**p) Project Liaison Committee (PLC)<sup>5</sup>**

The Committee that represents the Employer, Engineer, Contractor, project Stakeholders and the Communities affected by the project. It is important to note that:

- i) elected and/or nominated political office bearers shall not be members of the PLC, and
- ii) the Engineer and Contractor becomes members of the PLC on their appointment and participate in the Committee within the scope of their respective roles and responsibilities.

**q) Project Liaison Officer (PLO)<sup>6</sup>**

The person who acts as the liaison officer for the project. The PLO facilitates the selection of Targeted Labour to be employed by the Contractor and attends to the day-to-day project, Stakeholder, and Community matters that impact on the parties to the PLC.

<sup>5</sup> CIDB Standard for Minimum Requirements for Engaging Contractors and Sub-Contractors on construction Works Contracts, 31 October 2017.

<sup>6</sup> CIDB Standard for Minimum Requirements for Engaging Contractors and Sub-Contractors on construction Works Contracts, 31 October 2017; CLO definition.

**r) Stakeholders<sup>7</sup>**

Any Stakeholder listed in the Employer's Communication Policy who is affected by the Employer's operations in the Project Area(s) and/or who has an interest or concern in the project, either as a decision maker, participant or affected party and may include, amongst others, the following entities:

- i) Relevant Provincial departments;
- ii) Relevant Municipal departments;
- iii) Traditional authorities;
- iv) Community interest groups;
- v) Organised youth representation;
- vi) Organised women representation;
- vii) Organised disabled people representation;
- viii) Other structured community groups such as religion, education, farming, etc.
- ix) Local transport industry forums, e.g. Bus and taxi;
- x) Business sector forums;
- xi) Road user forums;
- xii) Environmental interest groups;
- xiii) Road safety interest groups;
- xiv) Any other recognised relevant and representative structure.

**s) Sub-contractor**

An entity appointed by the Contractor to execute a portion of the Works as defined in the Conditions of Contract under FIDIC subclause 1.1.2.8. This includes both Domestic Sub-contractors and Targeted Enterprises.

**t) Target Area**

The geographic area defined in the Specification Data for Targeted Labour and which typically are:

- i) one or more Provinces;
- ii) one or more Metropolitan or District Municipalities;
- iii) one or more Local Municipalities;
- iv) one or more Wards that are predominantly located within the Project Area;
- v) one or more of the areas listed in the definition of Designated Groups.

**u) Targeted Enterprise<sup>8</sup>**

A Targeted Enterprise is an entity to which the Contractor sub-contracts a percentage of the contract value as a condition of contract and which is:

- i) an EME or QSE which is at least 51% owned by black people; or
- ii) an EME or QSE which is at least 51% owned by black people who are youth; or
- iii) an EME or QSE which is at least 51% owned by black people who are women; or
- iv) an EME or QSE which is at least 51% owned by black people with disabilities; or
- v) an EME or QSE which is at least 51% owned by black people who are military veterans; or
- vi) an EME or QSE which is 51% owned by black people living in rural or underdeveloped areas or townships; or
- vii) a cooperative which is at least 51% owned by black people.

In addition, Targeted Enterprises must be:

- a. CIDB registered where applicable;
- b. registered with National Treasury's Central Supplier Database;
- c. tax compliant prior to award of the sub-contract; and

<sup>7</sup> Derived from SANRAL communication Policy, March 2018.

d. COIDA compliant prior to award of the sub-contract where applicable. Targeted Enterprises are also Sub-contractors as defined in the Conditions of Contract under FIDIC subclause 1.1.2.8.

**v) Targeted Enterprise Construction Manager (TE Construction Manager)**

The full-time dedicated staff member or sub-service provider appointed by the Contractor to develop, implement and monitor the training, development and support of Targeted Labour and Targeted Enterprises. The Targeted Enterprise Construction Manager also mentors, guides and coaches the Targeted Enterprises.

**w) Targeted Enterprise Monitor**

The Targeted Enterprise Monitor is an independent service provider, or individual, appointed by the Employer's Transformation Unit, to audit the Contractor and his TE Construction Manager's activities with respect to their obligations to Targeted Enterprises.

**x) Targeted Enterprise Procurement Coordinator (TE Procurement Coordinator)**

The staff member or sub-service provider appointed by the Contractor to facilitate the procurement of Targeted Enterprise sub-contractors.

**y) Target Group**

It is a group of entities and/or persons selected from the Designated Group as defined in the Preferential Procurement Policy Framework Act Regulations, 2017, and may include both Targeted Enterprises and Targeted Labour.

**z) Targeted Labour<sup>9</sup>**

Persons:

- i) who are unemployed; and
- ii) who are then employed by the Contractor or a Sub-contractor (including Targeted Enterprises) in the performance of this Contract; and
- iii) whose monthly earnings are derived from hours worked for a fixed hourly rate which is adjusted from time to time by legislation (as a statutory minimum) and the Contractor's or Sub-contractor's or Targeted Enterprise's employment policies; and
- iv) permanently reside in the Target Area(s) or who are recognized as being residents of the Target Area(s) based on identification and association with, and recognition by, the residents of the Target Area(s); and
- v) who are stated as being Targeted Labour in the Specification Data.

The personnel employed by the suppliers of goods and material are not defined as "Targeted Labour" for the purposes of this Contract.

**aa) Trainee Targeted Enterprise**

A Targeted Enterprise as defined in this Section D of the Specifications but which is selected and sub-contracted as a Trainee in terms of the Community Development Project associated with this Contract.

**bb) Training**

Training refers to the process of teaching a Trainee, usually in a classroom or simulated work environment situation where principles, theory, knowledge and skills are taught, and demonstrations are given. Assignments are set to ensure that the

<sup>9</sup> SANS 10845-7:2015, definition 2.12



Trainee can apply what has been taught. Training is done by a specialist in the subject, and who is qualified and accredited to train. The objective is to improve the competency of the Trainee.

**cc) Training and Skills Development Programme**

The programme which outlines how the Contractor intends to achieve the CSDG targets, as per Section D1010 of the Specifications and in line with the CIDB Standard for Developing Skills through Infrastructure Contracts (refer to latest version on [cidb.org.za](http://cidb.org.za)), by applying the various training methods described in Section D1010 of the Specifications.

**D1002.02 Applicable Legislation, Regulations and Standards**

The following Acts, as amended from time to time, are predominant amongst those which apply to the Construction Industry and are listed here for reference purposes only:

- a) The Constitution of South Africa;
- b) Public Finance Management Act, 1999 (Act No. 1 of 1999);
- c) Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000) and its latest applicable regulations;
- d) Construction Industry Development Board Act, 2000 (Act No. 38 of 2000);
- e) Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- f) The South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);
- g) The Skills Development Act, 1998 (Act No. 97 of 1998);
- h) The Skills Development Levies Act, 1999 (Act no. 9 of 1999);
- i) The amended Construction Sector Codes published in Notice 931 of 2017 of Government Gazette No. 41287 on 1 December 2017 by the Department of Trade and Industry;
- j) The National Small Enterprises Act, 1996 (Act 102 of 1996) as amended.

The following Standards and Practice Notes, as amended from time to time, are applicable in terms of Targeted Labour and Targeted Enterprises and are used fully or portions thereof in this Section D of the Specifications:

- i) SANS 10845: 2015, Parts 5, 7 and 8; and
- ii) CIDB Standard for Contract Participation Goals for Targeted Enterprises and Labour through Construction Works Contracts (refer to latest version on [www.cidb.org.za](http://www.cidb.org.za)).

**D1003 TARGET GROUP PARTICIPATION**

This part of Section D of the Specifications describes the Employer's requirements for the establishment of Target Group databases from which participants in the project will be selected for employment and sub-contracting.

It also describes the measurement of, and penalties or bonus to be applied, with respect to the CPG as defined in the Specification Data.

**D1003.01 Objectives of Target Group Participation**

Amongst others, the key objectives of Government are to extend economic opportunities and build entrepreneurial capacity in rural and underdeveloped areas and townships by:

- a) optimising the utilisation of local resources in the Project Area;
- b) developing these local resources in the execution of the project; and
- c) maximising the amount of funds retained within the Project Area.

To give effect to these objectives the Contractor shall, over the full duration of the contract, from site establishment up to the completion of the works:

- i) employ Targeted Labour from the Target Area(s) as stated in the Specification Data; and
- ii) sub-contract Targeted Enterprises as stated in the Specification Data; and

- iii) give preference to Targeted Enterprises which are from rural and underdeveloped areas and townships within the Project Area(s).

#### **D1003.02 Targeted Labour Database**

A system for the recruitment of Targeted Labour shall be agreed with the PLC prior to the commencement of labour recruitment. This system shall be fair and transparent.

Based on the system for recruitment, a Targeted Labour Database shall be compiled by the Contractor, with the assistance of the PLO, and the input and support of the PLC, for the Target Area(s) as stated in the Specification Data. If necessary, the assistance of the Department of Labour may be called upon to provide a labour database of labourers with the required skills and within the required designated groups and Target Area. Once the Database has been disseminated to the PLC, it shall be utilised to facilitate the selection of Targeted Labour as per the resources and skills required by the Contractor during the different construction stages.

The Targeted Labour Database shall be updated as and when required to reflect new employment seekers in the labour market.

Only Labour recruited from the Targeted Labour Database will be measured for Contract Participation Performance (CPP).

#### **D1003.03 Targeted Enterprise Database**

The Contractor shall, with the assistance and inputs of the PLC, compile a Targeted Enterprise Database from which Targeted Enterprises shall be sub-contracted to construct portions of the work as described in this part of Section D of the Specifications.

##### **a) Market Analysis and Requisite Resources Availability Audit**

The Contractor shall conduct a market analysis and requisite resources availability audit to determine the availability, expertise, abilities, and proficiency of Targeted Enterprises in the Project Area.

To inform the market analysis and requisite resources availability audit, the Contractor shall, as a minimum, use the National Treasury's Central Supplier Database (CSD) which can be obtained from the Employer's Supply Chain Management department via the Project Manager, as well as the CIDB contractor database (if applicable).

The market analysis and requisite resources availability audit, and all updates thereof for the duration of the Contract, shall be submitted to the Engineer and the Employer's Project Manager in a format acceptable to the Employer.

Following the market analysis and a requisite resources availability audit, the Contractor shall apply the CPG Target Group criteria in the Specification Data to compile a **preliminary** Targeted Enterprise Database (see D1003.03(c) below).

##### **b) Call for an Expression of Interest**

In addition to the CSD and the CIDB database, the Contractor shall call for an expression of interest from Targeted Enterprises in the Project Area. The call for an expression of interest shall outline the anticipated eligibility, functionality, preference and compliance criteria, as well as the anticipated Works content.

### c) Preliminary Targeted Enterprise Database

Based on the information obtained from the CSD, CIDB and the call for an expression of interest, the Contractor shall compile a Preliminary Targeted Enterprise Database.

The purposes of the Preliminary Targeted Enterprise Database are:

- i) for the Contractor to determine if the required resources and skills to execute the identified Targeted Enterprise work packages are available in the Project Area(s);
- ii) for the PLC to verify that Targeted Enterprises on the Preliminary Targeted Enterprise Database are authentic in terms of the Specification Data and other Database criteria, and
- iii) for the PLC to alert prospective Targeted Enterprises that are not on the Preliminary Database of the opportunity.

Based on the market analysis and requisite resources availability audit, and the information obtained from the call for an expression of interest, additional criteria for the Preliminary Targeted Enterprise Database may be tabled by the PLC to the Contractor to ensure Target Group participation as intended by the Employer.

### d) Final Targeted Enterprise Database

Once the Preliminary Targeted Enterprise Database has been disseminated to the PLC, the Contractor shall invite Targeted Enterprises to tender for the Targeted Enterprise work packages. The Preliminary Targeted Enterprise Database shall remain a “live database” until the day of tender closure when a print-out of the CSD, based on the Database criteria, shall become the **Final** Targeted Enterprise Database for the tender and shall be disseminated to the PLC.

Any Targeted Enterprise may respond to the invitation to tender, but preference shall be given to those Targeted Enterprises that satisfy the tender criteria.

The Targeted Enterprise Database shall be updated at every instance that a new sub-contract tender or group of similar sub-contract tenders are to be let for Targeted Enterprise work packages.

Targeted Enterprises within the Project Area shall be encouraged and assisted to register on the CSD and to become compliant with all other statutory requirements.

## D1003.04 Contract Participation Goal (CPG)

The CPG is the monetary value of the participation targets set by the Employer for Targeted Labour and Targeted Enterprises expressed as a percentage of the Final Contract Value. The participation targets comprise of the following:

% Targeted Labour (TL<sub>Total%</sub>) = the sum of the % Targeted Labour employed by the Contractor, Sub-contractors and Targeted Enterprises.

% Targeted Enterprises (TE<sub>Total%</sub>) = Minimum percentage of the greater of either 40% or the C1.1.1 Form of Offer stated percentage, of the Final Contract Value by the end of the contract to Targeted Enterprises.

While the individual participation targets, i.e. TL<sub>Total%</sub> and TE<sub>Total%</sub> must be met, the total CPG (CPG<sub>Total</sub>) is not the sum thereof, but are calculated as follows:

CPG<sub>Total</sub> = Final Contract Value x [TL<sub>Total%</sub> + (TE<sub>Total%</sub> - Targeted Labour employed by the Targeted Enterprises)]

where

Final Contract Value is = The Final Contract Value for purposes of this clause, is defined in clause D1003.04.

The Contractor shall strive to distribute and implement the participation targets and opportunities equally and continuously over the duration of the Contract. Where the Contractor deems such an equal and continuous distribution of the participation targets to be unachievable, he shall provide reasons and motivate it clearly in the preliminary CPG Plan submitted with the tender document.

Both the Targeted Labour and Targeted Enterprise participation targets may consist of sub-targets which are stipulated in the Specification Data, clause D1003. The Contractor is required to achieve these individual sub-targets. If the Contractor fails to achieve any one of the individual sub-targets and does not substantiate that such failure is due to quantitative underruns, the elimination by the Employer of items contracted to targeted enterprises, or any other reason beyond the Contractor's control which may be acceptable to the Employer, penalties shall apply as stated in Section D1003.05 of the Specifications, and as provided for in clause 8.7 of the FIDIC Conditions of Contract.

The value of the Provisional Sum scheduled under item D10.05 will not necessarily make up the full value of the work required to meet the minimum target set by the Employer for Targeted Enterprises. It is the Contractor's responsibility to assess the work required to meet the targets and, if necessary, to engage additional Targeted Enterprises to execute work on the Contract as well to ensure that the minimum targets are achieved.

#### **D1003.05 Contract Participation Performance (CPP)**

The CPP is the monetary value of the Contractor's actual progress towards achievement of the CPG calculated as follows:

$$\begin{aligned} \text{CPP} &= \text{CPG}_{\text{Actual}} \\ &= \text{total monetary value (excluding VAT) of Targeted Labour employed by the Contractor} + \text{total monetary value (excluding VAT) of Targeted Enterprises contribution, including Targeted Labour employed by the Targeted Enterprises.} \end{aligned}$$

The Contractor's CPP shall be monitored monthly to determine the extent to which it is striving to achieve the CPG. The basis of monitoring shall be a comparison of the actual expenditure on Targeted Labour and Targeted Enterprises with the planned expenditure for Targeted Labour and Targeted Enterprises as per the accepted CPG Plan. Monthly returns, in the format required by the Employer, shall be submitted by the Contractor with each interim Payment Certificate.

To assist in the measurement of the CPP the Contractor shall include the envisaged CPG programme in its initial contract programme which is to be submitted within 28 days after the Commencement Date. The CPG programme shall be updated in the accepted construction programme on acceptance of the CPG plan and with every subsequent revision.

As an incentive to encourage the Contractor to exceed the CPG, a bonus is offered, measured as follows:

##### **a) CPP Bonus**

$$\text{The bonus} = 0.25 \times (\text{CPP} - \text{CPG}_{\text{Total}})$$

Any bonus due (or portion thereof) shall be calculated on the Final Contract Value. No bonus shall apply if either the Targeted Labour, Targeted Enterprises and/or any individual sub-targets for Target Groups are not reached.

**b) CPP Penalties**

Conversely, failure to reach either the CPG or any individual Target Group targets shall render the Contractor liable for a penalty as prescribed in clause 8.7 of the FIDIC Conditions of Contract unless there are compelling reasons why the target or sub-targets could not be achieved as stipulated in Section D1003.04 of the Specifications. Penalties for Targeted Labour and for Targeted Enterprises shall be calculated as follows:

$$\text{Penalty Targeted Labour} = 0.5 \times ((\text{TL} - \text{TG}) + \text{Sum} (\text{TL}_n - \text{TG}_n) - 1.2 \times \text{L dp})$$

Where:

$n$	=	Each lowest order sub-group of Targeted Labour stipulated in the Specification Data.
TL	=	Monetary value of the Targeted Labour calculated at the percentage stipulated in the Specification Data applied to the Final Contract Value.
TG	=	Cumulative monetary value of Targeted Labour employed on the contract by the Contractor and all Sub-contractors.
L dp	=	Cumulative monetary value of black Disabled Persons employed on the Contract by the Contractor and all Sub-contractors.
$(\text{TL}_n - \text{TG}_n)$	=	The monetary values calculated unless if any calculated value is negative, then it shall be a zero value.

$$\text{Penalty Targeted Enterprises} = 1.0 \times ((\text{TE} - \text{TGE}) + \text{Sum} (\text{TE}_n - \text{TGE}_n) - 1.2 \times \text{TE mv} - 1.2 \times \text{TE dp})$$

Where:

$n$	=	Each lowest order sub-group of Targeted Enterprise stipulated in the Contract Data.
TE	=	Monetary value (excluding VAT) of Targeted Enterprises calculated at the percentage stipulated in the Specification Data applied to the Final Contract Value
TGE	=	Cumulative monetary value (excluding VAT) by Targeted Enterprises sub-contracted to the contract by the Contractor and 50% of the cumulative monetary value (excluding VAT) by Targeted Enterprise suppliers of goods and/or services.
TE mv	=	Cumulative monetary value (excluding VAT) by Targeted Enterprises being majority owned by black Military Veterans, sub-contracted to the Contract by the Contractor.
TE dp	=	Cumulative monetary value (excluding VAT) by Targeted Enterprises being majority owned by black Disabled Persons, sub-contracted to the Contract by the Contractor.
$(\text{TE}_n - \text{TGE}_n)$	=	The monetary values calculated unless if any calculated value is negative, then it shall be a zero value.

The total Penalty value shall be the sum of the Targeted Labour and Targeted Enterprises Penalty values unless the total Penalty value is negative then it shall be a zero value.

Interim penalty valuations, based on the accepted CPG Plan, shall be calculated to interim Payment Certificate values (excluding VAT) to establish the anticipated outcome, and to plan corrective actions for non-adherence to the CPG Plan.

Interim penalty valuations shall not be applied to the interim certificate value, but the Contractor shall by notice be placed on terms to correct as prescribed in sub-clause 15.1 of the FIDIC Conditions of Contract. Failure to correct by completion of the Contract will lead to an Employer's Claim in terms of sub-clause 2.5 of the FIDIC Conditions of Contract.

Any Penalty payable shall be calculated on, and applied to, the Final Contract Value.

#### **D1003.06 Accredited Registration**

The CPP for Targeted Enterprises shall only be accepted if the respective Targeted Enterprises comply fully with the definition of a Targeted Enterprise, and documentary evidence to support the claim lodged with the Engineer before the work, goods or service may be considered as having been performed by a Targeted Enterprise. The responsibility for producing evidence of the respective documentation shall rest with the Contractor.

The Contractor shall assume responsibility for the compilation and maintenance of comprehensive records detailing each Targeted Enterprise's progress.

#### **D1003.07 Contractor's Responsibility**

In terms of the Conditions of Contract, all Targeted Labour recruitment and employment and Targeted Enterprises sub-contracting, as well as its associated risks, shall remain the sole responsibility of the Contractor.

The Employer's CPG requirements, and the compulsory utilisation of project specific Targeted Labour and Targeted Enterprises databases, shall not relieve the Contractor of its obligations under the Contract and shall not attract any liability to the Employer.

### **D1004 STAKEHOLDER AND COMMUNITY LIAISON AND SOCIAL FACILITATION**

This part of Section D of the Specifications describes the Employer's requirements with respect to Stakeholder and Community liaison and social facilitation. It also describes the roles and responsibilities of the Project Liaison Committee (PLC) and the Project Liaison Officer (PLO).

#### **D1004.01 Purpose of Stakeholder and Community Liaison**

To give effect to the need for transparency and inclusion in the process of delivering services, the Contractor shall liaise with the project Stakeholders and affected Communities for the duration of the Contract's life cycle. This shall be achieved through structured engagement with the PLC which was established by the Employer for this purpose.

#### **D1004.02 Contractor's Responsibilities in Stakeholder and Community Liaison**

The Contractor shall have the following general responsibilities in the Stakeholder and Community liaison process:

- a) Stakeholder and Community engagement shall be executed based on the Employer's social facilitation principles and processes described in this Section D of the Specifications.
- b) The Contractor shall make use of the PLC as the official communication channel and utilise it to facilitate harmonious relationships, with project Stakeholders and affected Communities.
- c) PLC members, to which the Contractor is a party, shall be held accountable to disseminate project information discussed at the PLC meetings to the entities that they represent.
- d) As a party to the PLC, the Contractor shall delegate from among his site personnel a responsible person to participate in the PLC and its business.
- e) The Contractor shall provide the PLC with any assistance and information that it requires to execute its duties, which amongst others, include training, providing a meeting venue on site, provide Target Group reports, etc.

It is important to note that in terms of the Conditions of Contract, all Targeted Labour recruitment and employment, and Targeted Enterprises' selection and sub-contracting, as well as its associated risks, shall remain the sole responsibility of the Contractor.

The Contractor shall take cognisance of the Employer's PLC and PLO Forms, attached as Appendix 10, which shall be provided to the Contractor by the Engineer. While the Employer holds its own staff accountable for the deliverables listed in the checklist, the Contractor and the Engineer shall assist the Employer in accomplishing the deliverables.

The Employer's establishment of the PLC, and the Engineer providing a PLO to the Contractor, shall not relieve the Contractor of its obligations under the Contract and shall not attract any liability to the Employer.

#### **D1004.03 Project Liaison Committee (PLC)**

The PLC is the official communication channel through which the Employer, Engineer, Contractor and project Stakeholders and affected Communities communicates on project matters. This platform is also used to communicate the impact that the project has or may have on project Stakeholders and the affected Communities. This part of Section D of the Specifications describes the general processes pertaining to the PLC, as well as its role and responsibilities.

##### **a) Establishment of the PLC**

A PLC has either been established prior to commencement of the Contract or shall be established as soon as possible by the Employer. The PLC consists of the Employer, Engineer, Contractor and representatives of project Stakeholders and affected Communities.

To ensure that all relevant Stakeholders are represented in the PLC, the Employer did, or will, consult with the Executive Mayor's office, as well as with the LED Department of the Local Municipalities in the Project Area. Once, the PLC has been established, the Employer's further Stakeholder engagement activities shall not prevent the Contractor from continuing with construction.

Typical Stakeholder representation on the PLC may include:

- i) A PLC member from the relevant RRM PLC.
- ii) Local Municipality LED Office.
- iii) Traditional leadership representation.
- iv) Forums representing people with disabilities.
- v) Forums representing women.
- vi) Forums representing youth.
- vii) Forums representing business sector.
- viii) Forums representing transport sector.
- ix) Any other Stakeholder forum/organisation recognised by the Employer and the Local Municipality's LED Office.

Every forum/organisation/constituency shall have one (1) representative on the PLC, which representation shall be confirmed by a duly signed nomination form.

It should be noted that the PLC is not a political platform. While Councillors may be invited to some PLC meetings, they may not be PLC members and hence, will not have voting rights when attending a PLC meeting.

##### **b) Seating Allowance for PLC Members**

PLC membership is voluntary and PLC members shall not be remunerated for any time spent or work done associated with representing their constituency on the PLC.

Provision for the cost of liaison, social facilitation and PLC support has been made under pay-item D10.02(a). This pay-item provides for the Contractor's cost incurred in executing his responsibilities w.r.t. Stakeholder and Community liaison.

This pay-item may also be utilised to pay an allowance to PLC members for actual costs incurred in executing their PLC duties (other than time or work done related). The Contractor will determine and table to the PLC a realistic seating allowance which will be substantiated by an outline of the anticipated actual costs envisaged to be incurred by PLC members.

The seating allowance shall be increased annually based on the CPI figure contained in Table B2 of Statistical Release P0141 by StatsSA.

**c) Induction of the PLC**

The Employer shall conduct an induction meeting with the PLC to acquaint PLC members with the following information:

- i) SANRAL's Horizon 2030 Strategy.
- ii) SANRAL's Fourteen Point Plan.
- iii) The role and responsibilities of PLC members.
- iv) SANRAL's Transformation Policy.
- v) How the Transformation Policy impacts on SMMEs.
- vi) Relevant details of the Contract, e.g.
  - a. Start and end dates
  - b. Important milestones
  - c. CPG targets
  - d. Envisaged Targeted Enterprise packages
  - e. Envisaged work for other SMMEs (non-CPG).

**d) Rules of Engagement for the PLC**

In the execution of their duties, members of the PLC shall adhere to the undertakings listed below and the Contractor shall inform the Engineer of any transgression of these undertakings.

- i) General Matters and Membership
  - a. A PLC member may not be a politically elected representative and political party representation will not be allowed in the PLC.
  - b. Ward Councillors may interact with the project team through the Mayor's Office.
  - c. If required, and in consultation with the Employer, a Political Steering Committee (PSC) may be established to address political matters. A PSC will only be established where the Project Area traverse over more than one municipal area.
- ii) Term of Office for the PLC
  - a. The duration of PLC members' participating in the PLC (term of office) shall depend on the duration of the project.
  - b. If the Employer finds the performance of a PLC member to be below expectation or their conduct to be unacceptable, the affected member will be discharged from their obligations and a new nomination process shall commence.
- iii) Targeted Enterprise and Targeted Labour

PLC members shall:

  - a. ensure that they, or companies in which they hold equity, will not tender on the Contract for any work or sub-contract that may be issued. Should they tender, this will be treated as a conflict of interest and the tender proposal submitted will not be evaluated.



- b. not have private or business interests in any of the sub-contract tenders tabled to the PLC or considered in this Contract.
- c. shall recuse themselves from discussions that deal with a sub-contract tender if any other member is of the opinion that a member's participation in deliberations, which is rightly or wrongly construed as improper or irregular, may lead to the award of a sub-contract to a tenderer known to the member or to the member itself.
- d. recuse themselves from the operations of the PLC following a situation as described in paragraphs ii) above and shall cease to be a PLC member for this Contract.
- e. during the tender and tender evaluation processes, neither deliberately favoured nor prejudiced a person or tenderer, as intended, or contemplated in treasury Regulation 16, A8.3 (a), (b) & (c).
- f. ensure that no conflict of interest arises from members' involvement in the PLC and potential involvement in targeted labour recruitment and/or targeted enterprises procurement and/or any other supplier/sub-contractor/service provider procurement or involvement in the contract.

iv) Confidentiality

- a. PLC members shall accept that all information, documentation, and decisions regarding any matter serving before the PLC are confidential and undertake not to communicate decisions or discussions of PLC meetings to external or internal parties unless so directed and approved by the Project Manager.
- b. Information for public dissemination shall be clearly indicated by the committee to ensure that sensitive information is only disseminated to the correct audience.

v) Removal from Office

- a. PLC members who violate the provisions of these Rules of Engagement for PLCs will be removed from their role as a PLC member at the sole discretion of the Employer.
- b. The Employer reserves the right to recover any costs from PLC members whose actions can be regarded as detrimental to the Employer or to the execution of the project.
- c. The Employer also reserves the right to recommend criminal prosecution if the offence warrants such action.
- d. The Employer reserves the right to dissolve the entire PLC should it believe that such an action is in its best interest, or that of the project. The Employer will not be obliged to reconstitute the PLC if such a dissolution occurs.

**e) Responsibilities and Duties of the PLC**

The PLC shall execute specific duties during the design and construction phases of the project.

Some of the PLC's duties during the design and construction stages overlap and hence, for completeness, a description of the PLC's duties in both project stages is provided here.

The PLC shall execute the following duties:

ii) Project Design Stage

- a. Meet as often as required to discuss and resolve the project's design stage matters which are of interest or concern to the parties to the PLC.

- b. Peruse the Project Liaison Committee duties outlined in this Section D of the Specifications and agree on the duties of, and procedures to be followed by, the PLC to fulfil its duties.

**Note:** The principles outlined in this section shall not be amended, but duties and procedures may be altered to be project specific and to improve the functionality of the PLC.

- c. Act in accordance with the agreed terms of reference for the PLC.
- d. Inform the Employer of any training that project Stakeholder and affected Community representatives of the PLC require to execute their duties.
- e. Assist the Engineer to source suitable candidates, based on the Employer's qualifying criteria, for the position of PLO.
- f. Observe and verify that the qualifying criteria and procedures applied by the Engineer to select and employ the PLO were executed in a fair and transparent manner and were within the prescripts of the relevant labour legislation and regulations.
- g. Assist the Engineer to identify the project's Target and Project Area(s), from which Targeted Labour and Targeted Enterprises could be employed and sub-contracted respectively.
- h. Assist the Engineer to identify the project's Target Groups for inclusion in the Tender Documents and provide input and support to the identified Target Groups.

ii) Project Construction Stage

- a. Meet formally prior to the Employer's monthly site meeting, or as may be required, to discuss and resolve project matters, which are of interest or concern to the parties to the PLC.
- b. Assist the Contractor to establish the selection criteria and process to employ Targeted Labour.
- c. Assist the Contractor to identify the eligibility, functionality, preference and compliance criteria to select and sub-contract Targeted Enterprises.
- d. Provide input and support for the Databases compiled by the PLO and the Contractor from which Targeted Labour will be selected and employed and Targeted Enterprises will be sub-contracted respectively.
- e. Verify that the criteria and methodologies applied by the Contractor to select and employ Targeted Labour and sub-contract Targeted Enterprises are executed in a fair and transparent manner and are within Government legislation and regulations and the Employer's Policies.
- f. Verify that the conditions of employment and the conditions of sub-contracting, in the employment of Targeted Labour and sub-contracting of Targeted Enterprises are applied in a fair and transparent manner and according to the Employer's employment and sub-contracting requirements.
- g. Make recommendations to the Contractor on the training needs, eligibility criteria and selection criteria for the provision of training to Targeted Labour, Targeted Enterprises, Designated Groups, project Stakeholders and the affected Communities.
- h. Verify that training and skills development programmes, which the Contractor committed to, are implemented and executed as approved and intended.
- i. Inform the entities whom they represent of any project matters which the respective party to the PLC wishes to communicate with each other.
- j. Inform the entities whom they represent of any project matters that are impacting or may impact, either positively or negatively, on the respective parties to the PLC.

- k. Inform the Contractor of Stakeholder and/or Community requests and/or needs which could possibly be addressed within the project's Scope of Work.
- l. Inform the Employer, Engineer and Contractor of any road safety concerns within the Project Area(s) and advise them of possible mitigating measures and/or road safety programs that will be most suitable for acceptance by the affected Communities to promote road safety.
- m. Assist parties to the PLC to agree on a dispute resolution mechanism to resolve any disputes that may arise between the parties to the PLC.
- n. Assist parties to the PLC to liaise with their respective entities to resolve any disputes amongst the parties which may occur due to the project.

**f) PLC Meetings**

- i) Frequency
  - a. Meetings will be conducted monthly or as required by the Stakeholders or the project matters.
- ii) Notice of Meetings
  - a. The notice of the PLC meeting shall be given at least seven (7) calendar days prior to the meeting date.
  - b. Where meetings have been diarised over a period by the PLC, it shall be the duty of each PLC member to ensure his/her attendance on the set dates.
  - c. Where a PLC member has missed any meeting, he/she bears the onus of establishing the date and venue of the next meeting.
- iii) Venue
  - a. The venue for PLC meetings shall be the project site office or any other venue agreed to by the members of the PLC and approved by the Employer's Project Manager.
  - b. During the COVID-19 lockdown, or any other lockdown as announced by government, the meetings shall be held on an online platform such as WhatsApp, MS Teams, Zoom or similar.
- iv) Agenda
  - a. An agenda shall be made available or displayed to all participants at the commencement of such meetings or the minutes of the previous meeting will serve as the agenda of such meetings.
  - b. The agenda shall not be amended without prior approval from the Employer's Project Manager.
- v) Chairperson
  - a. PLC meetings shall be chaired by the Employer which will typically be the Employer's Project Manager, or a SANRAL staff member, with decision-making delegation, or the Engineer. The Chairperson shall:
    - i. chair all meetings of the PLC,
    - ii. co-ordinate all the activities of PLC,
    - iii. ensure that members are fulfilling their tasks as assigned by the PLC,
    - iv. see to the execution of decisions taken by the PLC,
    - v. ensure the validity of members' claim for allowance,
    - vi. ensure compliance of all activities of the PLC with current rules, law and general SANRAL policy, and
    - vii. be a co-signatory to all official documents of the PLC.
- vi) Secretariate
  - a. The Engineer's staff shall provide a secretarial service to take minutes of PLC meetings.

- b. Secretarial support other than taking minutes at PLC meetings shall be provided by the PLO.
- vii) Quorum
  - a. The quorum for PLC meetings shall be constituted by 50%+1 ratio excluding co-opted members.
- viii) Apologies and Non-attendance
  - a. Apologies shall be in writing except in emergency where the member apologising cannot communicate the apology in writing.
  - b. Apologies may be sent through any media agreed to prior by the PLC for example through SMS or WhatsApp messaging or similar application.
  - c. The organization, represented by a member who fails to attend three (3) consecutive meetings without an apology, will be informed in writing and asked to nominate a replacement member.
- ix) Language
  - a. The meetings will be conducted in English to enable all participants at the meeting to understand the discussions of the meeting.
  - b. However, care and consideration must be given to provide non-English speakers an opportunity to participate. Therefore, where desirable, any of the 11 official languages may be used to conduct the meeting. If another language other than English is used, the minutes of the meeting will need to be transcribed, translated, and recorded in English.
- x) Other
  - a. The PMT shall provide a finger lunch for PLC members at PLC meetings.

#### **D1004.04 Project Liaison Officer (PLO)**

The PLO facilitates the selection and employment of Targeted Labour and coordinates communication between the members of the PLC to address the day to day project, Stakeholder, and Community matters that impact on the parties represented in the PLC.

##### **a) Appointment of the PLO**

The Engineer appoints the PLO in accordance with the Employer's criteria for a PLO. The appointment of the PLO must be acknowledged and supported by the PLC.

Although the PLO provides social facilitation support to the Contractor, the PLO shall report to the Engineer or his delegated representative, e.g. the Resident Engineer.

##### **b) Duties of the PLO**

The PLO shall execute specific duties during the design and construction phases of the project. These duties include the following:

- (i) Except for taking the minutes of PLC meetings, which is a duty of the Engineer, the PLO shall provide a secretariat function to the PLC which includes, amongst others, the following:
  - a. Schedule meetings;
  - b. Compile meeting agendas;
  - c. Compile document packages for meetings;
  - d. Distribute minutes of meetings;
  - e. Assist representatives of project Stakeholders and affected Community to formulate their communication to the PLC in writing;
  - f. Distribute written communication between the parties to the PLC;
  - g. Keep records of all PLC correspondence and documentation; and
  - h. Provide any other reasonable secretariat function required by the PLC.

- (ii) Attend all PLC meetings to report on the day to day project, Stakeholder and Community matters that impact on the parties to the PLC.
- (iii) Attend all monthly project site meetings to report on the day to day project, Stakeholder and Community matters that impact on the parties to the PLC.
- (iv) Attend any other meetings related to the project and in which any of the project Stakeholders, affected Communities, Targeted Labour and Targeted Enterprises are involved.
- (v) Maintain a full-time presence on site to monitor and address the day to day project, Stakeholder and Community matters that impact on the parties to the PLC.
- (vi) Maintain a full-time presence on site to assist the parties to the PLC in the day to day liaison with each other.
- (vii) Assist the Engineer and the Contractor to disseminate information to PLC members such as:
  - a. the basic Scope of the Works and how it will affect the Community;
  - b. the project programme and regular progress updates;
  - c. the anticipated employment and sub-contracting opportunities;
  - d. the project programme as it pertains to the employment of Targeted Labour and sub-contracting of Targeted Enterprises;
  - e. Occupational Health and Safety precautions; and
  - f. any other information relevant to project Stakeholders and the affected Communities.
- (viii) Be well acquainted with the contractual requirements as it pertains to Targeted Labour employment and training.
- (ix) Assist the PLC to establish and agree the criteria to follow when selecting and employing Targeted Labour.
- (x) Assist the Engineer and the Contractor in their resources and skills audits by providing a coordinating function between the Engineer, the Contractor, project Stakeholders, and the affected Communities.
- (xi) Ensure that the Contractor compiles the Targeted Labour databases based on the eligibility and selection criteria and that he updates it as and when required.
- (xii) Coordinate the selection and employment of Targeted Labour based on the agreed eligibility and selection criteria and based on the Contractor's labour and skills requirements.
- (xiii) Ensure that each Targeted Labourer enters an employment contract which adheres to current and relevant Labour legislation.
- (xiv) Ensure that each Targeted Labourer understands the conditions of his/her employment contract with an emphasis on the employment start date, end date and wages payable.
- (xv) Identify and inform the Contractor of any relevant training required by the Targeted Labour.
- (xvi) Attend all disciplinary proceedings to ensure that hearings are fair and conducted in accordance with the current and relevant Labour legislation.
- (xvii) Be proactive in identifying project Stakeholder and affected Communities' (including Targeted Labour and/or Targeted Enterprise Sub-contractor), requirements, disputes, unrest, strikes, etc. and bring it to the attention of the PLC.
- (xviii) Assist the parties to the PLC to resolve any disputes, which may occur due to the project.
- (xix) Other than the document records to be kept as mentioned above, keep record of all other documents and processes pertaining to the employment of Targeted Labour.
- (xx) Produce and submit a monthly report to the PLC on PLC and other meetings attended by the PLO, as well as on Targeted Labour employment, and project Stakeholder, affected Community and any other project matters that impact on the parties to the PLC.

**D1005 MOBILISATION PERIOD**

The Mobilisation Period is defined in Section D1002 of the Specifications. This Section describes the requirements of the Mobilisation Period.

**D1005.01 Purpose of the Mobilisation Period**

The Mobilisation Period was introduced as an aid to the Contractor to:

- a) become acquainted with the Stakeholder and Community liaison requirements of the Contract as prescribed in this Section D of the Specifications;
- b) allow for the Contractor's planning to obtain the CPG as required in the Specification Data;
- c) allow for the Contractor's planning to obtain the Contract Skills Development Goals (CSDG) as required in Section D1010 of the Specifications,
- d) follow the processes prescribed in this Section D of the Specifications to employ the initially required Targeted Labour and enter the first sub-contracts with Targeted Enterprises; and
- e) provide the training required by Targeted Labour and Targeted Enterprises to commence with the construction of the Works.

Access to site for the Commencement of the Works shall thus only be issued once the following deliverables have also been submitted and/or completed by the Contractor:

- i) Submission of the CPG Plan, followed by acceptance of the Engineer.
- ii) Submission and the Training and Skills Development Programme, followed by acceptance of the Engineer.
- iii) Appointment of the initial Targeted Enterprise sub-contractors.

**D1005.02 Duties of the Contractor**

During the Mobilisation Period, the Contractor shall execute the following duties:

**a) Compile a CPG Plan**

The Contractor shall compile an acceptable CPG Plan, which sets out how he intends to achieve the various CPG targets as stated in the Specification Data. The Contractor shall distribute and implement the participation targets and Targeted Enterprise work opportunities equally and continuously over the duration of the Contract, i.e. from site establishment to completion of the Works. Where the Contractor deems such an equal and continuous distribution of the participation targets to be unachievable, he shall provide reasons and motivate it clearly in the CPG Plan.

The CPG Plan shall provide the detail of the Targeted Enterprise work programme, as well as the contents and value of the work packages. See Appendix 8 for the CPG Plan format.

The Targeted Enterprise work programme shall be in line with the Works Programme and once the CPG Plan has been accepted by the Engineer, it shall be captured in the Works Programme.

The Mobilisation Period shall only be concluded once the CPG Plan has been accepted by, and all the duties above have been executed to the satisfaction of, the Engineer after consultation with the Employer.

The Employer and the Engineer shall monitor progress and adherence to the CPG Plan in the same manner as they would monitor the Works Programme.

Should the Contractor require an extension of the Mobilisation Period due to a delay not within his control, Contractual Procedure shall be followed, and the Contractor shall submit his Claim for an extension of time through the relevant Contractual Clauses of the Conditions of Contract.

**b) Compile a Training and Skills Development Plan**

The Contractor shall compile an acceptable Training and Skills Development Plan, which sets out how he intends to achieve the various CSDG targets as per the Section D1010 of the Specification and in line with the CIDB Standard for Developing Skills through Infrastructure Contracts (refer to latest version on [www.cidb.org.za](http://www.cidb.org.za)).

The Training and Skills Development Plan shall provide the detail of the training methods selected for implementation as described in Section D1010 of the Specifications and shall include an execution programme for acceptance by the Engineer, which shall demonstrate its correlation with the Works Programme.

The Mobilisation Period shall only be concluded once the Training and Skills Development Plan has been accepted by the Engineer after consultation with the Employer.

The Employer and the Engineer shall monitor progress and adherence to the Training and Skills Development Plan in the same manner as they would monitor the Works Programme.

**c) Sub-contracting of Targeted Enterprises**

During the Mobilisation Period the Contractor shall execute the following duties w.r.t. the sub-contracting of Targeted Enterprises:

- i) Liaise with the Employer, Engineer and the PLC to structure and finalise the work packages to be sub-contracted to Targeted Enterprises.
- ii) Liaise with the Employer, Engineer and PLC to determine the Targeted Enterprise Database criteria for the sub-contracting of Targeted Enterprises.
- iii) Compile the Targeted Enterprise Database(s) for input and support by the PLC.
- iv) Undertake a skills audit of the Targeted Enterprises which appear on the Targeted Enterprise Database(s).
- v) Based on the skills audit, and in consultation with the PLC, identify the pre-tender training requirements of Targeted Enterprises.
- vi) Provide an opportunity to Targeted Enterprises to receive the identified pre-tender training.
- vii) Tender the initial work packages and sub-contract the first group of Targeted Enterprises for commencement of the Works.

**d) Employment of Targeted Labour**

During the Mobilisation Period the Contractor shall execute the following duties w.r.t. the employment of Targeted Labour:

- i) Liaise with the PLC and the PLO on the compiled Targeted Labour Database(s) for the employment of Targeted Labour.
- ii) Undertake a skills audit of the Targeted Labour which appear on the Targeted Labour Database(s).
- iii) Based on the skills audit, and in consultation with the PLC, identify the training requirements of Targeted Labour to enhance their employability.
- iv) Provide an opportunity to eligible Targeted Labour to receive the identified training to enhance their employability.
- v) Select and appoint the first group of Targeted Labour for commencement of the Works.

### e) **Training Requirements**

The Contractor will not be able to address all the training requirements identified for Targeted Labour and Targeted Enterprises during the Mobilisation Period and it is accepted that training will take place over the duration of the Contract.

The training provided to both Targeted Enterprises and Targeted Labour during the Mobilisation Period shall focus on the activities and/or skills required for the commencement of the Works and shall include the mandatory Occupational Health and Safety training.

## **D1006 THE ROLE OF THE ENGINEER**

The role and responsibilities of the Engineer are clearly described in the Conditions of Contract. This section elaborates on the Engineer's duties with respect to Stakeholder and Community Liaison, Targeted Labour Employment and Targeted Enterprise sub-contracting.

Together with the Employer and the Contractor, the Engineer is also a party to the PLC and hence, is co-responsible for successful project Stakeholder and Community liaison.

In addition, the Engineer shall play a supporting role to the Contractor in the successful implementation of the Employer's Targeted Labour and Targeted Enterprise utilisation and development goals.

### **D1006.01 Duties During the Design Phase**

During the design phase, the Engineer undertook a preliminary skills and resources audit of the Targeted Enterprises in the Project Area. The purpose of the audit was to:

- a) obtain an understanding of the Community's skills, both academically and occupationally;
- b) obtain an understanding of the resources within the Community, i.e. Targeted Enterprise availability and capabilities;
- c) establish the CPG targets for Targeted Enterprises and Targeted Labour for inclusion of the Specification Data; and
- d) identify tender and other relevant training to be offered to Targeted Enterprises and Targeted Labour to prepare them for tendering and to enhance their employability.

### **D1006.02 Duties During the Construction Phase**

To implement the Employer's Targeted Labour and Targeted Enterprise goals, the Engineer shall provide support to the Contractor by executing the following duties:

#### **a) Targeted Enterprise Sub-contracting**

- i) Make recommendations to the Contractor in identifying and structuring the work packages to be sub-contracted to Targeted Enterprises and approve the scope and extent of the work packages.
- ii) Verify that the Targeted Enterprise Database(s) has been updated prior to the letting of every new set of sub-contracts.
- iii) Approve tender procedures, tender documents, tender submission requirements and adjudication processes for the sub-contracting of Targeted Enterprises.
- iv) Review all tender adjudication reports and monitor that the criteria and procedures applied by the Contractor to sub-contract Targeted Enterprises are executed in a fair and transparent manner and are within the Employer's and Government's Supply Chain Management Policies.
- v) Verify that sub-contract agreements and the conditions of sub-contracting with Targeted Enterprises are fair and transparent and within the prescripts of the Contract requirements.



- vi) Monitor the management of Targeted Enterprise sub-contracts and ensure that conditions such as the application of penalties, the termination of contracts, etc. are applied in a fair and transparent manner and within the prescripts of the agreement.

**b) Targeted Labour Employment**

- i) Verify that the Labour Database(s) from which Targeted Labour will be employed is updated prior to every new Labour intake.
- ii) Monitor that the criteria and procedures applied by the Contractor to employ Targeted Labour are executed in a fair and transparent manner and is within the Contract requirements.
- iii) Monitor that the conditions of employment of Targeted Labour are applied in a fair and transparent manner and within the prescripts of the current and relevant Labour legislation.

**c) Target Group Training Requirements**

- i) Make recommendations to the Contractor in identifying the training requirements of Targeted Labour and Targeted Enterprises and approve the proposed training programmes.
- ii) Monitor that training programmes and support programmes, which the Contractor committed to, are implemented and executed as intended.

**D1008 GENERAL RESPONSIBILITIES OF THE CONTRACTOR TOWARDS TARGETED ENTERPRISES**

The Contractor shall have the responsibilities described in this Section, D1008 of the Specifications, towards all Targeted Enterprises subcontracted in terms of the CPG as stated in the Specification Data.

**a) The Employer's Independent Targeted Enterprise Monitor**

The Employer shall, through its Transformation Unit, appoint an independent Targeted Enterprise Monitor, who shall audit the Contractor with respect to his obligations to Targeted Enterprises and who shall report his findings to the Employer's Project Manager, the Engineer, and the Regional Transformation Officer (RTO) monthly.

**b) Failure to Comply with Responsibilities Towards Targeted Enterprises**

If the Contractor, in the opinion of the Employer's Project Manager or the Engineer, fails to comply with its responsibilities towards Targeted Enterprises, the Engineer shall issue a written warning to the Contractor, stating all the areas of non-compliance. The Contractor's time to correct shall be stated in the letter and shall be in accordance with the relevant specifications for the aspects of non-compliance.

A copy of the letter of warning shall be forwarded to the Employer's Project Manager and the Targeted Enterprise Monitor shall monitor that corrective action is taken by the Contractor.

Failure by the Contractor to comply with a deadline, will be sufficient grounds for the Employer to apply a penalty or institute a claim in accordance with the relevant Conditions of Contract.

**D1008.01 Targeted Enterprise (TE) Construction Manager**

The Contractor shall appoint a dedicated TE Construction Manager whose sole responsibility shall be to assist the Contractor with the execution of his responsibilities towards Targeted Enterprises and Target Groups as prescribed in this Section D of the Specifications, with an emphasis on D1008 and D1010.

The TE Construction Manager may be appointed from the Contractor's existing staff or may be employed or sub-contracted for the purpose of this Contract. Irrespective of the contractual relationship between the TE Construction Manager and the Contractor, the TE Construction Manager shall not perform any other duties than that of a dedicated TE Construction Manager on a full-time basis for this Contract.

**a) TE Construction Manager's Obligations**

Amongst others, the TE Construction Manager shall facilitate the training, mentoring, development and support of Targeted Enterprises as per the Contractor's approved Training and Skills Development Programme (see Section D1010 of the Specifications).

The TE Construction Manager shall submit monthly TE Progress Reports in the Employer's reporting format. The report shall be submitted to the Employer's Project Manager and Regional Transformation Officer, the Engineer and the Contractor, at least one week prior to the monthly site progress meeting.

This report shall include, amongst others:

- i) Details of TEs trained, e.g., number, hours, value, modules, credits obtained, etc.
- ii) Details of TEs sub-contracted, e.g., number, packages, values, etc.
- iii) Details of TEs performance on the work packages, and skills gaps to be addressed, etc.
- iv) Details of TEs growth and sustainability, e.g., CIDB grading upgrades, business success, etc.
- v) Details of disputes and the associated interventions and/or resolutions.

**b. TE Construction Manager's Qualifications and Experience**

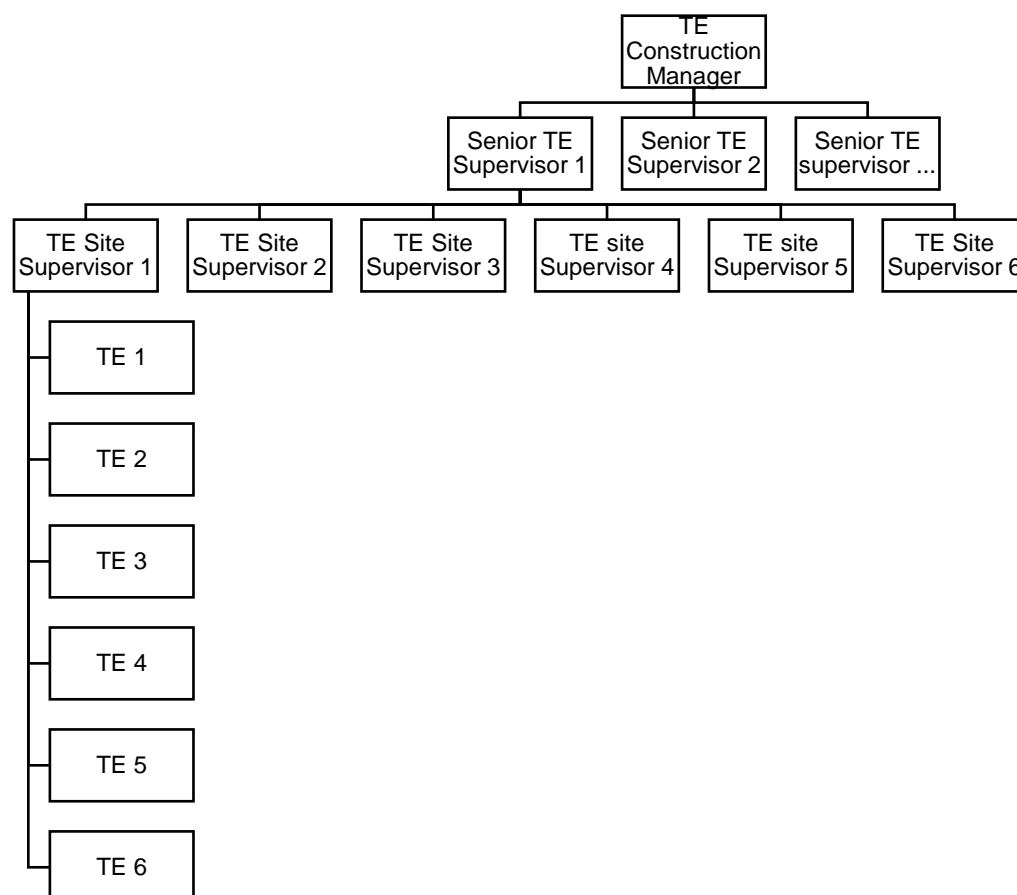
The TE Construction Manager shall have, as a minimum, a National Diploma: Management of Civil Engineering Construction Processes (NQF Level 5) or an equivalent qualification.

He shall have at least 5 years' experience as a Site Agent, managing construction processes in the fields of roads maintenance, new roads construction, roads rehabilitation, roads structures, etc. In addition, he shall have ample knowledge of, and experience in, the requirements of training and mentoring in the road construction environment.

**c. TE Construction Manager's Team**

The TE Construction Manager shall have on his team one (1) TE Site Supervisor for every six (6) Targeted Enterprises which are in their respective construction phases and one (1) Senior TE Supervisor for every six (6) TE Site Supervisors.

The qualifications and/or experience of TE Site Supervisors and Senior TE Supervisors shall be relevant and of a suitable level to enable them to supervise the level of Targeted Enterprise and the specific works under construction. Below is an indicative organogram of the TE Construction Manager and his team.



#### **D1008.02 General Obligations**

The Contractor shall, with the assistance of the TE Construction Manager, comply with the following general obligations:

- a) Assist the Targeted Enterprises in instituting a quality assurance system;
- b) Provide adequate training, coaching, guidance, mentoring and any other identified and approved assistance to Targeted Enterprises and their employees;
- c) Provide support and any other identified and approved assistance to ensure that the Targeted Enterprises meet their obligations and commitments with respect to their sub-contracts,
- d) Assist Targeted Enterprises to monitor and manage the schedules, costs, and cash flows of their sub-contracts.
- e) Endeavour to avoid sub-contract disputes and if disputes do arise, facilitate a process to find an amicable solution.
- f)
- g) Ensure that the CPG objectives are achieved.

#### **D1008.03 Sub-contract Agreements**

The Contractor shall conclude subcontract agreements with each subcontracted Targeted Enterprise and shall utilise the be the Employer's proforma document for Targeted Enterprise sub-contracting (see Appendix 11), which is based on the 2011 FIDIC Conditions of Sub-contract for Construction and shall be in accordance with the provisions of amended sub-clause 4.4 of the Conditions of Contract and shall be consistent with the terms and conditions of this Contract.

##### **a) Special Conditions of Contract**

The following Special Conditions of Contract forms part of the subcontract agreement:

- i) The Targeted Enterprise's entitlement to receive the training contemplated in this Contract (Part C1, C1.2.1, Part B, clause 6.8);
- ii) The Targeted Enterprise's obligation to participate and co-operate in the training provided for in this Contract (Part C1, C1.2.1, Part B, clause 6.5);
- iii) The allowable sources from which Labour may be drawn in terms of the Contract (Part C1, C1.2.1, Part B, clause 6.8);
- iv) The terms and conditions relating to the recruitment, employment and remuneration of Labour engaged on the Contract (Part C1, C1.2.1, Part B, clause 6.5);
- v) The training to be provided to the Targeted Enterprise's workforce (Part C1, C1.2.1, Part B, clause 6.8);
- vi) The terms and conditions related to payment of the Targeted Enterprise (Part C1, C1.2.1, Part B, clauses 14.6 to 14.8 and 15.3);
- vii) Sanctions in the event of failure by the Targeted Enterprise to comply with the terms and conditions of the subcontract agreement (Part C1, C1.2.1, Part B, clauses 14.6 and 20.4 to 20.7);
- viii) Dispute avoidance and resolution procedures (Part C1, C1.2.1, Part B, clauses 20.4 to 20.7).

Further Special Conditions of Contract required by the Contractor shall only be included into the subcontract agreement once approved by the Employer and the Engineer.

#### **b) Monitoring of Sub-contract Agreements**

The proforma subcontract agreement for each group of work packages shall be tabled to the Employer's Independent Targeted Enterprise Monitor for his review and confirmation that sub-contract agreements are in terms of the Employer's requirements and policies.

In addition, the PLC may request proof that subcontract agreements were entered into with the subcontracted Targeted Enterprises. The PLC may also request insight into the Conditions of Subcontract and Subcontract Data.

To protect Targeted Enterprises' competitive advantage and/or tender strategy, only the subcontract agreement shall be available to the PLC for perusal and not the pricing structure and/or Schedule of Quantities.

A copy of each subcontract agreement shall be filed with the Engineer after confirming that it is in accordance with the provisions of this Contract.

### **D1008.04 Payment of Targeted Enterprises**

Targeted Enterprises shall be paid the rates and/or provisional sums which they have tendered, or which have been negotiated as described in this Section D of the Specifications.

#### **a) Payment of Provisional and General Obligations**

Provision shall be made in the subcontract agreement for the Targeted Enterprise's preliminary and general obligations (P&Gs), which shall be calculated as a minimum of 15% of the value of the scheduled subcontract work items.

Where the Contractor's subcontract work is not paid from a Provisional Sum, the P&Gs of the Targeted Enterprise shall be paid from the Lump Sum tendered by the Contractor for the P&Gs of Targeted Enterprises.

P&Gs shall be paid to Targeted Enterprises as per Section C1.3.1 of the COTO specification payment items, i.e.:

- i) C1.3.1.1 paid in 3 instalments of 50%, 35% and 15%;

- ii) C1.3.1.2 paid as a percentage of the total value progressively per certificate;
- iii) C1.3.1.3 paid monthly for the sub-contractor's contract duration.

**b) Monitoring of Payment of Targeted Enterprises**

The Employer's independent Targeted Enterprise Monitor shall audit the Contractor's Payment of Targeted Enterprises to ensure timeous and correct payment in terms of the Employer's requirements and Policies and shall report his findings to the Employer's Project Manager on a regular basis.

**D1008.05 Quality of Work and Performance of Targeted Enterprises**

**a) Ensuring Quality of Work and Performance**

The purpose of the Employer's CPG is to, amongst others, enhance the utilisation and development of Targeted Enterprises. Thus, while the Contractor remains responsible for the quality of work and performance of Targeted Enterprises, he may not neglect the developmental requirements in the sub-contracting of Targeted Enterprises.

It is thus emphasised that the Contractor's TE Construction Manager shall closely monitor and supervise all Targeted Enterprises and shall train, coach, guide, mentor and assist each Targeted Enterprise in all aspects of management, execution and completion of its subcontract. This shall typically include assistance with planning of the Works, sourcing and ordering of materials, labour relations, monthly measurements and invoicing procedures. The extent and level of such training, coaching, guidance, mentoring, and assistance to be provided by the Contractor shall be commensurate with the level of subcontract applicable and shall be directed at enabling the Targeted Enterprise to achieve the successful execution and completion of its subcontract.

**b) Failure by the Targeted Enterprise to Comply**

If the Targeted Enterprise, in the opinion of the Engineer, fails to comply with any of the criteria listed below, the Engineer shall issue a written warning to the Contractor stating all the areas of non-compliance. A copy of the letter of warning shall be forwarded to the Employer's Project Manager and the Employer's independent Targeted Enterprise Monitor. The criteria are as follows:

- i) Deliver acceptable standard of work as set out in the specifications;
- ii) Progress in accordance with the time constraints in the subcontract agreement;
- iii) Punctual and full payment of the workforce and suppliers;
- iv) Site safety;
- v) Accommodation of traffic.

**c) Assist the Targeted Enterprise to Make Good**

The Contractor shall in terms of the sub-contract agreement (Part C, clause 3.1.12) give reasonable warning to the Targeted Enterprise when any contravention of the terms and conditions of the subcontract agreement has occurred or appears likely to occur.

The Contractor shall, together with the Targeted Enterprise, identify the causes that led to failure to comply and jointly develop a plan to rectify, which plan shall be submitted to the Employer's Project Manager and the Engineer for information purposes.

Based on the plan to rectify, the Contractor shall give the Targeted Enterprise reasonable opportunity to make good any such contravention, or to avoid such

contravention, and shall render all reasonable assistance to the Targeted Enterprise in this regard.

**d) Monitoring Execution of the Plan to Make Good**

The Employer's independent Targeted Enterprise Monitor shall review plans to rectify and monitor the execution thereof to ensure that Targeted Enterprises are given a fair opportunity to rectify within a developmental environment. He shall report his findings to the Employer's Project Manager monthly.

**D1008.06 Dispute Avoidance and Resolution Procedures**

When any disputes arise, the Contractor shall within seven (7) calendar days inform the Employer's Project Manager, the Employer's Targeted Enterprise Monitor, and the Engineer, in writing, of the details of the dispute.

**a) Facilitate Dispute Avoidance**

Prior to taking any action, the Contractor shall commence with a facilitation process by arranging a formal meeting with the Targeted Enterprise with the aim to find an amicable solution to the dispute. The meeting shall be attended by the Employer's Project Manager, the Employer's Targeted Enterprise Monitor, and the Engineer to ensure a fair and transparent process in reaching a settlement.

If the parties are unable to find an amicable solution, the Contractor shall explain fully to the Targeted Enterprise the provisions in the sub-contract agreement to address disputes. If action is necessary, it shall be discussed with the Employer's Project Manager and the Engineer prior to any action being taken.

**b) Support to Targeted Enterprise during Dispute Resolution Process**

While the Employer's Project Manager and the Engineer will observe the dispute resolution process to ensure fairness and transparency, the Targeted Enterprise may request consultation and assistance from the Targeted Enterprise Monitor. The Targeted Enterprise Monitor will assist the Targeted Enterprise with the interpretation of the Conditions of Sub-contract and will guide the Targeted Enterprise during the dispute resolution process.

**c) Issuing a Letter of Warning to Targeted Enterprise**

The Contractor shall issue a letter of warning to the Targeted Enterprise, whom shall have 21 calendar days from the date of receipt of the letter of warning by the Contractor to address and rectify the issues raised by the Engineer, except for issues pertaining to Site Safety and Accommodation of Traffic, for which the reaction time shall be in accordance with the relevant specifications for those aspects of the Works, but which shall not be longer than 24 hours.

**d) Failure by the Targeted Enterprise to Comply**

Failure by the Targeted Enterprise to comply with a deadline, will be sufficient grounds for the Contractor to apply a penalty or terminate the subcontract agreement provided that the Employer and the Engineer are satisfied that the Contractor has made every effort to correct the performance of the Targeted Enterprise.

The Targeted Enterprise may dispute any ruling given or deemed to be given by the Contractor or the Engineer, within 21 calendar days after receipt thereof by submitting a written Dispute Notice to the Contractor, in terms of the relevant Conditions of Sub-contract.

On request by the Targeted Enterprise, the Targeted Enterprise Monitor will assist the Targeted Enterprise with the interpretation of the Conditions of Sub-contract and will guide the Targeted Enterprise during the dispute resolution process.

#### **D1009 WORK SUITABLE FOR EXECUTION BY TARGETED ENTERPRISES**

To assist the Contractor in achieving his CPG, the following work items have been identified as being suitable for execution by Targeted Enterprises:

- b) Erection and maintenance of the Contractor's camp site
- c) Clearing and grubbing.
- d) Removal of trees.
- e) Provision of traffic control facilities.
- f) Management of traffic control facilities and traffic safety as part of the accommodation of traffic.
- g) Construction and clearing of drains.
- h) Installation of prefabricated culverts including inlet and outlet structures.
- i) Concrete channelling and concrete linings for open drains.
- j) Construction of concrete paving, kerbs and channels.
- k) Construction of small concrete and other structures.
- l) Pitching, stonework and protection against erosion.
- m) Construction of gabions.
- n) Patching and repairing edge breaks.
- o) Erection of guardrails.
- p) Landscaping.
- q) Fencing.
- r) Road signs.
- s) Road markings.
- t) Finishing the road and road reserve.
- u) Site Security Services.
- v) Haulage of materials
- w) Supply of plant.
- x) Supply of fuel.
- y) Specialised subcontract work such as:
  - i) Construction of concrete pavements.
  - ii) Laying of asphalt using asphalt pavers.
  - iii) Structural concrete such as culvert and bridges.
  - iv) Crushing of materials.
  - v) Precast manufacture.
  - vi) Batch plant erection and operations.
  - vii) Earthworks, layerworks construction.
  - viii) Structural steel fabrication, erection.
  - ix) Pipe jacking.

From the above work items, the following have been identified as suitable for execution by CIDB CE1 and CE2 Targeted Enterprises:

- h. Concrete sidewalks.
- i. Side drains.
- j. Clearing and grubbing.
- k. Construction and clearing of drains.
- l. Any other work identified by the Employer to be executed in the Target Area.

The work to be carried out by Targeted Enterprises is not limited to the work listed above and the Contractor may need to engage Targeted Enterprises on other aspects of the Works to achieve the CPG.

A Provisional Sum for the work by CIDB 1 and 2 Targeted Enterprise sub-contractors is allowed under pay item D10.05.

## **D1010 TRAINING, COACHING, GUIDANCE, MENTORING AND ASSISTANCE**

The Contractor shall with the input and support of the PLC develop a Training and Skills Development Programme which shall be managed by the Contractor's TE Construction Manager.

### **D1010.01 Purpose of the Training and Skills Development Programme(s)**

Skills development forms an integral part of the Employer's Transformation and Community Development Policies and hence, it is important to the Employer that Targeted Labour and Targeted Enterprises be equipped with skills that can be used to gain meaningful future employment and secure subcontracting opportunities.

It is, therefore, a requirement of this Contract that the Contractor provide adequate training, coaching, guidance, mentoring and assistance to the Targeted Labour and Targeted Enterprises to ensure skills development within the Construction Industry.

### **D1010.02 Skills Audit and Analysis**

To develop the Training and Skills Development Programme(s), the Contractor shall conduct a skills audit and analysis of Labour on the Targeted Labour database and the Targeted Labour of sub-contracted Targeted Enterprises to determine their levels of education, existing qualifications, and skills sets. The outcome of the skills audit and analysis shall be used to develop a Training and Skills Development Programme(s) that will benefit both the employee and the Construction Industry at large.

Included in the skills audit and analysis shall be a separate section, analysing the education, qualifications and skills sets of the Targeted Enterprise's owners and their supervisors sub-contracted by the Contractor to develop a Training and Skills Development Programme that will develop and improve the ability of small business owners and their supervisory staff to better manage their enterprises.

### **D1010.03 Developing the Training and Skills Development Programme**

The Employer shall be involved in the decision making and quality control pertaining to the development and implementation of the Training and Skills Development Programme facilitated through this Contract.

The Employer has no service agreement or memorandum of understanding with any education and training quality assurance body and, therefore, does not function as the "Employer" as defined under any three-party-agreement between the Trainee, the Training Provider and the Employer.

However, the Employer requires similar outcomes to that of formal learnership programmes and the Contractor shall structure a Training and Skills Development Programme in a manner that permits continued access to further learning and qualifications within a defined programme.

The complete Training and Skills Development Programme shall be developed during the Mobilisation Period, accepted by the Engineer after consultation with the Employer and tabled to the PLC for their information before any training commence.

### **D1010.04 The Training Service Provider**

While the Contractor's TE Construction Manager will manage the Training, Development and Support Programme and mentor Targeted Enterprise subcontractors from a practical point of view, the Contractor shall subcontract a Training Service Provider to implement the theoretical training components of the Programme by applying the Employer's Supply Chain Management Policy for second tier procurement.



**a) Accreditation of the Training Service Provider**

The Training Service Provider entity shall be accredited, and have in its employ Practitioners, Assessors and Moderators who are registered, with the Construction Education Training Authority (CETA). Proof of accreditation and registration shall be current, valid and list the NQF levels and Unit Standards for which the entity and its staff are accredited.

**b) Qualifications and Experience of the Training Service Provider**

The training and competency levels required of the Training Service Provider and his staff are outlined in the table below:

**TABLE D1010/1: QUALIFICATIONS FOR TRAINING STAFF**

<b>Designation</b>	<b>Title and Unit Standard No.</b>	<b>NQF Level</b>	<b>Credit</b>
Practitioner	Train the trainer; No 7384	4	16
Assessor	Conduct outcome base assessment; No 115753	5	15
Moderator	Conduct moderation of outcome-based assessment; No 115759	6	10

In addition to the above qualifications, and in keeping with current CETA practical experience requirements for registration as a Practitioner, NQF Level 4 Unit Standards shall only be presented by Practitioners with NQF Level 5 (one level up) credentials.

The Employer further requires that Assessors and Moderators shall have at least 5 years' experience as a Site Agent, managing construction processes in the fields of roads maintenance, new roads construction, roads rehabilitation and structures.

Elective Unit Standards are typically more vocational orientated and may require specialist input. It is thus not a requirement that individual Practitioners and Assessors shall have all the necessary skills for all the different categories of Unit Standards. The Training Service Provider may and shall therefore, when necessary, appoint Practitioners and Assessors on an ad hoc basis with the levels of experience which are required for the Unit Standards to be presented.

**D1010.05 Training and Skills Development Programme: General Requirements**

The Training and Skills Development Programme shall consist of Learnerships that include multiple, but related Unit Standards which are (1) relevant to the Works to be constructed, (2) aimed at achieving the skills development objectives of the Programme, and (3) lead towards a formal qualification in the Construction Industry.

Learnerships shall include both the theoretical and practical components of each Unit Standard and shall be in accordance with the various laws and regulations contained in the South African Qualification Authority (SAQA) statutes.

**a) Training Programme: Requirements and Considerations**

The Skills Audit and Analysis shall inform the Contractor of every employee's Recognised Prior Learning (RPL) skills and competencies, which shall be taken into consideration in the development of the Training and Skills Development Programme so that the RPL skills and competencies, together with the Training

Programme Unit Standards offerings, will lead to a full Learnership outcome and hence a formal qualification.

It is recognised that the Training and Skills Development Programme may consist of several Unit Standards but totalling insufficient credits for a full Learnership qualification. Nevertheless, the competencies and credits achieved in the Programme shall contribute to a full Learnership by a later acquisition of the outstanding Unit Standards required for the full Learnership.

The Training and Skills Development Programme shall be structured in a manner to prioritise those Unit Standards that will equip Trainees with the minimum skills and competencies required to become economically involved in the execution of the Works as soon as possible.

The Training Service Provider shall apply the SAQA Learnership criteria of which the basic elements are listed below to demonstrate the Employer's requirements:

- i) Minimum credits for qualification;
- ii) Fundamental Unit Standards and credit values;
- iii) Core Unit Standards and credit values;
- iv) Elective Units Standards and credit values;
- v) Assumption that NQF Level 3 literacy, numeracy, and computer competencies exist;
- vi) RPL processes;
- vii) Exit level outcomes.

The above criteria are not exhaustive, and the Training Service Provider shall apply the systems and processes required by the relevant SAQA and other related legislation pertinent to training. The Training Service Provider shall regularly consult the SAQA website ([www.saga.org.za](http://www.saga.org.za)) to ensure that the most current Unit Standards are presented. In the event of any conflict, the legislated requirements shall apply.

While structuring the Learnership offerings, the Training Service Provider shall distinguish between the levels of learning required. The bulk of the training shall focus on NQF Levels 4 and 3. NQF Level 5 training is not anticipated but may be suitable for qualifying staff of established small contractors. The qualification titles for the respective NQF Levels are:

- a. NQF Level 3 National Certificate: Construction Roadworks.
- b. NQF Level 4 National Certificate: Supervision of Construction Processes
- c. NQF Level 4 National Certificate: Business Management
- d. NQF Level 5 National Diploma: Management of Civil Engineering Construction Processes

It may be necessary to include additional Core Unit Standards, e.g. "Tendering" or "Entrepreneurship" as an additional Unit Standard for NQF Level 4, to achieve the Contract's development objectives. The identification of any additional Unit Standards shall be discussed with the Engineer and shall not be implemented without prior approval.

Before qualifying, Trainees will be expected to demonstrate competence in a practical situation that integrates the assessment of all specific outcomes, for all Unit Standards in the Learnership Programme.

All training shall take place within normal working hours, or as agreed with the trainees.

## **b) Selection of Trainees**

To complete a Learnership successfully requires minimum literacy and numeracy competencies as defined by SAQA. The Training Service Provider shall utilise the skills audit and analysis and conduct additional skills analysis to benchmark the

literacy and numeracy levels of Targeted Labour and Targeted Enterprises and their employees. This information shall guide the Training Service Provider in formulating the Trainee selection methodology(ies) and process(es). The Training Service Provider shall make provision for:

- i) baseline assessments, e.g. conducting RPL enquiries and tests; and
- ii) a skills gap programme consisting of Fundamental Unit Standards, to facilitate the selection process.

Trainees identified as having already acquired some tertiary training, particularly in the field of Civil Engineering, may be suitable for a specialised Trainee programme or a higher NQF Level programme. The Training and Skills Development Programme shall, therefore, make provision for Trainees with a variety of competency levels and shall make provision for different levels of training.

It should be noted that where this Section D of the Specifications refers to the selection and training of Trainees, any person, employed by any national, provincial or local authority, being it full time or part time, is expressly excluded from being considered for this training.

#### **c) Learning Material**

Learning material is required for each Unit Standard. This learning material is the equivalent of prescribed textbooks for other qualifications. Each Trainee shall receive a copy of the learning material to learn the contents and to use it as a reference source after obtaining the qualification.

The SAQA Unit Standard curriculums define the contents of the learning material. The learning material shall not only comply with the SAQA and CETA guidelines but shall be technically and practically aligned to road construction and/or road maintenance. Any input from a subject matter expert required to ensure the appropriateness of learning material contents shall be included in the Training Service Provider's costs.

The requirements to be addressed in learning material as outlined by the SAQA Unit Standard curriculums are, amongst others, the following:

- i) purpose of the Unit Standard;
- ii) specific outcomes (typically 4 per Unit Standard);
- iii) assessment criteria (typically 4 per specific outcome);
- iv) range as is defined for each specific outcome;
- v) critical cross-field outcomes for the Unit Standard;
- vi) Unit Standard essential embedded knowledge.

#### **d) Student Experiential Training or Learnerships or Internships**

The Employer may deploy students to the construction site to obtain experiential training. The Contractor shall provide experiential training to these students in accordance with the relevant academic institution's requirements, which is typically a university, a university of technology, or a TVET.

The Contractor shall also provide students with all the tools (including appropriate information technology hardware and software) and site office space necessary to carry out engineering work as if they were the Contractor's own permanent staff.

Reporting on training progress of each student shall be compiled according to the formats and intervals set by the relevant academic institution.

#### **(e) Keeping of Records**

The Training Service Provider shall keep comprehensive records of the training provided to each Trainee and shall ensure that Trainees' successful completion of successive Unit Standards are entered onto the national SAQA database. After the

successful completion of generic skills courses, each Trainee shall be issued with a certificate indicating the course contents as proof of attendance and completion. The Contractor shall keep a register of certificates issued. Whenever required, the Contractor shall provide copies of such records to the Engineer.

**(f) Skills Development Requirements**

**i) Contract Skills Development Goals (CSDG)**

This section establishes a minimum CSDG which is to be achieved in the performance of a Contract *(as per the CIDB Standard for Developing Skills through Infrastructure Contracts August 2013)* in relation to the provision of different types of workplace opportunities linked to work associated with a Contract which culminates in or leads to:

- a. a part- or full occupational qualification registered on the National Qualification Framework;
- b. a trade qualification leading to a listed trade (GG No. 35625, 31 August 2012);
- c. a national diploma registered on the National Qualification Framework; and
- d. registration in a professional category by one of the professional bodies listed in Table 1 of the Standard.

The Contractor shall achieve or exceed the CSDG in the performance of the Contract. The Contractor may, if need be, devolve their obligations onto Subcontractors.

The CSDG shall not be less than the contract amount multiplied by 0.25 percent (%) for Civil Engineering work (CE). For this reason, the Contractor shall insert the CSDG amount in form C2.3 Summary of Pricing Schedule.

**ii) Achieving Contract Skills Development Goal (CSDG)**

The Contractor shall achieve the CSDG by providing employment opportunities to Trainees requiring structured workplace learning using one or a combination of any of the following methods in relation to work directly related to the Contract:

**Method 1:** Structured workplace learning opportunities for Trainees (LoL) towards the attainment of a part or a full occupational qualification.

This training method shall apply to Targeted Enterprises and Targeted Labour.

**Method 2:** Structured workplace learning opportunities for apprentices or other artisan Trainees (LoA) towards the attainment of a trade qualification leading to a listed trade (GG No. 35625, 31 August 2012) subject to at least 60% of the artisan Trainees being holders of public FET college qualifications.

This training method shall apply to Targeted Enterprises and Targeted Labour.

**Method 3:** Work integrated learning opportunities for University of Technology or Comprehensive University students (LoUS) completing their national diplomas.

This training method shall apply to P1 and P2 Trainees, or Trainees with a 240 credits qualification. Both the

permanently employed and temporary employed Trainees shall be considered under this training method.

**Method 4:** Structured workplace learning opportunities for candidates (LoC) toward registration in a professional category by a statutory council listed in Table 1 of the Standards.

This training method shall apply to Candidates with 480 credits qualification. Both the permanently employed and temporary employed Trainees shall be considered under this training method.

No single method shall contribute more than 75 percent of the CSDG. Permanently employed Trainees may not account for more than 33 percent (%) of the CSDG, and not more than one method may be applied to any individual concurrently in the calculation of the CSDG.

iii) CSDG Credits

The CSDG shall be calculated by multiplying the number of people employed by the Contractor and placed for continuous training opportunities in a three-month period by the notional values contained in Table 3 of the Standard, or as revised in a Gazette notice.

The Contractor may source beneficiaries of the CSDG from a Skills Development Agency (SDA) recognised by the CIDB.

All beneficiaries shall be registered with a construction Skills Development Agency (SDA) recognised by the CIDB.

iv) Denial of Credits

Credits towards the CSDG shall be denied should the Contractor not fulfil all the requirements listed in clause 3.4 (a) to (f) of the Standards.

v) Compliance with Requirements

The Contractor shall comply with the requirement as set out in clause 4 of the Standards.

vi) Records

The Contractor shall submit all the documentation required in terms of clause 4 of the Standards, in a timely manner and according to a prescribed format where applicable.

The Engineer shall certify the value of the credits counted towards the CSDG, if any, whenever a claim for payment is issued to the Employer and shall notify the Contractor of this amount.

The Contractor shall, upon termination of the opportunities provided to satisfy the CSDG, certify the quantum and nature of the opportunity and submit the certificate, counter-certified by the relevant individual, to the Engineer for record-keeping purposes.

vii) Sanctions

Failure to achieve the CSDG shall render the Contractor liable for a penalty as prescribed in clause 8.7 of the FIDIC Conditions of Contract. Penalties shall be as follows:

a.  $\text{Penalty} = 0.5 \times \{[\text{LoAs} + \text{LoLs} + \text{LoUSs} + \text{LoCs}]\}$

Where:

LoLs = Monetary Value of the shortfall for structured workplace learning opportunities for Trainees towards the attainment of a part or a full occupational qualification;

LoAs = Monetary Value of the shortfall for structured workplace learning opportunities for apprentices or other artisan Trainees towards the attainment of a trade qualification leading to a listed trade (GG No. 35625, 31 August 2012) subject to at least 60% of the artisan Trainees being holders of public FET college qualifications;

LoUSs = Monetary Value of the shortfall for work integrated learning opportunities for University of Technology or Comprehensive University students completing their national diplomas (LoUS);

LoCs = Monetary Value of the shortfall for structured workplace learning opportunities for candidates towards registration in a professional category by a statutory council listed in Table 1 of the Standards (LoC), and

- b. Delay the issuing of the Performance Certificate until all the required records described in clause 5 of the Standards are received.

#### **(g) Generic Skills Training**

Generic skills shall be taught where the need has been identified and approved by the Employer and the Engineer.

The Contractor shall make representation to the Employer and the Engineer, who shall approve candidates that should attend such courses as they deem appropriate. Those selected shall receive formal generic skills training in a programmed and progressive manner. The PLC may also identify a need for generic skills training.

Typical training programmes could comprise some or all of the following modules:

- i) Basic hygiene and HIV/AIDS awareness;
- ii) Road safety;
- iii) Basic management of the environment;
- iv) Tourism awareness and opportunities;
- v) Managing personal finance;
- vi) Adult Basic Education and Training (ABET);
- vii) Community based training programmes (e.g. knitting, computer skills, plant/machine operator, etc.).

All generic skills training shall be accredited by the relevant Sector Education and Training Authority (SETA) and shall be provided with accredited entities and/or individuals.

#### **(h) Community Training**

Community training shall be taught where the need has been identified. Affected Communities may submit their training needs to the PLC for the Contractor's consideration and inclusion into the Training and Skills Development Programme.

While considering the training needs of affected Communities, the Engineer shall inform the PLC of the Contract's training limitations, as well as of the training that could be undertaken through the Contract. Trainees from the Community shall be identified through the Community structures, and with the input and support of the PLC. Trainees selected from the Community shall receive formal skills training in a programmed and progressive manner in compliance with subclause D1010.04.

Priority shall be given to training that will equip Community members with skills that will enhance their employability.

All community skills training shall be accredited by the relevant Sector Education and Training Authority (SETA) and shall be provided with accredited entities and/or individuals.

**(i) Training Facilities**

The Contractor shall be responsible for providing everything necessary to offer the various training workshops and modules including:

- i) a suitable venue with sufficient furniture, lighting and power,
- ii) all necessary stationery consumables and study material,
- iii) transport for attendees.

**D1011 LABOUR ENHANCED CONSTRUCTION**

The Contractor's attention is drawn to the fact that it is an objective of the Contract to maximise the labour content of certain operations or portions thereof. In this regard, where the specified work allows for a choice between mechanical or labour-enhanced means, the former should generally be kept to the practical minimum.

Before commencing with any labour enhanced operations the Contractor shall discuss his intentions with the Engineer and shall submit to the Engineer on a monthly basis, daily labour returns indicating the numbers of temporary personnel employed on the Works and the activities on which they were engaged.

It should be noted that activities that are conventionally done by labour methods, e.g. gabions, shall not qualify under this Section D of the Specifications.

**D1012 COMMUNITY DEVELOPMENT**

**D1012.01 Corporate Social Investment (CSI)**

The Contractor shall demonstrate its willingness to actively participate in the social development initiatives for local Communities affected by the Contract. To this end, the Contractor shall provide details of CSI initiatives it will actively pursue under Form D9: Corporate Social Investment.

**D1012.02 Community Development Component**

Community Development (CD) components to the Contract are primarily training and skills development programmes to benefit an identified Community and Trainee Targeted Enterprises selected from this Community.

The owners and supervisors of Trainee Targeted Enterprises receive SAQA accredited training towards an accredited qualification which consists of theoretical and practical components.

The theoretical training is conducted by the Contractor's Training Service Provider while the practical training, which is the construction of the CD Works, is undertaken by the Trainee Targeted Enterprises under the mentorship and supervision of the Contractor's dedicated TE Construction Manager.

**a) CD Project(s)' Service Provider(s)**

CD Projects identified for implementation in association with this Contract will be let for tender by the Employer as **separate Contracts**.

The name(s) and contact details of the Service Provider(s) appointed for the implementation of the CD Project(s) will be provided to the Contractor on award of the Contract or as soon as the Service Provider(s) has/have been appointed.

The Contractor shall collaborate and cooperate with the CD Project(s)' Service Provider(s) and take cognisance of the CD Project(s)' programme in compiling the programme of the Works Contract.

**b) CD Project(s) Associated with this Contract**

The Employer will identify a CD Project associated with this Contract and will inform the Contractor of the CD project number and description as soon as it has been registered, together with all other relevant detail.

**D1013 MEASUREMENT AND PAYMENT**

<b>Item</b>		<b>Unit</b>
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**D10.01 Target Group Participation**

(a)	Contract Participation Performance bonus	Prime Cost (PC) Sum
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The prime cost sum for item D10.01(a) shall cover any CPP bonus due as specified in clause D1003.05. The prime cost sum shall be expended in accordance with clause 13.5 of the FIDIC Conditions of Contract.

**Note:**

No separate payment shall be made for any costs incurred by the Contractor, whether direct or indirect, for his efforts in accomplishing the specified requirements, and which are not recoverable from the pay-items allowed. Such costs shall be deemed to have been included in the rate offered under pay sub-item C1.3.1.3 Contractor's Establishment on Site and General Obligations: Time Related Obligations.

<b>Item</b>		<b>Unit</b>
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**D10.02 Stakeholder and Community Liaison and Social Facilitation**

(a)	Cost of liaison, social facilitation and PLC support	Prime Cost (PC) Sum
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(b)	Handling cost and profit in respect of sub-item D10.02(a)	Percentage (%)
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The prime cost sum for item D10.02(a) shall cover the direct costs incurred by attending members of the PLC. The rate of compensation shall be fair and agreed by the Engineer in accordance with clause 13.5 of the FIDIC Conditions of Contract. The tendered percentage for sub-item D10.02(b) shall include full compensation for all handling costs and profit of the Contractor associated with sub-item D10.02(a).

The liaison with, and assistance provided by the Contractor to the PLC to perform its duties shall not be paid from the prime cost sum. The Contractor's costs to liaise with the PLC and render such assistance shall be deemed to have been included in its rate offered for pay sub-item C1.3.1.3 Contractor's Establishment on Site and General Obligations: Time Related Obligations.

<b>Item</b>		<b>Unit</b>
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**D10.03 Tender Process for Targeted Enterprises**

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(a)	Contractor's charge for the management and execution of the Targeted Enterprise procurement process:	
(i)	Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading	Number (No)
(ii)	Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 3 and 4 contractor grading	Number (No)
(iii)	Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 5 and higher contractor grading	Number (No)
(iv)	Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise suppliers	Number (No)
(b)	Targeted Enterprise Procurement Coordinator	Month

The unit of measurement for sub-item D10.03(a) shall be the number of individual subcontract agreements concluded with Targeted Enterprise sub-contractors and suppliers in accordance with the procurement process described in this Section D of the Specifications.

The tendered monthly rate for sub-item D10.03(b) shall include full compensation for the provision of the relevant personnel on a full-time basis to carry out the requirements in terms of sub-item D10.03(a) and the full contents of this Section D of the Specifications.

Each tendered rate shall be in full compensation for the management and execution of the Targeted Enterprise procurement process in the relevant CIDB contractor grading designation scheduled, including for the appointment of a TE Procurement Coordinator (if required), the pre-tender training of eligible Targeted Enterprises, the compilation, printing, binding and issue of the tender documents for each tender, for the advertising of each tender, for the provision of the venue and the conducting of each compulsory briefing session for tenderers, for the conducting of each tender opening process, for the adjudication of the tenders received for each tender, for the preparation of each tender adjudication report and the review thereof in conjunction with the Employer, Engineer and the PLC, for the award of each tender and for the conclusion of the subcontract agreement with each successful Targeted Enterprise tenderer, and any other relevant requirement described in this Section D of the Specifications.

Item	Unit
<b>D10.04 Responsibilities of the Contractor towards Targeted Enterprises</b>	
(a) Contractor's establishment, management, management support, assistance, coaching, guidance, mentoring and supervision of Targeted Enterprises	Month
(b) Targeted Enterprise Construction Manager	Person Month
(c) Targeted Enterprise Site Supervisors	Person Month

The tendered monthly rate for sub-item D10.04(a) shall include full compensation for the registration of all the subcontract agreements and the management of all the Targeted Enterprise subcontracts, including for the provision of the necessary management, support, coaching, guidance, mentoring and supervision of the Targeted Enterprise subcontractors.

The tendered monthly rate for sub-items D10.04(b) and (c) shall include full compensation for the provision of the relevant personnel on a full-time basis to carry out the requirements in terms of sub-item D10.04(a) and the full contents of this Section D of the Specifications.

Item		Unit
<b>D10.05</b>	<b>Construction Works by Targeted Enterprises</b>	
(a)	Payments associated with the construction works executed by Targeted Enterprise sub-contractors of CIDB 1 and 2 contractor grading designation appointed in terms of Section D of the Specifications	Provisional (Prov) Sum
(b)	Handling costs and profit in respect of payment associated with sub-item D10.05(a)	Percentage (%)
(c)	Fluctuation between the main contractor's rates and that of the Targeted Enterprise sub-contractors	Lump Sum (LS)
(d)	Preliminary and General Obligations of Targeted Enterprise sub-contractors appointed in terms of Section D of the Specifications	Lump Sum (LS)

Expenditure under sub-items D10.05(a) shall be in accordance with clause 13.5 of the FIDIC Conditions of Contract.

The Provisional Sum for sub-item D10.05(a) is provided to cover the cost of the construction works , including preliminary and general obligations carried out by the Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading designation as certified by the Engineer, in separate payments for each Targeted Enterprise in accordance with Section D of the Specifications. Expenditure under sub-item D10.05(a) shall be limited to the Provisional Sum amount stated in the Pricing Schedule. Construction works by Targeted Enterprise sub-contractors of CIDB 1 and 2 contractor grading designation exceeding the Provisional Sum amount shall be measured for payment from the applicable work items in the Contractor's pricing schedule.

The tendered percentage for sub-item D10.05(b) is the percentage of the amount spent under sub-item D10.05(a) and shall include full compensation for the Contractor's handling costs, profit or any other costs associated with the work conducted by the Targeted Enterprise sub-contractors, which are not provided for in other pay items.

The Lump Sum tendered under item D10.05(c) is for fluctuation of the Targeted Enterprise sub-contractor rates more than the contractor's tendered rates, for work not paid under items D10.05(a). Payment of the Lump Sum shall be on a prorata basis to provide compensation for the fluctuation between the tendered rates of the Main Contractor and that of the Targeted Enterprise sub-contractors until the Lump Sum is depleted. Any costs incurred due to fluctuation in tendered rates more than that tendered for under item D10.05(c) will be for the Contractor's account. Item D10.05(c) is applicable where the Target Enterprise sub-contractor's tender amount is higher than the Main Contractor's tender amount. The Lump Sum will cover the fluctuation for all the tendered rates of the sub-contractors.

The Lump Sum tendered under item D10.05(d) is for the Preliminary and General Obligations of Targeted Enterprise sub-contractors (excluding CIDB 1 and 2 contractor grading designation paid from the Provisional Sum). Payment of the Lump Sum shall be on a prorata basis to provide compensation for the P&Gs of Targeted Enterprise sub-contractors until the Lump Sum is depleted. Any costs incurred for the P&Gs of Targeted Enterprise sub-

contractors more than that tendered for under item D10.05(d) will be for the Contractor's account.

Item	Unit
<b>D10.06 Training, coaching, guidance, mentoring and assistance</b>	
(a) Training Costs	
(i) Accredited NQF training	Provisional (Prov) Sum
(ii) Accredited generic skills training	Provisional (Prov) Sum
(iii) Community skills training	Provisional (Prov) Sum
(iv) Handling cost and profit in respect of sub-items D10.06(a)(i), (ii) and (iii)	Percentage (%)
(c) Other costs during training	Provisional (Prov) Sum
(d) Training venue	Lump Sum (LS)

The Provisional Sums under sub-items D10.06(a) shall be paid in accordance with the provisions of sub-clause 13.5 of the FIDIC Conditions of Contract. The Provisional Sums shall include all charges for the provision and delivery of the service including an accredited Training Service Provider (if required), learning material and any other requirement as described in Section D1010 of the Specifications.

The rate tendered under sub-item D10.06(a)(iv) shall be deemed to cover all costs required to organise accredited trainers to provide training and shall include the Contractor's handling cost, profit, record keeping, reporting and all other costs associated with sub-items D10.06(a)(i), (ii), and (iii).

The prime cost sum under sub-item D10.06(b)(i) shall be paid in accordance with the provisions of sub-clause 13.5 of the FIDIC Conditions of Contract. The prime cost sum shall cover the monthly stipend as prescribed by the Employer to be paid to students receiving experiential training.

The unit of measurement for sub-item D10.06(b)(ii) shall be the person-month, with pro-rata payments made for partial months for training provided based on 23 workdays per month.

The rate tendered under sub-item D10.06(b)(ii) shall include full compensation for the Contractor to provide training to the students provided by the Employer inclusive of all costs to communicate with the Employer and any other body or organisation in respect of work assigned to the students. The rate tendered shall include telephone calls and charges, stationery and information technology hardware, software, connection or licence costs and lost production, profits and all other incidentals as well as all administrative and overhead costs.

The Provisional Sum under pay item D10.06(c) shall be paid in accordance with the provisions of sub-clause 13.5 of the FIDIC Conditions of Contract. The Provisional Sum shall cover the Contractor's costs for payment of wages of employed trainees attending training courses during working hours, for the provision of meals to trainees, for provision of transport and for all other incidentals required for the trainees and approved by the Engineer. No mark-up is payable to the Contractor under this item.

The unit of measurement for pay item D10.06(d), shall be the Lump Sum. The sum tendered shall include full compensation for the provision of the training venue, for all necessary lighting, power, furniture, stationery, consumables and study material and all other costs necessary to maintain the venue for the duration of the contract. Payment of the Lump Sum shall be made in two instalments as follows:

- a) The first instalment, 75% of the Lump Sum, shall be paid after the Contractor has met all his obligations regarding the provision of the training venue as specified.
- b) The second and final instalment, 25% of the Lump Sum, shall be paid after the provision of all the accredited training as specified in the document.

No payment, nor pro-rata payment, shall be made for trainees that, once selected, do not attend or only partially complete structured training courses. The Contractor's own staff may attend the courses provided. However, such attendants from the Contractor's staff shall not be considered for measurement and payment purposes unless they also qualify as Targeted Labour.

SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.033-120-2019/1

THE IMPROVEMENT OF NATIONAL ROAD R33 SECTION 12 FROM THE N1 (KM 77.0) TO  
SECTION 13 MODIMOLLE (KM 0.6) (TOTAL 12.3km)

**SECTION E: REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND  
REGULATIONS**

**Note to tenderer:**

Wherever reference is made in this section of the Scope of Works to contractor this is the equivalent of the *principal contractor* in the Occupational Health and Safety Act and Regulations. Similarly, reference to subcontractors is equivalent to *other contractors*.

## SECTION E: REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS

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## E1001 SCOPE

The Occupational Health and Safety Act, Act 85 of 1993 (OHS Act) and its Regulations together with SANS Codes set out minimum standards with regards to Occupational Health and Safety. The South African National Roads Agency SOC Limited (SANRAL), has developed this Occupational Health and Safety Specifications with these minimum standards in mind and in certain aspects the requirements of SANRAL exceeds the minimum legal requirements to follow best practices and to ensure a healthy and safe workplace for all.

SANRAL in no way assumes The Principal Contractors legal liabilities and responsibilities. The Principal Contractor is and remains accountable for the quality and execution of his health and safety program for his employees. This Health and Safety Specification reflects minimum legal and SANRAL requirements and should not be construed as all encompassing.

It is realized that The Principal Contractor have its own Health and Safety Management system and safe work practices. The intention of this Health and Safety Specification is not to change The Principal Contractors Health and Safety management system, but for The Principal Contractor to use its current Health and Safety management system to draw up a project specific Health and Safety plan according to these specifications as well as to legally comply with the any applicable Regulations under the OHS Act and incorporated Standards.

It is the responsibility of the Principal Contractor and other Contractors to make themselves conversant and comply with the requirements and conditions contained in the various legislation pertaining to their profession and scope of works at all times.

This specification is not exhaustive of all duties imposed by the OHS Act and its Regulations, governing the duties and obligations, of a Designer, Principal Contractor and Contractor performing duties in terms of an agreement with the client (SANRAL). These duties are fully described in the OHS Act and its Regulations and it is the duty of every Designer, Principal Contractor and Contractor to acquaint themselves therewith before commencing work.

This specification is compiled to ensure that the Principal Contractor and any other Contractors working for SANRAL directly or through a Principal Contractor, are aware of the Occupational Health and Safety requirements when working on a SANRAL contract, as well as to make them aware of their legal liabilities and responsibilities as per the Occupational Health & Safety Act, Act 85 of 1993, and its Regulations.

Words used herein in the singular shall be deemed to include the plural and male shall include female and vice versa unless the context otherwise requires.

## E1002 DEFINITIONS AND ABBREVIATIONS

**Assessment** – An opinion or a judgment about someone or something that has been thought about very carefully.

**At-risk behavior** – Conduct that unnecessarily increases the likelihood of an injury or incident.

**Audit** – A systematic and documented review of the effectiveness of implementation of processes, programs and procedures, based on general process criteria.

**Baseline risk assessment:** This is the initial assessment of risk in a workplace. It is a broad assessment and includes all activities taking place on site but does not include risk control measures or safeguards.

**Client** – Any organization or person for whom construction work is performed. For the purpose of this document, the client is the South African National Roads Agency SOC Limited, also identified in the contract document as the Employer.

**Competence** – A combination of attributes such as knowledge, training, experience and qualifications to assure successful performance.

**Competent Person** – Means a person who has in respect of the work or task to be performed the required knowledge, training and experience and, where applicable, qualifications, specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualification Framework Act, 2000 (Act No. 67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and is familiar with the Act and with the applicable regulations made under the Act.

**Consequence** – Outcome or impact of an event.

**Continual Improvement** – A recurring process of enhancing performance to achieve consistent improvements in overall performance.

**Contractor** – An employer as defined in section 1 of the OHS Act, who performs construction work and includes Principal Contractors and Sub-Contractors.

**Construction Work** – any work in connection with:

- The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or
- The construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work.

**Corrective Action** – An action taken to eliminate the cause of a detected non-conformity or other undesirable situation.

**Construction Regulations (CR)** – Construction Regulations, GNR. 84 of 2014

**Critical equipment** – A piece of equipment or a structure whose failure to perform to design specification, has the potential to result in a major accident event.

**Design** – in relation to any structure, includes drawings, calculations, design details and specifications.

**Designer** –

- a) competent person who:
  - Prepares a design;
  - Checks and approves a design;
  - Arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer; or
  - Designs temporary work, including its components;
- b) an architect or engineer contributing to, or having overall responsibility for a design;
- c) a building services engineer designing details for fixed plant;
- d) a surveyor specifying articles or drawing up specifications;
- e) a contractor carrying out design work as part of a design and building project; or
- f) an interior designer, shop fitter or landscape architect.

**DMR** – Driven Machinery Regulations, GNR. 295 of 26 February 1988

**Documents** – Structured units of recorded information and its supporting medium (paper or electronic). Most records are documents, but not all documents are records. A document becomes a record when it is part of a business transaction, is kept as evidence of that transaction and is managed within a record-keeping system.

**EIR** – Electrical Installation Regulations, GNR. 242 of 6 March 2009

**Emergency** – An abnormal occurrence that pose a threat to the safety or health of employees, customers, or local communities, or which can cause damage to assets or the environment.

**Employee** – An individual who is employed by or works for an Employer and who receives or is entitled to receive any remuneration or who works under the direction or supervision of an employer or any other person.

**Employer** – Any person who employs or provides work for any person and remunerates that person or expressly or tacitly undertakes to remunerates him but excludes a labour broker as defined in section 1(1) of the Labour Relations Act, 1956 (Act No. 28 of 1956). The South African National Roads Agency SOC Limited, also identified in the contract document as the Employer.

**EMR** – Electrical Machinery Regulations, GNR. 250 of 25 March 2011

**Environment** – The surroundings or conditions in which a person, animal or plant lives or operates, including air, water, land, natural resources and habitats.

**Epidemic Disease** - An *epidemic* disease is one affecting many persons at the same time and spreading from person to person in a locality where the disease is not permanently prevalent. The World Health Organization (WHO) further specifies *epidemic* as occurring at the level of a region or community.

**Excavation work** – The making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping



**GAR** – General Administrative Regulations, GNR. 929 of 25 June 2003

**GMR** – General Machinery Regulations, GNR. 1521 of 5 August 1988

**GSR** – General Safety Regulations, GNR. 1031 of 30 May 1986

**Harm** – A significant and or long-lasting adverse effect on people, the environment or the community.

**Hazard** – A source, situation or act with a potential for harm in terms of human injury or ill health.

**Health and Safety File** – Means a file, or other record in permanent form, containing the information in writing as required by the Construction Regulations, GNR. 84 of 7 February 2014, Section 7(1)(b).

**Health and Safety Plan** – Means a project specific documented plan in accordance with the client's health and safety specifications, as required by the Construction Regulations, GNR. 84 of 7 February 2014, Section 7(1)(a).

**Health and Safety Specification** – Means a project specific document prepared by the client pertaining to all health and safety requirements related to construction work, as required by the Construction Regulations, GNR. 84 of 7 February 2014, Section 5(1)(b).

**HSE** – Health, Safety and Environment. Commonly used in the format HSE.

**Incident** – Work-related events (including accidents which give rise to injury, ill health, fatality or emergencies) that have resulted in, or has the potential to result in adverse consequences to people, the environment, property, reputation or a combination of these.

**Likelihood** – A description of probability or frequency, in relation to the chance that something will occur.

**Lost Time Injury (LTI)** – When a person is injured during the execution of his/her duties and as a result of the injury is unable to perform his/her regular duties for one full shift or more on the day following the day on which the injury has incurred, whether a scheduled work day or not(weekend).

**Management System** – Management processes and documentation that collectively provide a systematic framework for ensuring that tasks are performed safely, correctly, consistently and effectively to achieve a specified outcome and to drive continual improvement in performance.

**Mandatory** – An agent, contractor or sub-contractor for work, but without derogating from his status in his own right as an employer or a user.

**MSDS** – Material Safety Data Sheet

**Near Hit / Near Miss** – Any occurrence or situation which had the potential for adverse consequences to people, the environment, property, reputation or a combination of these.

**Non-conformance** – Any deviation from work standards, practices, procedures, regulations that could either directly or indirectly lead to injury or illness, property damage, damage to the environment or a combination of these.

**OHS Act** – Occupational Health & Safety Act, 85 of 1993

**Pandemic Disease** - a *pandemic* disease is an *epidemic* disease that has spread over a large area, that is, it is prevalent throughout an entire country, continent, or the whole world.

**Policy** – Statement by an organization of its intentions and principles in relation to its overall performance which provides a framework for action and for the setting of its objectives and targets.

**PPE** – Personal Protective Equipment

**Preventive Action** – An action implemented to eliminate the cause of a potential non-conformity or other undesirable potential situation.

**Principal Contractor** – An employer appointed by the client to perform construction work and who is in overall control and management of a part of or the whole construction site.

**Procedure** – A specific documented way to carry out an activity or a process.

**Records** – Recorded information, in any form that is kept as evidence. Records include monitoring results, evidence of training, audits, inspections and calibration reports.

**Risk Assessment** – A process of evaluating the risk(s) arising from hazards taking into account the adequacy of any existing controls and deciding whether or not the risk(s) is acceptable.

**Risk Management** – The ongoing treatment of risks through the application of management policies, processes, procedures and risk control measures.

**Risk** – A combination of the likelihood of an occurrence of a hazardous event or exposure and the severity of injury or ill health that can be caused by the event or exposure.

**Root Cause** – The cause of the incident that, when rectified, will prevent the recurrence of not just incidents with those exact circumstances, but others with similar causes.

**SACPCMP** – South African Council for Project and Construction Management Professions

**SANRAL** - South African National Roads Agency SOC Limited

**Supplier** – A person or company that supplies material or equipment to a contractor on a construction site but does not physically carry out construction work on the construction site.

**The Act** – The Occupational Health and Safety Act No. 85 of 1993

**The Site** – The area where work is carried out for SANRAL as defined on the front page of this document.

**WAH** – Acronym for Working at Heights.

## **E1003 HEALTH AND SAFETY POLICY**

Contractors are expected to have their own written Health and Safety Policy. The policy should declare their attitude and approach to the health, safety and welfare of their employees and others. The policy should include a description of the company and provision must be made to review the policy annually and the CEO or Managing Director must sign and date the policy to indicate his commitment to ensuring the health and safety of his employees, as per Section 7 of the OHS Act.

## **E1004 ROLES AND RESPONSIBILITIES**

Every Contractor is considered to be an employer in his own right and shall comply with all legal requirements pertaining to an employer, which include the responsibility to provide as far as reasonably practicable a safe and healthy working environment for his employees, as per Section 8 of the OHS Act.

In conjunction with Section 8 of the OHS Act, all employees on the project are responsible for their own health and safety as well as the safety of persons who may be affected by their acts, as per Section 14 of the OHS Act. It is the responsibility of each employee to ensure that he acts in a safe manner before and during work is carried out.

The Principal Contractor shall ensure that where required by the OHS Act and Regulations, competent employees are appointed in writing. These appointments must be project/contract specific and specific to the tasks that will be performed. Every appointment must display the duties of the person appointed and training certificates from a registered training provider must be attached to such appointment (where applicable). A list of possible appointments can be found in clause E1010 below.

## **E1005 HSE TRAINING AND COMPETENCE**

Where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2000 (Act No. 67 of 2000), those qualifications and training must be regarded as the required qualifications and training and employees must have attended courses of the aforementioned nature to be considered competent in the task.

All employees that forms part of the construction work must be trained and competent. Employees formally appointed to perform a certain duty must be in possession of a training certificate (where applicable), received from a registered training provider. All employees must as a minimum have received site specific safety induction training and must receive daily safe task instruction training (DSTI) before any work commences and thereafter on a daily basis.

a) Training Needs

There shall be a system in place to determine the training requirements of each individual, based on the tasks that the employee will perform as well as to ensure the health and safety of fellow employees and the public. Special attention should be given to employees who are new hires, new to the task or have combined responsibilities.

b) Basic Safe Work Training (Induction Training)

Every contractor shall ensure that his employees are inducted into his own company Health and Safety System as well as basic safe work training (HSE Induction Training). The Principal Contractor shall ensure that his, all his Contractor's employees and visitors are inducted on the specific site safety procedures.

A Daily Safe Task Instruction (DSTI) must be conducted on site with all employees involved in the project. The DSTI must be carried out each day before work commences and proof thereof must be available on site. Each work crew may conduct their own specific DSTI to discuss the hazards, risks and control measures associated with their task for the day.

Where two or more contractors or work crews work in the same area, they should have a combined DSTI to ensure they know of the additional hazards the other contractor or work crew will introduce to their operations and what precautions to put in place.

The Principal Contractor shall have evidence that employees have been trained on the relevant procedures prior to and during the project duration. The evidence will be in a form of attendance register.

c) Formal Training

All qualifications for which there are SAQA registered training courses, must be regarded as the minimum required qualifications and training. To be deemed "competent" an employee must have received training at a registered training provider, the training course must be registered and if there is an assessment, the employee must have been found competent after the assessment. A person cannot be deemed competent after awareness training only.

The Principal Contractor shall ensure that his employees, as well as the employees of any contractors that may be used, have received appropriate training for the type of work that will be performed, e.g. First Aid, Flag Man, Mobile Plant Operator, Working at Heights, Risk Assessment training etc.

d) Records

Record of all training shall be kept by the employer and shall be readily available. Records shall make provision for refresher training where applicable. Where an employee is legally appointed with certain duties and responsibilities a copy of the training certificate must be attached to the appointment.

## **E1006 APPLICATION FOR CONSTRUCTION WORK PERMIT**

Construction Regulation, 2014 Section 3 requires that the client apply for a construction work permit at least 30 days before construction work is started, if the intended construction work will:

- exceed 365 days AND will involve more than 3 600 person days of construction work; or
- if the tender value limit is a CIDB grade 7, 8 or 9.

If approved, the provincial director will issue a construction work permit in writing to perform construction work within 30 days of receiving the application and assign a site-specific number for the construction site. It is the intention of SANRAL to apply for a construction work permit as soon as The Principal Contractor is appointed and his Health and Safety Plan is received, in order to minimize construction delays.

The site-specific construction work permit number must be displayed at the main entrance to the site and a copy of the construction work permit must be kept in the principal contractor's health and safety file for inspection purposes.

## **E1007 DUTIES**

Various duties are imposed on the client, designer, principal contractor and other contractors by the Construction Regulation, 2014, Sections 5, 6 & 7. SANRAL will comply and carry out the required duties as contemplated in Section 5 of the Construction Regulations, 2014 and it is expected from the designer and every contractor to make themselves conversant with the requirements and duties imposed on them and to ensure that they comply with the requirements of section 6 & 7 at all times.

## **E1008 MANAGEMENT AND SUPERVISION**

The Principal Contractor shall ensure that the project is managed safely, and legal compliance is ensured at all times.

A full-time competent person must be appointed as a Construction Manager to manage all construction work, including health and safety compliance. The construction manager may not be appointed to manage more than one single construction site. An Alternate Construction Manager must be appointed, to carry out the duties in the absence of the Construction Manager.

The construction manager must appoint construction supervisors responsible for construction activities and ensuring occupation health and safety on the construction site.

The Principal Contractor must appoint a full-time construction health and safety officer, who is registered with the SACPCMP, to assist in the control of health and safety aspects on site.

## **E1009 RISK MANAGEMENT**

The Principal Contractor must follow a formal risk-based approach to ensure hazard control measures are implemented to an acceptable reasonable practical level. The Principal Contractor and his employees shall be responsible to ensure all hazards pertaining to his scope of activity are proactively identified, the risks assessed and appropriately eliminated or minimized and managed on an ongoing basis. Risk assessments shall also identify possible and potential environmental, health and hygiene issues pertaining to each hazard with potential exposures and limits.

### **a) Risk Assessment**

#### **i) Hazard Identification and Risk Assessment (Construction Regulation 9)**

The Principal Contractor shall, before the commencement of any construction work or work associated with the aforesaid construction work and during such work, conduct a risk assessment by a competent person, appointed in writing and the risk assessment so produced shall form part of the OH&S plan and be implemented and maintained as contemplated in Construction Regulation 9(1). Competence is a factor of training, knowledge, experience and/or appropriate qualifications.

The risk assessment shall include, as far as is reasonably practicable, at least:

- The task or task step
- the identification hazards to which persons may be exposed to during the task or task step;
- The analysis and evaluation of the risks associated to the hazards identified, inclusive of a residual risk rating methodology. The method to be used is not prescribed;
- a documented plan of safe work procedures, to mitigate, reduce or control those residual risks that have been identified as unacceptably high, by means of the rating system;

- a monitoring plan;
- a review plan, inclusive of dates to be adhered to; and
- Ergonomic related risks are to be analysed, evaluated and addressed as part of the process.

Based on the risk assessments, The Principal Contractor shall develop a set of site-specific OH&S rules that shall be applied to regulate the OH&S aspects of the construction. The risk assessments, together with the site-specific OH&S rules shall be submitted to the Employer before construction on site commences. SANRAL has conducted a Baseline Risk Assessment as per clause E1009 (b) below, which must be used by The Principal Contractor to develop task specific risk assessments before work commences. This does not mean that all possible Risk Assessments must be attended to before work commences, but that all relevant Risk Assessments receive the necessary attention as the contract progresses, and this is the responsibility of The Principal Contractor.

All variations to the scope of work shall similarly be subjected to a risk assessment process.

ii) Risk Assessment Monitoring

The Principal Contractor shall ensure that a monitoring plan for all risk assessments are in place. Risk assessments must be monitored to ensure effectiveness and employee understanding. The monitoring of risk assessments shall be formal, and records thereof shall be available for audit purposes.

iii) Review of Risk Assessment

The Principal Contractor shall review the hazard identification, risk assessments and standard safe working procedures:

- prior to any work activity commencement,
- where changes are affected to the design and construction that result in a change to the risk profile,
- when an incident has occurred, or
- at least quarterly.

**THE PRINCIPAL CONTRACTOR SHALL PROVIDE THE EMPLOYER, SUB-CONTRACTORS AND ALL OTHER CONCERNED PARTIES WITH COPIES OF ANY CHANGES, ALTERATIONS OR AMENDMENTS AS CONTEMPLATED ABOVE.**

Activities carried out without conducting a risk assessment or found to be non-compliant with the risk assessment, will be stopped until such time a risk assessment is compiled, and work is carried out according to the risk assessment.

Risk assessments must be fully communicated to all relevant personnel and must be considered when establishing training, awareness and competency requirements. Records of risk assessment communications must be kept for inspection purposes.

b) **Baseline Risk Assessment**

SANRAL prepared a Baseline Risk Assessment from which the Health and Safety Specifications for this project was prepared. The Baseline Risk Assessment highlights all work for which The Principal Contractor must prepare safe work procedures and or work method statements. It must be noted that the Baseline Risk Assessment is not exhaustive and Principal Contractors are required to identify risks and come up with control measures, this must be identified by Principal Contractor when preparing the Issue Based Risk Assessments.

The Baseline Risk Assessment for this Project can be found in clause E1018.

c) **Continuous Risk Assessment**

The Principal Contractor shall continuously assess the risks of the activities that are carried out. Risk assessments must be in writing, site specific and must be reviewed continuously as per E1009 a(iii) to ensure it is current and it address all the relevant hazards and risks associated with the specific activity at the specific site.

The Risk assessment must be discussed with the whole work crew before the activity starts and the work crew must acknowledge in writing having discussed the risk assessment and that they understand it. This acknowledgement must be on site and must be available to the client for audit purposes.

**E1010 LEGAL COMPLIANCE AND DOCUMENT CONTROL**

The Principal Contractor is required to implement systems and procedures to ensure legal compliance through:

- Identification of all relevant HSE legislation, standards and codes applicable to its operations.
- Have available copies of all relevant HSE legislation, standards and codes for reference purposes.
- Update systems and procedures with changed/updated legislation, standards and codes.
- Communicate to all employees any changes that may affect their accountabilities and conformance
- Incorporate any legal requirements into their HSE management system
- Monitor and review their HSE management system for effectiveness.

The Principal Contractor shall, as a minimum, comply with:

- The Occupational Health and Safety Act and Regulations (Act 85 of 1993), an up-to-date copy of which shall be available on site at all times.
- The Compensation for Occupational Injuries and Diseases Act (Act 130 of 1993), an up-to-date copy of which shall be available on site at all times.
- Where work is being carried out on a quarry/borrow pit/"mine", The Principal Contractor shall comply with the Mines Health and Safety Act and Regulations (Act 29 of 1960) and any other OH&S requirements that the mine may specify. An up-to-date copy of the Mines Health and Safety Act and Regulations shall be available on site at all times.

Wherever in the Construction Regulations or this specification there is reference to other regulations (e.g. Construction Regulation 24: Electrical Installations and Machinery on Construction Sites) The Principal Contractor shall be conversant with and shall comply with these regulations.

All legal appointments of The Principal Contractor regarding the Health and Safety of his employees who are to work on the project are addressed and governed by the OHS Act and applicable Regulations. Legal appointments must be in place and must reflect in the project safety file before work commences.

a) **Overall Supervision and Responsibility for OH&S**

SANRAL will appoint the Principal Contractor in terms of Construction Regulation 5(1)(k). A Mandatory agreement as per Section 37.2 of the OHS Act, shall be signed between SANRAL and the Principal Contractor.

It is a requirement that the Principal Contractor, when he appoints other contractors in terms of Construction Regulations 7(1)(c), 7(1)(d), 7(1)(f) and 7(3) includes in his agreement with such Contractors the following:

- OH&S Act (85 of 1993), Section 37(2) agreement: "Agreement with Mandatory".
- OH&S Act (85 of 1993), Section 16(2) appointee(s) as detailed in his/her/their respective appointment forms. (Where applicable).

The signed Mandatory agreements shall be placed in the project file for reference and for audit trail purposes.

b) **Specific Supervision Responsibilities for OH&S**

The Principal Contractor shall appoint designated competent employees and/or other competent persons as required by the OHS Act and Regulations, as well as this specification. Appointments shall be in writing and the responsibilities clearly stated together with the period for which the appointment is made. This information shall be communicated to and agreed with the appointees. Where applicable, the training certificate must be attached to the appointment. Notice of appointments shall be submitted to the Employer. All changes shall also be communicated to the Employer.

Below is a list of possible appointments for the project, which is not an all-inclusive list, but for reference purposes only:

<b>Appointment</b>	<b>Legal Reference</b>
Assistant to CEO	OHS Act 16(2)
Health and Safety Representative	OHS Act 17(1)
Nominated Health and Safety Committee Member	OHS Act 19(3)
Contractor (Sub-contractor)	CR 7(1)(c)(v)
Construction Manager	CR 8(1)
Alternate Construction Manager	CR 8(1)
Assistant Construction Manager	CR 8(2)
Health and Safety Officer	CR 8(5)
Construction Supervisor	CR 8(7)
Assistant Construction Supervisor	CR 8(8)
Risk Assessor	CR 9(1)
Fall Protection Plan Developer	CR 10(1)(a)
Structure Inspector	CR 11(2)(a)
Temporary Works Designer	CR 12(1)
Temporary Works Supervisor	CR 12(2)
Excavation Supervisor	CR 13(1)(a)
Demolition Supervisor	CR 14(1)
Competent Person in the use of Explosives	CR 14(11)
Scaffold Supervisor	CR 16(1)
Suspended Platform Supervisor	CR 17(1)
Rope Access Supervisor	CR 18(1)(a)
Material Hoist Inspector	CR 19(8)(a)
Bulk Mixing Plant Supervisor	CR 20(1)
Explosive actuated fastening device Inspector	CR 21(2)(b)
Explosive actuated fastening device cartridge Controller	CR 21(2)(g)(i)
Construction Vehicle & Mobile Plant Operator Authorised	CR 23(1)(d)(i)
Temporary Electrical Installation Controller	CR 24(c )
Stacking and Storage Supervisor	CR 28(a)
Fire Equipment Inspector	CR 29(h)
Incident investigator	GAR 9(2)
Lifting tackle inspector	DMR 18(10)(e)
Ladder inspector	GSR 13(a)
Certified Explosives Manager	ER 12(1)
First Aider GSR	GSR 3(4)
Lifting machine Operator	DMR 18(11)

In addition to the above, the Employer requires that a Traffic Safety Officer be appointed.

It is a requirement that The Principal Contractor shall provide the Employer with an organogram of all sub-contractors that he/she has appointed or intends to appoint and keep this list updated and prominently displayed on site.

c) **Designation of OH&S Representatives (Section 17 of the OH&S Act)**

Where the Principal Contractor employs more than 20 persons (including the employees of sub-contractors) he has to appoint 1 (one) OH&S representative for every 50 employees or part thereof. This is a minimum (legal) requirement. The Principal Contractor may at his own discretion appoint more OH&S representatives according to site specific requirements. General Administrative Regulation 6 requires that the appointment or election of the OH&S representatives be conducted in consultation with employee representatives or employees (Section 17 of the Act and General Administrative Regulation 6 & 7). OH&S representatives shall be designated in writing and the designation shall include the area of responsibility of the person and term of the designation. OH&S representatives must be experienced, permanently employed by The Principal Contractor or his sub-contractors, trained and able to move freely within their designated area of responsibility.

d) **Duties and Functions of the OH&S Representatives (Section 18 of the OH&S Act)**

The Principal Contractor shall ensure that the designated OH&S representatives perform their functions in respect of the workplace or section of the workplace for which they have been appointed. These functions include to conduct continuous monitoring and monthly inspections of their respective areas of responsibility, focusing on unsafe acts and unsafe conditions and report thereon to The Principal Contractor and OH&S Committee. OH&S representatives shall participate in accident or incident investigations. OH&S representatives shall attend all OH&S committee meetings. The complete list of functions can be found in Section 18 of the OHS Act.

e) **Appointment of OH&S Committee (Sections 19 and 20 of the OH&S Act)**

The Principal Contractor shall establish an OH&S committee, which shall meet at least once a month, where two or more Health and Safety Representatives have been appointed. OH&S representatives must be appointed as OH&S committee members. The number of members nominated by management may not exceed the number of OH&S representatives on the committee and must be appointed in writing.

## **E1011 OPERATIONAL INTEGRITY**

The operational integrity of plant, equipment, structures and protective systems must be monitored and assured on an ongoing basis throughout the project cycle. Hazards must be identified, risks assessed and as far as reasonably practicable, eliminated or the risks treated to as low as reasonably practicable (ALARP).

a) **Construction Plant & Equipment**

The Principal Contractor shall maintain all items of plant and equipment necessary to perform the work in a safe condition.

SANRAL reserves the right to inspect items of plant and equipment brought to site and used on site by The Principal Contractor. Should it be found that any item is inadequate, faulty, unsafe or in any other way unsuitable for the safe and satisfactory execution of the work for which it is intended, The Principal Contractor will be advised of such observation/inspection, and The Principal Contractor shall be required to repair, make safe or remove such item from operation and replace it with a safe and adequate substitute.

The Principal Contractor shall ensure that all plant, equipment, and power tools that are brought onto and used on site are:



- Appropriate for the type of work to be performed
- Placed on a register and inspected by a competent person and/or the authorized operator before use, daily or monthly dependent on Legislation.
- Record inspection findings on a register that must be kept on site.
- The inspection register shall reflect the serial number of the plant, equipment or power tool.
- Maintained and used in accordance with the manufacturers' recommendations
- Have adequate machine guarding fitted to all exposed rotating or moving parts, as reasonably practicable, that have the potential to cause harm
- All electrical power supply units are protected with operational earth leakage devices.
- Any defective, damaged or sub-standard equipment must be marked as unsafe for use and removed from operation as soon as possible

**b) Standards and Registers**

As standard project procedures, The Principal Contractor is expected to:

- Set up an initial set of registers as per the requirements of the OHS Act and Regulations.
- Complete the registers for each piece of plant, tool and equipment brought on and used on site
- Maintain a complete, continuous and comprehensive inspection and service history in these registers or checklists
- Ensure daily, weekly, monthly inspections are done and recorded for all plant, tools & equipment by a competent person and/or authorized operator as required by the OHS Act and Regulations.
- Have the inspection and maintenance records available for audit purposes.

**E1012 OCCUPATIONAL HEALTH AND HYGIENE**

**a) Medical Fitness for Duty**

All contractor employees shall undergo medical examinations and be certified fit for duty by an Occupational Health Practitioner before they are allowed to work on site.

The medical certificate must be in the form of Annexure 3 of the Construction Regulations and stipulate the possible exposures the employee might be exposed to during the execution of the project.

It is recommended and in the best interest of The Principal Contractor to implement pre-employment, periodic, as well as exit medical surveillance, especially with regards to Section 8 of the Noise Induced Hearing Loss Regulation.

**b) First Aid**

According to GSR 3(4), where more than 10 employees are employed at a workplace/worksites, The Principal Contractor shall ensure that there is at least one trained first aider for every group of 50 employees at the workplace/site. First Aid boxes must be provided where more than 5 employees are employed and must be readily available and accessible for the treatment of injured persons at the workplace.

To ensure immediate treatment of an injured person, it is recommended that all work crews have at least one trained first aider, with a fully stocked first aid box, irrespective of the number of people in the work crew. This is especially important when contractors work at great distances from the nearest emergency facility or town. These persons shall be appointed in writing as the first aiders with their certificates attached as proof of competency.

The minimum contents of the first aid box shall be as per the supplied list in the General Safety Regulations.

All treatments done must be recorded on a register and kept with the first aid box. A trained and appointed first aider must be responsible for the first aid box and its content. Used content must be replenished as soon as possible.

In order to ensure prompt response at the emergency facility it is recommended that the W.CI 2 forms be partially completed with the Employers' details.

c) **Hygiene Facilities**

The Principal Contractor and his contractors shall ensure compliance to Section 30 of the Construction Regulations with regards to facilities on the construction site as well as where accommodation is provided to employees on remote sites. The Principal Contractor shall ensure that the facilities are kept clean at all times, either through a service provider or self-employed persons. The Principal Contractor shall provide employees with at least one sanitary facility for each sex and for every 30 workers, changing facilities for each sex and sheltered eating areas.

d) **Health related Epidemics and Pandemics**

The contractor shall, as far as reasonably practicable describe in his health and safety plan how health related epidemics and pandemics will be dealt with. The Employer is aware that this section in the health and safety plan will not speak to specifics, but generic procedures. The Contractor must ensure that the requirements stipulated in the Hazardous Biological Agents (HBA) Regulation are addressed in his health and safety plan, training and information given to staff and procedures implemented on site to prevent health risks on site.

Once the nature and scale of the epidemic or pandemic is known, the Contractor must update his health and safety plan with the relevant information and send the updated plan to the relevant appointed OHS Agent for approval. Once approved, the Contractor must implement the updated health and safety plan and maintain the updated plan on site.

## **E1013 WASTE MANAGEMENT**

The Principal Contractor shall comply with all applicable and relevant Waste management legislation, as well as municipal bylaws applicable to waste management.

The Principal Contractor shall remove all waste generated at the construction site as soon as possible after generation to ensure good housekeeping at all times. The Principal Contractor shall have a waste management plan which must be implemented on the construction site and which will have the objective to ensure that waste is managed according to the Waste Management Hierarchy:

- Reduce what you can. If you cannot reduce then,
- Re-use what you can. If you cannot re-use then,
- Recycle what you can. What you cannot recycle,
- Convert into energy sources. If it cannot be converted to an energy source,
- Dispose of in a landfill – this is only to be done as a last resort and disposed without endangering human health and without using processes or methods which could harm the environment.

## **E1014 HAZARDOUS SUBSTANCE MANAGEMENT**

The Principal Contractor shall ensure that hazardous substances brought onto site are easily identifiable and stored according to the requirements of the General Safety Regulations, GNR. 1031 of 1986, Section 4.

Where flammable liquids are being used or stored, this must be done in a manner which would not cause a fire or explosion hazard.

The Principal Contractor shall have Material Safety Data Sheets (MSDS) readily available for flammable, hazardous and toxic chemical substances and materials brought onto site and shall ensure that his employees are trained in these MSDS's.

Flammable, hazardous or toxic chemical substances may not be stored in empty food or drink containers. Empty flammable, hazardous and toxic containers must be disposed of in a safe manner, which will prevent further use of such a container.

A survey of the construction site must be done during site establishment, to locate any asbestos. Should asbestos be located, the conditions of the Asbestos Regulations, GNR. 155 of 2002 must be followed and complied with.

## **E1015 CONTRACTORS**

### **a) Consultations, Communications and Liaison**

OH&S liaison between the Employer, The Principal Contractor, The Contractors, the designer and other concerned parties will be through the OH&S committee. In addition to the above, communication may be directly to the Employer or his appointed agent, verbally or in writing, as and when the need arises.

Consultation with the workforce on OH&S matters will be through their construction managers and supervisors, OH&S representatives and the OH&S committee. The Principal Contractor shall be responsible for the dissemination of all relevant OH&S information to The Contractors e.g. design changes agreed with the Employer and the designer, instructions by the Employer and/or his/her agent, exchange of information between subcontractors, the reporting of hazardous/dangerous conditions/situations etc. The Principal Contractors' most senior manager on site shall be required to attend all OH&S meetings.

### **b) Operational Procedures**

Each construction activity shall be assessed by The Principal Contractor so as to identify operational procedures that will mitigate against the occurrence of an incident during the execution of each activity. This specification requires The Principal Contractor:

- to be conversant with all relevant Regulations;
- to comply with their provisions;
- to include them in his OH&S plan where relevant

### **c) Checking, Reporting and Corrective Actions**

#### **i) Monthly Audit by Employer (Construction Regulation 5(1)(o))**

The Employer will conduct monthly health and safety and document verification audits in compliance with Construction Regulation 5(1)(o) in order to ensure that The Principal Contractor has implemented and is maintaining the agreed and approved OH&S plan.

The Principal Contractor will be provided with a copy of the Health and Safety audit report within seven days after the audit. The Employer or his representative may stop any Principal Contractor from executing a construction activity which poses a threat to the health and safety of persons which is not in accordance with the client's health and safety specification and the Principal contractor's health and safety plan for the specific site.

#### **ii) Other Audits and Inspections by the Employer**

The Employer reserves the right to conduct other ad hoc audits and inspections as deemed necessary. This will include site safety walks.

iii) Principal Contractor's Audits and Inspections

The Principal Contractor must conduct his own regular internal audits to verify compliance with his own OH&S management system, as well as with this specification.

The Principal Contractor shall furthermore ensure that each contractor's health & safety plan is being implemented and maintained. The Principal Contractor will ensure that periodic health and safety audits and document verification are conducted at intervals mutually agreed upon between the Principal Contractor and any contractor, but at least once every 30 days.

iv) Inspections by OH&S Representatives and other Appointees

OH&S representatives shall conduct monthly inspections of their areas of responsibility and report thereon to their foreman or supervisor, as well as the OH&S Committee, whilst other appointees shall conduct inspections and report thereon as specified in their appointments e.g. vehicle, plant and machinery drivers, operators and users must conduct daily inspections before start-up.

v) Recording and Review of Inspection Results

All the results of the abovementioned inspections shall be in writing, reviewed at OH&S committee meetings, endorsed by the chairman of the meeting and placed on the OH&S File.

d) **Project Health and Safety Management Plan**

As per Section 5(1) (l) and Section 7(1) (a) of the Construction Regulations of 2014, The Principal Contractor shall develop, implement and administer a Health and Safety Management Plan. The plan shall be in writing and shall be negotiated between The Principal Contractor and SANRAL or designated OHS Agent and must be approved by SANRAL or the designated OHS Agent prior to the commencement of work on site. The plan shall demonstrate management's commitment to ensure employee health and safety as their primary objective during the contract. The H&S plan shall be site and project specific and must address all aspects of the project H&S specification.

e) **Project Health and Safety File**

The Principal Contractor shall compile a project specific Health and Safety File that consist of all the relevant project specific documentation. The Health and Safety file may consist of multiple files, which when combined should contain all the required documentation.

It is recommended that the project specific Health and Safety file contain at least the following:

- Scope and summary of the project as well as any scope changes.
- Notification of Construction Work to DoL / Copy of Work Permit
- Proof of COID registration (Letter of Good Standing)
- Contractor Health and Safety Policy statement signed by management
- Appointment of Principal Contractor
- Mandatory Agreement – OH&S Act 37.2 (Between Employer and Principal Contractor)
- Client Health and Safety specification
- Latest copy of the OHS Act and Regulations
- Company Organogram depicting Health and Safety Responsibilities, including sub-contractors
- Employee list including copy of IDs and medicals
- Project specific Health and Safety Management Plan agreed with the Employer – See E1015(d) above
- Relevant OH&S Legal appointments which includes duties and responsibilities as well as competencies (training certificate)
- Copies of minutes of meetings – OH&S committee and other relevant OH&S meeting minutes
- Site specific Fall Protection Plan (if applicable)

- Risk Assessments
- Contractor Induction material
- Waste management Plan
- Emergency preparedness (first aid, firefighting, emergency plan, etc.)
- Emergency Contact Telephone numbers
- List of hazardous chemical substances used on site
- Material Safety Data Sheets of hazardous chemicals on site
- List of plant & equipment to be used on site
- Inspection Checklists/Registers of plant & equipment and emergency equipment
- List of Sub-contractors including type of work
- Sub-contractor 37.2 Mandatory Agreements
- Sub-contractor appointments which shall include the type of work The Principal Contractor is appointed for.

f) **Contracting Philosophy**

Any site-specific hazards and safety management expectations will be made known to the Principal Contractor prior to the work commencing on site. This will be done through the OH&S Specification for the project. SANRAL as the Employer/Client may specify requirements that are stricter than Legislative requirements in this OH&S Specification. Legal OHS requirements contained in the OHS Act and Regulations, SANS Codes and the project OH&S Specifications are the minimum requirements the Principal Contractor must apply during this contract with regards to Occupational Health and Safety. The Principal Contractor shall implement the minimum OH&S requirements and ensure conformance to these at all times.

g) **Workers Compensation Registration**

The Principal Contractor shall ensure that his employees are covered for any occupational injuries and illnesses in terms of the Occupational Injuries and Diseases Act 130 of 1993, which cover shall remain in place and up to date for the duration of the project.

The Principal Contractor shall ensure that his sub-contractor employees are covered for any occupational injuries and illnesses in terms of the Occupational Injuries and Diseases Act 130 of 1993, which cover shall remain in place and up to date for the duration of the project.

h) **HSE Non-Compliance**

It is a legal duty of the client according to the Construction Regulation 5(1)(q) that a Principal Contractor is stopped from executing any activity which poses a threat to the health and safety of persons. Depending on the seriousness of the non-compliance only the specific activity may be stopped until the non-compliance is rectified or the whole operation may be stopped.

It is also the duty of every employee to take reasonable care of his own health and safety and of other persons who may be affected by his acts as per OHS Act, Section 14(a). Keeping this in mind, it is required of The Principal Contractor to ensure his employees has the right to remove themselves from any unsafe situation or work activity, without any negative consequence to them until such time as The Principal Contractor has made the unsafe situation or activity as safe as practicable possible.

i) **Indemnity by Contractor**

The Principal Contractor shall indemnify the Employer against and from all damages, losses and expenses (including legal fees and expenses) resulting from:

- i) the loss of output and delay caused by the slowing down or partial or total stoppage of work caused by:
  - all or any of The Principal Contractor's workforce as a result of a dispute between all or any of the Principal Contractor's workforce and The Principal Contractor; or
  - all or any of the Principal Contractor's suppliers' difficulty or impossibility to deliver goods or materials needed to perform the Works;
- ii) Any unlawful, riotous or disorderly conduct by or amongst the Principal Contractor's personnel."

j) **The Principal Contractor Conduct**

Guidelines to the most important rules that shall be implemented and maintained by the Principal Contractor:

- Complete compliance to the OH&S Act 85 of 1993 and Regulations,
- Hazard identification and Risk Assessments for all activities,
- Daily communication of DSTI's before work commences, even if it is a repetitive task,
- Safe access and egress to and from work areas,
- Compulsory use of lifelines, Safety Harnesses and Fall Arrestors (Lanyards to be attached at all times), when working in elevated positions,
- Scaffold shall comply with Legal and SANS standards at all times,
- Good housekeeping and stacking practices,
- Safe lifting, rigging and slinging practices,
- Complying to Legal standards for lifting machinery & equipment,
- No lifting in wind conditions exceeding 30km/h (This is a guide and is dependent on risk assessments),
- Securing of tools, equipment and material at heights,
- Wearing of appropriate personal protective equipment as identified in the risk assessment.

Supervisors in charge are responsible for ensuring that the employees are aware of the hazards/risks involved in the work they will be doing/are doing and shall ensure the safety rules are obeyed.

No person shall act in a manner that endangers or is likely to endanger, the safety of any other person, or cause harm to any other person.

An employee who observes any dangerous situation, shall as soon as possible inform the person who is responsible for that section of the site.

Any employee who becomes aware of any person disregarding any safety rules, shall remind that person of the rules. If he persists in disregarding the rules, the matter must be reported to his supervisor.

No person shall damage, alter, remove, render ineffective or interfere with anything that has been provided for the protection of the site, or for the health and safety of persons.

No person shall interfere with or use firefighting equipment without authority and training.

No person in a state of intoxication or condition that render him incapable of controlling himself shall enter or be allowed to enter the site.

No alcohol or illegal drugs shall be taken onto the site.

All safety and warning signs shall be obeyed.

Always be alert of construction vehicles as well as traffic. Never turn your back to oncoming traffic, always have a line of sight.

k) **Principal Contractor and Contractor Management**

The Principal Contractor shall establish, maintain and ensure that all his contractors establish and maintain OH&S standards and systems as necessary and to comply with the Legal requirements as well as these OH&S specifications.

The Principal Contractor shall be solely responsible for carrying out work on the project, having the highest regard for the health and safety of his employees and people in the vicinity of his work area.

**l) Public Health and Safety**

The Principal Contractor shall, as far as is reasonably practicable, be responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimise those dangers.

This includes:

- Non- employees entering the site for whatever reason
- The surrounding community
- Passers-by to the site.

**E1016 DESIGNING FOR HEALTH, SAFETY AND THE ENVIRONMENT**

Designing for safety is a process aimed at minimizing injury, death, property damage or destruction and harm to the environment, by utilizing an approach to identify and eliminate or control hazardous conditions and material during the design process. The Principal Contractor is responsible for appointing the temporary works Designer and shall ensure that the temporary works Designer implement a process and designs the temporary works in such a way that ensure the safety of employees during the erection, use and dismantling of the temporary works. The temporary work designer shall comply with the duties of the Temporary Work Designer as per the Construction Regulations, 2014 Section 6(2).

The Principal Contractor must communicate the anticipated risks and hazards resulting from the design to his employees and establish safe work procedures for the temporary works.

**E1017 INCIDENT MANAGEMENT**

The Principal Contractor shall ensure that a culture exists within his company that promotes the recognition, response, reporting and investigation of incidents, including near misses (near hits). The Principal Contractor must implement a procedure for reporting and investigating accidents, incidents and near misses. The Principal Contractor should have a clear objective and target to obtain zero injuries for the duration of the project and such an objective must be communicated to all employees.

Appropriate corrective actions must be implemented, and the applicable learnings must be shared within The Principal Contractors business to prevent a recurrence of the incident or to prevent the near miss from becoming an incident in future.

**(a) Incidents and Accidents**

The Principal Contractor and his contractors shall coordinate their investigation of all accidents/incidents where employees and non-employees were injured to the extent that he had to be referred for medical treatment by a doctor, hospital or clinic. The results of the investigation shall be entered into an accident/incident register, which must be updated with each accident/incident.

The Principal Contractor shall notify the relevant SANRAL Project Manager and or SANRAL OHS Specialist of any incident/accident within the Principal Contractors or his Contractors area of responsibility in writing as soon as possible.

Although the accident/incident is reported to the client, the Principal Contractor has a responsibility and is required by law to report any Section 24 accidents and incidents to the Department of Labour. Any road traffic accident must be reported to the relevant authorities.

It is essential that the Principal Contractor demonstrate that corrective and preventative action has been taken to prevent a similar incident in future and that it is communicated to all the Principal Contractors affected staff. A copy of the investigation, corrective and preventative action taken as well as the attendance register of the employees who attended the discussion of the incident and the action implemented to prevent a similar incident, must be forwarded to the SANRAL Project Manager and or the SANRAL OHS Specialist.

Investigations must be completed for:

- Near Miss Incidents (To prevent it from becoming an incident)
- First Aid case Incidents
- Medical treatment case Incidents
- Fatalities

(b) **Incident Reporting**

The Principal Contractor shall provide the Employer with copies of all statutory reports required in terms of the Act within 7 days of the incident occurring. In addition, The Principal Contractor shall update monthly the Disabling Injury Frequency Ratio (DIFR) and display this information on a signboard at the site office.

The Principal Contractor is responsible for collecting, recording, calculating and reporting his and his sub-contractors Health & Safety statistics to the SANRAL OHS Specialist.

The statistics should contain at least the following for all employees of all contractors working on the project:

- Total Number of workers
- Total Number of hours worked (on the SANRAL project)
- Total Number of Near Miss Incidents
- Total Number of First Aid case Incidents
- Total Number of Medical Treatment case Incidents (Excluding Section 24 type incidents)
- Total Number of Section 24 type Incidents
- Preventative actions taken on incidents that have occurred
- Communication to employees and contractors of incidents and preventative actions.

**E1018 PROJECT SPECIFIC CONSTRUCTION REQUIREMENTS**

The clause contains specific requirements for Contract SANRAL R.033-120-2019/1 FOR THE IMPROVEMENT OF NATIONAL ROAD R33 SECTION 12 FROM THE N1 (KM 77.0) TO SECTION 13 MODIMOLLE (KM 0.6), which must be adhered to in addition to minimum legislative requirements.

a) **Baseline Risk Assessment**

The following is a list of activities, hazards and risks identified which forms the Baseline Risk Assessment for the project prepared by the Client in terms of Construction Regulation 5(1) (a):

Risks associated for identified activities and hazards:

<u>Activity</u>	<u>Associated Hazards</u>	<u>Associated Risks</u>	<u>Risk Rating</u> High Medium Low
Site establishment	Extreme temperatures; Pesticides, herbicides, dust. Snakes, bees, spiders, vermin (rats & mice); Portable electrical equipment; Electrical hand tools; Lifting equipment; Aggrieved members of the public; Flooding.	Heat exhaustion; Dehydration; Poisoning; Fatality / Serious health effect; Silicosis; Electrical shock; Personal Injuries; Falling objects; Strikes / riots; Drowning.	M
Security	Aggrieved members of the public; Uncontrolled people	Protest Riots Theft Grievous bodily harm	M



<u>Activity</u>	<u>Associated Hazards</u>	<u>Associated Risks</u>	<b>Risk Rating</b> <div>High</div> <div>Medium</div> <div>Low</div>
Loading / Unloading of materials / plant & equipment from trucks	Lifting equipment; Inexperience operators; Inexperienced workers; Poor support.	Material / plant falling from height; Operator losing control; Employees under/close to suspended loads; Plant and equipment losing stability	H
Transportation of personnel / materials	Overloaded vehicles; Transportation of workers in vehicles not designed to transport people; Transporting vehicle defective / not roadworthy	Operator losing control of vehicle; Vehicle overturning; Vehicle accidents; Fatality; Serious injuries	H
Erection of temporary site offices / Laboratory	Extreme temperatures; Pesticides, herbicides, dust, cement; Snakes, bees, spiders, vermin (rats & mice); Portable electrical equipment; Electrical hand tools; Lifting equipment; Temporary works; Aggrieved members of the public; Poor ventilation	Heat exhaustion; Poisoning; Fatality / Serious health effect; Silicosis; Electrical shock; Personal Injuries; Falling objects; Strikes / riots; Shortness of breath, headaches and fatigue.	M
Working with and handling of hazardous / flammable / toxic materials	Hazardous, flammable and toxic substances	Chemical burns; Fire; Serious injuries; Fatalities	M
Disposal of waste materials	Hazardous waste	Environmental pollution Re-use of containers can have serious health effect on people or fatal.	H
Traffic accommodation / calming	Public vehicles; Extreme temperatures; Temporary bypass; Speeding; Flooding.	Employees run over by public vehicles – serious injuries / fatalities Heat exhaustion Public not slowing down to manoeuvre through byapss – fatality / serious injuries / vehicle accidents; Public not obeying speed limits – fatality / serious injuries / vehicle accidents; Drowning.	H
Working in elevated positions - Working at heights, on slopes, next to excavations, on trucks, on bridges.	Defective / Inadequate equipment; Improper use or non-use of fall protection equipment; Environmental conditions – rain / strong wind, lighting;	Falls from height – serious injury fatality; Fall into river – serious injury drowning; Electrical Shock; Electrical arching;	H

<u>Activity</u>	<u>Associated Hazards</u>	<u>Associated Risks</u>	<b>Risk Rating</b> <b>High</b> <b>Medium</b> <b>Low</b>
	Live electrical power lines; Suspension trauma.	Slippery work surfaces; Fatality / serious injuries;	
Stockpiling	Material falling from stockpile	Serious personal injuries; Material damage	M
Operations involving Noise	Noise	Noise induced hearing loss	M
Operations involving Vibration	Vibration	Damage to joints, muscles, circulation and sensory nerves.	M
Working above / near water environments	Working at heights Water environment Working on new bridge Working on temporary water structures	Drowning	H
Working near existing services – overhead/underground power cables; telecommunication cables	Electricity	Electrical Shock; Electrical arching; Fire; Burns Fatality Serious injury	H
Working with portable electrical equipment – grinders, circular saws, generators	Electricity Electrical tools Portable electrical equipment	Electrical shock Cuts Personal injuries	M
Lifting / Lowering operations	Elevated objects Lifting machines Improper rigging Electrical cables	Lifting machine / crane overturning; Falling objects Dropped loads Strong winds Loads striking personnel, vehicles or equipment. People working underneath High voltage power lines may arch onto crane boom.	H
Driving and operation of construction vehicles and mobile plant	Distracted drivers; Recklessness; Impaired driving; Poor visibility; Poor road conditions; Unsecured loads; Uncontrolled vehicle entry; Equipment failure; Public vehicles; Uneven ground surfaces	Fatalities; Serious injuries; Crashes; Vehicles, plant and equipment damage; Workers not seen by operators; Workers working too close to mobile plant and vehicles; Construction vehicles & mobile plant not road worthy / defective; Roll over of construction vehicles / plant.	H
Excavation work	Unstable ground	Cave-ins;	H

<u>Activity</u>	<u>Associated Hazards</u>	<u>Associated Risks</u>	<b>Risk Rating</b> <b>High</b> <b>Medium</b> <b>Low</b>
	Underground electrical cables; Underground pipelines; Excavation equipment, construction vehicles & plant.	People falling into excavation; Workers buried in excavation due to cave-ins; Construction vehicles / plant falling into excavation; Fatalities; Serious injuries	
Use of explosives	Explosives; Flying debris	Fatality; Serious Injuries	M
Gabion work	Manual handling Slopes Slippery Rocks	Personal injuries Trips, Slips & Falls	M
Work adjacent or in proximity of railway lines	Trains	Working too close to railway track can cause train draft to suck workers under trains. People falling onto or in front of trains while working above railway track.	H
Work adjacent or near traffic	Public vehicles	Workers not attentive to approaching vehicles. Drivers not slowing down to indicated speed limit. Drivers losing control of their vehicles.	H
Temporary works – Form work & support work	Temporary works	Falls from height; Collapse of temporary work overloading	H
Demolition work	Demolition equipment Flying debris Explosives;	Fatality; Serious Injuries; Damage to equipment; Damage to public assets	H
Work adjacent to public property	Construction plant and equipment; Excavation activities; Demolition activities;	Injury to public persons; Damage to public property and assets;	H
Protection of public H&S	Unprotected temporary works; Stockpiles; Incomplete structures.	Public persons accessing construction area, stockpiles and incomplete structures. Fatality / Serious injury to public persons	H
Welfare facilities – drinking water; eating facilities; sanitary facilities	Water not suitable for human consumption; Shortage of water; Hazardous substances; Environmental impact.	Serious health effects; Dehydration Environmental pollution	M
Working in the environment	Bees Snakes Spiders	Poisoning; Fatality / Serious health effect; Electrical shock / burns;	M

<u>Activity</u>	<u>Associated Hazards</u>	<u>Associated Risks</u>	<u>Risk Rating</u> <b>High</b> <b>Medium</b> <b>Low</b>
	Lighting Strong winds Heavy rain Hot/cold conditions	Personal Injuries; Slips; Drowning; Heat exhaustion; Dehydration;	
	Hazardous biological agents	Serious health effects; Fatality; Pandemic; Epidemic	H
Working on high pressure pipelines	Deep excavations Pipe burst Lifting equipment	People falling into excavation; Workers buried in excavation due to cave-ins; Construction vehicles / plant falling into excavation; Falling pipes; Drowning; Injury through pipe bursts; Fatalities; Serious injuries	H

b) **Daily Site Attendance Register**

The Principal Contractor shall keep a daily site register so as to be able to identify the entire Contractors personnel on site in case of an emergency or evacuation situation. The attendance register must include permanent as well as temporary workers working on the site.

All contractors shall report to security/reception upon arrival at site. The Principal Contractor will only grant first time access to work on the site if all required documentation has been provided by the contractor and has been approved by the Principal Contractor.

All site visitors, suppliers and any new contractors shall report to security/reception upon arrival at site. All visitors need to sign an attendance register when visiting the site. Visitors include all persons which are not permanently working on the site but excludes temporary site workers. Visitors must undergo site induction training before they are allowed on site to make them aware of the site dangers.

c) **Emergency Numbers / Emergency Evacuation**

A list with emergency numbers must be readily available to first aiders and supervisors. Emergency numbers must be site specific and must display the nearest emergency facilities.

The Principal Contractor shall identify and formulate emergency procedures in the event an incident does occur. The emergency procedures thus identified shall also be included in The Principal Contractor's OH&S plan and communicated as part of induction training. It is the responsibility of the first aid worker, together with the construction supervisor, to make an assessment regarding the severity of injuries and which actions are appropriate. For example: transfer to a medical facility by ambulance or helicopter.

The Principal Contractor must implement an emergency evacuation procedure on site to ensure that in case of an emergency, all staff will leave their place of work when the emergency siren is sound and proceed to the designated emergency assembly point. The emergency assembly point at the site office must display the sign "Emergency Assembly Point".

An evacuation route diagram must be displayed and visible at strategic points in the site office buildings and on notice boards.

All staff working on site must be given awareness training on the emergency evacuation procedure and evacuation drills must be exercised to ensure all staff know the correct procedure to follow in case of an emergency.

d) **Site Security**

Certain areas where work must be carried out, is recognized unsafe areas and certain other areas may from time to time become unsafe, due to 3<sup>rd</sup> party actions. The Principal Contractor must, as far as reasonably possible, anticipate unsafe areas and must ensure that his site staff is safe from 3<sup>rd</sup> party actions, which include but is not limited to:

- Unrests,
- Violent Demonstrations,
- Theft,
- Injury to staff due to 3<sup>rd</sup> party actions.

The Principal Contractor must, when work is to be carried out in the above-mentioned areas, make provision for security services to accompany site staff during the execution of their work, as The Principal Contractor is responsible for the Health, Safety and Security of his own staff. The provision for security services must form part of The Principal Contractors tender.

e) **Personal Protective Equipment**

Comply with General Safety Regulations, Section 2

The Principal Contractor shall identify the hazards in the workplace and follow the hierarchy of controls to prevent incidents. Where possible, hazards must be eliminated or, where impracticable, mitigate the hazards through implementing control measures. Where mitigated hazards still pose a risk to the health and safety of workers, take steps to protect workers and make it possible for them to work safely and without risk to their health under the hazardous conditions, by wearing personal protective equipment and clothing.

Personal protective equipment (PPE) should, however, be the last resort and there should always first be an attempt to apply engineering and other solutions to mitigate hazardous situations before the wearing of PPE is considered. The hierarchy of hazard control must be followed before the option of personal protective equipment is considered. The following hierarchy of controls must be followed:

- Elimination
- Passive Controls
  - Substitution – Using a cherry picker or man-lift instead of a ladder.
  - Engineering Controls – Installing barrier railings; Installing stairs instead of using vertical ladders.
- Active Controls
  - Administrative policies and procedures
  - Personal protective equipment

Where it is not possible to create an absolutely safe and healthy workplace, the Principal Contractor shall inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in the hazardous environment.

It is a further requirement that the Principal Contractor maintain the said equipment, that he instructs and trains the employees in the use of the equipment and ensures that the prescribed equipment is used by the employee/s.

Employees do not have the right to refuse to use/wear the equipment prescribed by the Employer and, if it is impossible for an employee to use or wear prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition/s for which the equipment was prescribed but an alternative solution has to be found that may include relocating the employee.

The Principal Contractor shall include in his OH&S plan the PPE he intends issuing to his employees for use during construction and the sanctions he intends to apply in cases of non-conformance by his employees. Conformance to the wearing of PPE shall be discussed at the DSTI and Toolbox Talk meetings.

The Principal Contractor shall ensure that all his personnel, excluding those who are permanently office bound, are equipped with reflective safety jackets and that these are worn at all times when working on site. Any person found not wearing a reflective jacket on site must be removed from the site until such time as he is in possession of and wearing a reflective jacket. Reflective safety jackets shall be kept in good condition and any jackets that are ineffective must immediately be replaced by The Principal Contractor.

f) **Site Supervision**

Comply with Construction Regulation, Section 8.

The Principal Contractor shall appoint a competent Construction Manager who shall be responsible for the construction activities and for ensuring occupational health and safety compliance on the construction site.

g) **Working in Elevated Positions**

Comply with Construction Regulation, Section 10

The Principal Contractor shall ensure that a fall protection plan, developed by a competent person who is designated as the Fall Protection Plan Developer, is available on site and understood by all employees who will be working in elevated positions.

All employees working in elevated positions shall protect themselves from falls by wearing a full body harness and the lanyard shall be attached as far as possible above the head of the worker to a life-line or other approved and anchor point indicated in the fall protection plan.

In addition to obvious elevated work activities, work activities which include:

- Working on the edge of an excavation where there is a risk of falling into the excavation; or
- Work on the edge of a vertical drop where there is a risk of falling;

shall be considered work in elevated positions and Section 10 of the Construction Regulations must be adhered to at all times. The hierarchy of controls must be implemented when such activities are carried out. As a minimum the employee must wear PPE as identified in the risk assessment, which shall include a full body harness.

h) **Structures**

Comply with Construction Regulations, Section 11.

The Principal Contractor shall ensure that all practicable measures are taken to prevent the uncontrolled collapse of new or existing structures or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work. No structure may be loaded in a manner which would render it unsafe.

When a structure is of temporary nature, all conditions as required by the Construction Regulations Section 12 - Temporary Works, must also be complied with.

i) **Excavations**

Comply with Construction Regulations, Section 13

The Principal Contractor shall ensure that all excavations are carried out under the supervision of a competent person who has been appointed in writing as Excavation Supervisor.

The Principal Contractor must evaluate the stability of the ground before excavation work begins as well as during excavation work.

Excavations must be barricaded to prevent unauthorized access.

Material removed from excavations, as well as heavy machinery and construction vehicles, must not be closer than 1 meter to the edge of the excavation, to prevent additional loads on the excavation edge, which could cause cave-ins, to prevent construction vehicles from falling into the excavation and to prevent the accumulation of carbon monoxide gas inside the excavation.

The principal contractor and its contractors must cause every excavation which is accessible to the public or which is adjacent to the public roads or thoroughfares, or whereby the safety of persons may be endangered, to be –

- Adequately protected by a barrier or fence and as close to the excavation as is practicable; and
- Provided with warning illuminants or any other boundary indicators that are clearly visible at night or when visibility is poor.

People working in the excavation must be adequately protected from cave-ins, by means of protection systems such as trench boxed and shielding and must have a safe means of access into the excavation and egress from the excavation.

j) **Scaffolding**

Comply with Construction Regulations, Section 16, General Safety Regulations, Section 6 and SANS 10085 – The Design, erection, use and inspection of access scaffolding

The Principal Contractor shall appoint a competent person in writing as scaffolding Supervisor. Scaffolding Inspectors and Scaffolding Erectors must be trained and found competent to carry out scaffolding work. It is important to note that only competent scaffold erectors are allowed to build the scaffolding. The scaffold inspector is not allowed to build the scaffold with the scaffold erector team.

Scaffolding shall be erected according to SANS 10085 and shall be tagged “Unsafe for use” while it is being build and “Safe for Use” after inspection indicated that the scaffold is safe to use. The inspection of the scaffold shall be in writing and proof thereof shall be available for any user of the scaffold as well as for audit purposes.

Scaffold left erected while The Principal Contractor is not in attendance, must be tagged with a “Not Safe for Use” tag and all reasonably practicable measures must be taken to prevent unauthorised access to the scaffold.

Scaffold must be inspected by the competent scaffold inspector on completion of the scaffold build, weekly thereafter or following severe weather conditions.

Hazards such as overhead power lines must be identified before the scaffold is build and must be reflected in the risk assessment.

When using mobile scaffold, employees and materials must be removed from scaffold before moving the mobile scaffold. Hazards such as overhead power lines must be identified before moving mobile scaffold and must reflect in the risk assessment.

k) **Suspended Platforms**

Comply with Construction Regulation, Section 17, SANS 10295-2 - Suspended access equipment Part 2: Temporary suspended platforms (TSPs)

All suspended platform work must be carried out under the supervision of a competent appointed Suspended Platform Supervisor. Suspended platform erectors, operators and inspectors must be competent.

The Principal Contractor must be in possession of a certificate of design for the use of the suspended platform system.

**l) Cranes**

Comply with Construction Regulation, Section 22, Driven Machinery Regulation, Section 18.

Crane operators must be trained and found competent to operate the particular type of lifting machine and have a valid operator's card. The crane operator must be in possession of a valid medical certificate of fitness, issued by an occupational health practitioner.

The wind factor should always be taken into consideration when operating cranes and a wind speed device must be fitted so that it provides the operator with an audible warning when the speed exceeds the safe lifting speed. Upon noticing that the wind speed is equal or more than the specified speed limit, the operator should stop immediately.

**m) Construction Vehicles & Mobile Equipment**

Comply with Construction Regulation, Section 23, National Road Traffic Act, 1996

Construction vehicle operators must have received training to operate the class of construction vehicle or mobile equipment and must be in possession of an operator's card as proof of competency. Construction vehicle operators must be authorised in writing and have a medical certificate of fitness issued by an occupational health practitioner to operate the construction vehicle and/or mobile equipment.

All construction vehicles operating on a public road, must be roadworthy, licenced and when operated on a public road, comply with the National Road traffic Act.

**n) Electrical Equipment**

Comply with Construction Regulations, Section 24.

The Principal Contractor shall take adequate steps to ascertain the presence of and guard against danger to workers from electrical cables or apparatus which is under, over or on the site.

The exact location of underground electric power cables must be determined before any excavators are used for excavation purposes.

The location of overhead electrical cables must be assessed when working with cranes and lifting equipment. Injury may be possible from touching the electrical cables with the crane boom, or from arching when the crane boom comes too close to the electrical cable.

All temporary electrical installations must be inspected at least once a week by a competent person and the records of the inspections must be recorded in a register which must be kept on site.

Electrical machinery and extension cords must be in a serviceable condition and must be inspected on a daily basis before use on a construction site by the authorised operator and the inspection checklist must be kept on the construction site.

Comply with Electrical Installation Regulations.

All electrical installations shall be inspected and approved by an accredited electrical inspector and a valid Certificate of Compliance must be issued for the installation.

All electrical installations carried out on site (permanent and temporary) must be in accordance and comply with the Electrical Installation Regulations.

All power supplies and generating units must be fitted with a functional earth leakage device.

**o) Temporary Storage of Flammable Liquids**

Comply with Construction Regulation, Section 25 and General Safety Regulations, Section 4

The Principal Contractor must ensure storage areas of flammable liquids are well ventilated and "No Smoking" signs are placed at the entrances and ventilation ducts of the storage areas. Firefighting equipment must be available in suitable positions around the storage areas.



The Principal Contractor must ensure that good housekeeping is practiced in and around the flammable storage areas.

p) **Water Environments**

Comply with Construction Regulation, Section 26.

The Principal Contractor must ensure that a lifejacket forms part of the employees PPE and is worn when the employee is exposed to the risk of drowning, by falling into water.

The risk assessment must make provision for the rescuing of persons in danger of drowning and for preventing employees from falling into the water.

When working next to a river, the Principal Contractor shall put a system in place to monitor the river water level in order to evacuate employee in case of a flood.

When working over water environments, Section 10 of the Construction Regulations – Fall Protection will also apply.

q) **Housekeeping**

Comply with Construction Regulation, Section 27, Environmental Regulations for Workplaces, Section 6(3).

The Principal Contractor shall ensure that suitable and acceptable housekeeping is continuously implemented and maintained on the construction site. Off-cuts and waste must be removed as soon as practicable.

r) **Stacking & Storage of Material, Plant & Equipment**

Comply with Construction Regulations, Section 28 and General Safety Regulations, Section 8.

The Principal Contractor shall appoint a competent person in writing with the duty of supervising all stacking and storage operations on site.

Stacking shall only take place in areas specifically demarcated for this purpose. Circular items must be secured with wedges or chocks.

Items removed from a stack shall only take place from the topmost layer of the stack.

Stacks shall not obstruct any fire extinguishing equipment, first aid equipment, electrical switchgear (DB Boxes) and ventilation or lighting installations.

Unstable stacks must be broken down immediately.

s) **Fire Precautions**

Comply with Construction Regulation, Section 29.

The Principal Contractor must provide his own firefighting equipment that is within the service date and safe for use. Firefighting equipment must be on a register and inspected by a competent person who has been appointed in writing.

Suitable and sufficient fire extinguishing equipment must be placed at strategic locations and a sufficient number of firefighters must be available, which must be trained in the use of it.

t) **Intoxicating Liquor and Drugs**

Comply with General Safety Regulations, Section 2A.

The principal Contractor must compile a Substance Abuse Policy, which must be communicated to all employees. This policy should form part of the induction material for employees as well as visitors.

The Substance Abuse Policy should set the limit for intoxication to zero in order to complement a vision of zero tolerance.

Any person found to be intoxicated, or consuming intoxicating liquor or illegal drugs, shall not be allowed onto the premises and/or must be removed from the premises.

The Principal Contractor has the right to test any person entering the premises for intoxicating liquor or illegal drugs and may refuse entrance on the basis of the outcome of the test.

The Principal Contractor shall ensure that employees taking prescription medicine informs the Principal Contractor of such and shall ensure that the side effect of such medicine does not constitute a hazard to the employee himself or people working with, or in close proximity to the employee.

u) **Confined Space Work & Tunnelling**

Comply with Construction Regulation, Section 15 and General Safety Regulations, Section 5.

The Principal Contractor shall ensure that only authorized persons enter confined spaces.

An entrance log must be kept to ensure people are not left inside the confined space. Adequate air monitoring must be carried out before entering the confined space. When air monitoring indicated the oxygen to be less than 20% by volume, the confined space must be purged and ventilated to obtain a safe atmosphere or self-contained breathing apparatus must be used.

v) **Site Services**

The Principal Contractor shall provide and maintain on the site adequate facilities for employees to use, which must be serviced and kept sanitary and hygienic at all. The following site services should be taken not of:

i) Drinking Water

The Principal Contractor must ensure that an adequate supply of potable drinking water is available for all persons engaged in managing and working on the construction site and, if necessary, similar facilities elsewhere for such personnel off the site. Employees working in hot conditions must consume enough water per hour to prevent dehydration.

Where water is unsafe for human consumption, it must be so indicated by means of adequate signage.

ii) Accommodation

The Principal Contractor shall comply with the requirements of Construction Regulation 30 with regards to employee's accommodation. Reasonable and suitable living accommodation must be provided to employees who are far removed from their homes.

iii) Sanitary Facilities

The Principal Contractor shall comply with the requirements of Construction Regulation 30 with regards to employee's sanitary facilities. Sanitary facilities must be positioned in close proximity of the work area. Sanitary facilities must be serviced regularly and kept in a clean and hygienic condition.

w) **Traffic Accommodation**

The Principal Contractor must develop a clear Traffic Management Plan, which must be approved by the Engineer. Traffic must be organized and controlled in accordance to the Traffic Management Plan and any work area must have adequate signage, signaling or other control arrangements to guard against the dangers relating to the movement of vehicles. Where reasonably practicable, solid barriers must be placed between workers and traffic passing by.

When the Principal Contractor is executing night work, permission should be obtained from the Engineer. The Principal Contractor must put in place visible or reflective signs that can be seen by motorist at a distance. If a stop and go method is used flag persons must be properly trained on how to control the traffic.

SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.033-120-2019/1

THE IMPROVEMENT OF NATIONAL ROAD R33 SECTION 12 FROM THE N1 (KM 77.0) TO  
SECTION 13 MODIMOLLE (KM 0.6) (TOTAL 12.3km)

**SECTION F: STANDARD ELECTRICAL SPECIFICATIONS**

**SECTION F: STANDARD ELECTRICAL SPECIFICATIONS****TABLE OF CONTENTS**

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## **PART F3 STANDARD ELECTRICAL SPECIFICATIONS**

### **F3.1. REGULATIONS**

The installation shall be erected and tested in accordance with the Acts and Regulations as indicated in the scope of works.

The supply and installation of the work shall be in agreement with the Conditions of the Contract with special attention to the following in particular:

- a) The Occupational Health and Safety Act no. 85 of 1993, as revised,
- b) SANS 10142-1, "The Wiring of Premises Part 1: Low Voltage Installations".
- c) SANS 10098-1 and 10098-2, "Public Lighting".
- d) Government notices.
- e) The local Municipal By-laws and any special requirements of the local supply authorities.
- f) The local Fire Office Regulations.
- g) Telkom Regulations
- h) Any special conditions specified in this specification.

It must be clearly understood that, where differences in the Generals occur as stated in (a), (b), (c), (d), (e) and (f) or where additional requirements are required, the higher General requirements shall apply.

In the event of any contradiction between (a), (b), (c), (d), (e) and (f), then (f) shall be accepted above the rest.

Where any required by-law or regulation, which applies or becomes applicable during the execution of the electrical installation, is in conflict with the stipulation of the document, the former must have preference in all cases. The contractor must immediately notify the Engineer of such discrepancies.

The contractor may not make any alterations to the installation before written sanction to do so is received from the Engineer or its representative.

### **F3.2. NOTICES AND FEES**

The Contractor shall give all notices required by and pay all necessary fees, including any inspection fees, which may be due to the local Supply Authority.

On production of the official account, only the net amount of the fee charged by the Supply Authority for connection of the installation to the supply mains, will be refunded to the Contractor by the Client.

The Contractor shall issue all notices and make the necessary arrangements with the Supply Authority, the local municipality, SANRAL and any other authority as may be required with respect to the installation.

### **F3.3. TESTS**

After completion of the works and before first delivery is taken, a full test will be carried out on the installation for a period of 30 days to determine the satisfactory working thereof. During this period the installations will be inspected, and the contractor shall make good, to the satisfaction of the Engineer, any defects which may arise.

The contractor shall provide all instruments and equipment required for testing and any water, power and fuel required for the commissioning and testing of the installations at completion.

Tests as stipulated in the "Occupational Health and Safety Act no. 85 of 1993, as amended, and in the "Code of Practice for the Wiring of Premises" SANS 10142-1 (as amended), must be done. These test report forms must be filled in fully and correctly in ink, signed by the installation electrician and handed to the Engineer or its representative.

Tests must be conducted on site after the whole installation is complete, unless written the Engineer to the contrary grants permission. The tests must include a full-load test for an adequate period to ensure the satisfactory working of the installation. If negative test results are obtained, faults must be rectified and tests again done.

The contractor must supply all testing apparatus, correctly calibrated.

All tests shall be carried out in conjunction with and to the satisfaction of the Supply Authority and in the presence of the Engineer or his representative. The contractor shall make all arrangements for testing and inspection, the costs thereof being included in the Tender Price.

Each length of cable shall be tested for insulation and polarity by means of a 1000 Volt insulation tester designed for that purpose. In the case of underground cables this shall be done before back filling. In addition, the earth-loop impedance of each conductor earth electrode shall be measured. The earth resistance shall be tested by means of an approved instrument.

"Danger" notices shall be displayed at remote ends of cables under test.

The contractor shall ensure that the installation is completed in every respect and that there are no major defects prior to notifying the Engineer (in writing) for a first delivery inspection. The Engineer will accept zero minor defects during the final inspection. Should the number of defects be exceeded at the final inspection then the Engineer will terminate that inspection and request that the contractor arrange an additional final inspection.

#### **F3.4. MAINTENANCE OF INSTALLATIONS**

With effect from the date of the First Delivery Certificate the contractor shall at his own expense undertake the regular servicing of the installation during the Defects Liability Period and shall make all adjustments necessary for the correct operation thereof.

If during the said period the installation is not in working order for any reason for which the contractor is responsible, or if the installation develops defects, the contractor shall immediately, upon being notified thereof, take steps to remedy the defects and make any necessary adjustments.

Should such stoppages however be so frequent as to become troublesome, or should the installation otherwise prove unsatisfactory during the said period the contractor shall, if called upon by the Engineer or the Employer, at his own expense replace the whole of the installation or such parts thereof as the Engineer or the Employer may deem necessary, with apparatus specified by the Engineer or the Employer.

#### **F3.5. SCHEDULE OF FITTINGS**

In all instances where schedule of light, socket outlet and power points are attached to or included on the drawings, these schedules are to be regarded as forming part of the specification.

#### **F3.6. QUALITY OF MATERIALS**

Only materials of first class quality shall be used and all materials shall be subject to the approval of the Employer. Specifications for various materials to be used on this Contract are attached to and form part of this specification.

Wherever applicable the material is to comply with the relevant South African National Standards, specifications, or to British Standard Specifications, where no SANS Specifications exist.



Materials wherever possible, must be of South African manufacture.

### **F3.7. WORKMANSHIP AND STAFF**

Except in the case of electrical installations supplied by a single-phase electricity supply at the point of supply, an accredited person shall exercise general control over all electrical installation work being carried out.

The workmanship shall be of the highest grade and to the satisfaction of the Employer.  
All inferior work shall, on indication by the Employer's inspecting officers, immediately be removed and rectified by and at the expense of the Contractor.

### **F3.8. CERTIFICATE OF COMPLIANCE BY AN ACCREDITED PERSON**

On completion of the electrical installation the contractor shall complete the Certificate of Compliance for the electrical Installation in the form of Annexure 1 as described in the Occupational Health and Safety Act no. 85 of 1993, as amended, and obtainable from the Department of Labour of South Africa. This form must be handed to the Engineer or its representative.

### **F3.9. CABLE SLEEVE PIPES**

Where cables cross under roadways, other services and where cables enter buildings, the cables shall be installed in high-density polyethylene pipes or heavy duty class 34 uPVC sleeves with a wall thickness of not less than 1,5mm thick and a smooth finish inside. The ends of all sleeves shall be sealed with a non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed with a draw wire inserted.

Cable sleeves shall be provided where shown on the drawings and wherever necessitated by installation conditions. Sleeves shall be of steel water pipe when traversing railways sidings, heavy duty tarmac, loading areas, etc.; they shall be of other approved materials where traffic loading is lighter. Cable sleeves shall not be less than 100mm internal diameter unless specifically noted otherwise in the Project Specification; they shall be of continuously smooth bore with no snags or hitches en route and shall encompass only easy sweeping bends permitting the easy passage of the heaviest cable involved. No cable sleeve shall exceed ten meters without a manhole draw position, unless authorized in writing by the Engineer.

Cable sleeves entering a floor cable duct shall be swept gently to the level of the bottom of the trench so that cables do not kink at entry to the trench. Cable sleeves brought to switchboards or distribution boards having no associated floor cable ducts, or brought to rising cable ducts shall be swept up easily so that the cable emerges vertically from the floor. In cases where the emerging cable is exposed to view, wooden dams shall be fitted round the cable at the top of the sleeve, and the floor screeded completely round the cable. The outer ends of cable sleeves entering buildings shall, after drawing in the cables, be water proofed with cable compound of low melting point. Sweeping bends shall be installed where sleeves enter distribution boards. Sharp sleeve bends are not acceptable.

Cables attached to external walls must be placed in a recessed galvanized pipe from 300mm below ground level into the meter box or into roof spaces complete with brass bushes at both ends. The ends of all sleeves shall be sealed with a non-hardening watertight compound after the installation of cables. All sleeves intended for future use shall likewise be sealed.

### **F3.10. ELECTRICAL EQUIPMENT**

All equipment and fittings supplied must be in accordance with the attached specifications, suitable for the relevant supply voltage, and frequency and must be approved by the Employer's representative.

### **F3.11. DRAWINGS**

The drawings generally show the scope and extent of the proposed work and shall not be held as showing every minute detail of the work to be executed.

The position of power points, switches and light points that may be influenced by built-in furniture must be established on site, prior to these items being built in.

### **F3.12. BALANCING OF LOAD**

The Contractor is required to balance the load as equally as possible over the multiphase supply.

### **F3.13. SERVICE CONDITIONS**

All plant and equipment shall be designed for the climatic conditions appertaining to the service.

### **F3.14. LIGHT FITTINGS AND LAMPS**

The installation and mounting of luminaires must conform to the manufacturer's requirements. All fittings to be supplied by the Contractor shall have the approval of the Engineer / Employer. The light fittings must be of the type specified in the Schedule of Light Fittings.

### **F3.15. EARTHING AND BONDING**

The Contractor will be responsible for all earthing and bonding of the building and installation. The earthing and bonding is to be carried out strictly as described this specification and to the satisfaction of the Employer's representative.

### **F3.16. MAINTENANCE OF ELECTRICAL SUPPLY**

All interruptions of the electrical supply that may be necessary for the execution of the work, will be subject to prior arrangement between the Contractor and the user Employer and the Employer's representative.

### **F3.17. SUPPLY AND CONNECTION**

The supply will be as specified in the Project Particular Specifications.

The Contractor must arrange in good time with the local supply authority for the installation of the Power Supply and meter point and submit the account to the Employer's Regional Office for payment.

The Contractor will be responsible for the supply and installation of the supply cable from the meter box to the main LV distribution board (MDB). The size and length of the cable is listed in the Schedule of Cables and measured in the Bills of Quantities.

### **F3.18. CABLES**

The Contractor shall supply and completely install all distribution cables as indicated on the drawings, and listed in the Schedule of Cables.

The storage, transportation, handling and laying of the cables shall be according to first class practice, and the contractor shall have adequate and suitable equipment and labour to ensure that no damage is done to cables during such operations.

The cable-trenches shall be excavated to a depth of 0,6m deep below ground level and shall be 450mm wide for one to three cables, and the width shall be increased where more than three cables are laid together so that the cables may be placed at least two cable diameters apart throughout the run. The bottom of the trench shall be level and clean and the bottom and sites free from rocks or stones liable to cause damage to the cable.

The Contractor must take all necessary precautions to prevent the trenching work being in any way a hazard to the personnel and public and to safeguard all structures, roads, sewage works or other property on the site from any risk of subsidence and damage.

In the trenches the cables shall be laid on a 75mm thick bed of earth and be covered with a 150-mm layer of earth before the trench is filled in.

All joints in underground cables and terminations shall be made by means of approved epoxy-resin pressure type jointing kits. Epoxy-resin joints must be made entirely in accordance with the manufacturer's instructions and with materials stipulated in such instructions. Low voltage PVC cables are to be made off with sealing glands and materials designed for this purpose which must be of an approved make. Where cables are cut and not immediately made off, the ends are to be sealed without delay.

The laying of cables shall not be commenced until the trenches have been inspected and approved. The cable shall be removed from the drum in such a way that no twisting, tension or mechanical damage is caused and must be adequately supported at intervals during the whole operation. Particular care must be exercised where it is necessary to draw cables through pipes and ducts to avoid abrasion, elongation or distortion of any kind. The ends of such pipes and ducts shall be sealed to approval after drawing in of the cables.

Backfilling (after bedding) of the trenches is to be carried out with a proper grading of the material to ensure settling without voids, and the material is to be tamped down after the addition of every 150mm. The surface is to be made good as required.

On each completed section of the laid and jointed cable, the insulation resistance shall be tested to approval with an approved type instrument of not less than 500 V for low tension Cables.

Earth continuity conductors are to be run with all underground cables constituting part of a low voltage distribution system. Such continuity conductors are to be stranded bare copper of a cross-sectional area equal to at least half that of one live conductor of the cable, but shall not be less than 4mm<sup>2</sup> or more than 70mm<sup>2</sup>. A single earth wire may be used as earth continuity conductor for two or more cables run together, branch earth wires being brazed on where required.

The sizes and routes of low voltage cables are indicated on the drawings and in these documents. Low voltage cables shall be PVC SWA ECC type with Copper conductors which shall comply with the requirements of SANS 1507 and those of the Standard Specification in all respects. All new cables shall be provided with enhanced armouring suitable for E.C.C. use and cable glands are to be provided complete with E.C.C. connection washers to allow for correct earthing techniques to be followed, as specified.

Tenderers must base their cost for trenching in earth. Payment for cable trenching having a greater volume than that specified for the purpose will not be considered except where extra excavations are necessary to by-pass obstacles such as water pipes, drains, large boulders etc. In all such instances the amount of the extra excavations must be agreed upon on site between the Engineer or his representative/agent and the contractor.

Cables shall be labelled, cable routes marked and terminated as per the requirements of the Standard Specification (Labels and Notices).

The electrical contractor shall determine the present cable routes of all existing underground cables as and when required for the contract work and shall allow for this requirement as part of his tender sum. The dielectric shall consist of PVC suitable for general use, 600/1000V grade. It shall be distinctly coloured as detailed in Table I of SANS 1507 so as to identify the phase, neutral

The phase conductors being coloured red, white or blue, the neutral conductor black and the earth conductor green/yellow or green.

The whole of the dielectric shall be coloured - surface painting or a longitudinal coloured stripe is not acceptable.

### **F3.18.1 CABLE MARKERS**

The necessary number of cable markers must be installed so as to indicate the route of

underground cables, as on the drawings. Where the direction of cables changes, this must be indicated on the surface by means of cable markers. Cable markers must be concrete pyramids, with measurements of 150mm x 150mm on the top and 250mm x 250mm at the bottom. Their height must be 300mm.

Brass plates must be cast into the tops of these pyramids in such a way that they cannot be removed easily. The words "ELECTRIC CABLE" must be punched onto these plates as well as the voltage of the cable and an arrow indicating the direction of the cable routes.

The cable must be linked to the cable marker by a galvanized wire cast in the cable marker. Cable markers must be placed on the surface above all underground cables and must stand out 35mm above ground level, unless they are a danger to pedestrians or traffic, in which case the tops of the markers must be flush with the level of the ground. Cable markers must be placed at the beginning and end of each cable route (e.g. where a cable goes into a cable kiosk or a building); at changes of direction; at all joints; above cable sleeve inlets and outlets, and along the whole cable route at distances not exceeding 50 meters. Low voltage cables shall be laid at a depth of 600mm under final ground level.

### **F3.18.2TAPE ABOVE CABLE**

**For all cables, a coloured plastic-marking tape shall be installed 200mm above the cable. The tape shall be yellow, with red skull and crossbones with the words "ELECTRIC CABLE ". These markings shall not be more than 1m apart from centre to centre.**

### **F3.18.3EXCAVATION**

The contractor shall be responsible for all trenching excavations unless specified to the contrary.

### **F3.18.4LAYING, JOINTING AND MAKING OFF OF ELECTRICAL CABLES**

1. The use of the term "Inspector", includes the engineer or inspector of the Employer or an empowered person of the concerned supervising consulting engineer's firm.
2. No cable is to be laid before the cable trench is approved and the soil qualification of the excavation is agreed upon by the Contractor and inspector.
3. After the cable has been laid and before the cable trench is back-filled the inspector must ensure that the cable is properly bedded and that there is no undesirable material included in the bedding layer.
4. All cable jointing and the making off of the cables must only be carried out by qualified experienced cable jointers. Helpers of the jointers may not saw, strip, cut, solder, etc. The cable and other work undertaken by them must be carried out under the strict and constant supervision of the jointer.
5. Before the Contractor allows the jointer to commence with the jointing work or making off of the cable (making off is recognized as half a joint) he must take care and ensure:
  - 5.1 that he has adequate and suitable material available to complete the joint properly and efficiently. Special attention must be given to ensure the cable furrules and cable lugs are of tinned copper and of sufficient size. The length of the jointing lugs must be at least six times the diameter of the conductor,
  - 5.2 that the joint pit is dry and that all loose stones and material are removed,
  - 5.3 that the walls and banks of the joint pit are reasonable firm and free from loose material which can fall into the pit,
  - 5.4 that the necessary coffer-dams or retaining walls are made to stop the flow of water into the joint pit,
  - 5.5 that the joint pit is provided with suitable groundsheets so that the jointing work is carried out in clean conditions,
  - 5.6 that the necessary tents or sails are installed over the joint pit to effectively avert unexpected rainfall and that sufficient light or lighting is provided,
  - 5.7 that the necessary means are available to efficiently seal the jointing or cable end when an unexpected storm or cloudburst occurs, regardless of how far the work has progressed,
  - 5.8 that the cables and other materials are dry, undamaged and in all respects are suitable for the joint work or making off,
6. Before the paper-insulated cables are joined, they must be tested for the presence of moisture by the cable jointers test. This consists of the insertion of a piece of unhandled

insulated impregnated paper tape in warm cable oil heated to a temperature of  $130 \pm 5^{\circ}\text{C}$ .

Froth on the surface of the oil is an indication that moisture is present in the impregnated insulation and the amount of the froth gives an indication of the moisture present.

7. If the cable contains moisture or is found to be otherwise unsuitable for jointing or making of the inspector is to be notified immediately and he will issue the necessary instruction to cope with the situation.

8. The joint or making off of paper insulated cables must not be commenced during rainy weather.

9. Once a joint is in progress the jointer must proceed with the joint until it is complete and before he leaves the site.

10. The jointer must ensure that the material and his tools are dry at all times, reasonably clean and absolutely free from soil.

11. Relating to the jointing of the cable the following requirements apply:

11.1 All jointing must be carried out in accordance with recognized and tried techniques and comply strictly with the instructions given by the supplier of the jointing kit.

12. As far as cable end boxes are concerned the requirements as set out above are valid where applicable.

### **C3.19. DISTRIBUTION KIOSKS**

#### **1. General**

All distribution kiosks and equipment shall comply with the requirements of the Standard Specification. Before the commencement of manufacture, detailed drawings of the proposed panels and boards are to be submitted to the Engineer or his representative/ agent for approval. Full schematic details of the layout and wiring of the boards are to be provided with these drawings.

Kiosks, constructed of sheet metal, shall be waterproof and spacious enough to accommodate all equipment as described in the schedules. Sheet metal shall be galvanized. Welding materials shall be of the same quality as the base metal.

Ventilation slots or louvers fitted with gauze wire shall be provided at the doors or sides of all kiosks. All vents shall be vermin proof.

Doors shall open  $180^{\circ}$  and shall be fitted with approved locks, which shall be of the 40mm approved by the Engineer with hardened brass hasps and rust resistant mechanisms. Access to the kiosk from the back shall be possible through doors.

All Kiosk doors shall be equipped with a covered, tamper free, lock system for padlock that cannot be cut by a bolt cutter.

The gland plate shall be manufactured of hot dipped, galvanised steel of 3mm minimum thickness. Sufficient holes shall be pre-punched for the number and sizes of cables specified.

The galvanized finish off all kiosks on the interior and exterior and on the panels on which switch gear is to be mounted shall be of a high quality and shall be suitable for exterior use. Galvanising shall be applied to surfaces prepared in accordance with SANS 121/ISO1461.

Mounting shall be on a concrete plinth of adequate size to provide a skirt of at least 50mm around the unit. The plinth shall be of adequate thickness to protrude 100mm above ground while installed to a minimum depth of 300mm below ground level. The earth shall be properly compacted to prevent the unit from tilting or subsiding.

All equipment in the kiosk, except for the meters, shall be flush-mounted on a panel. These panels shall be fixed by means of peg-and-hole fixing at the bottom and key-operated latches at the top. Suitable handles or knobs shall be installed on the panels to facilitate removal.

A solid copper bus bar shall be provided for each phase and neutral and shall be mounted on appropriately coloured ceramic or similar insulators. The colours of insulators shall correspond with the phase colours that are red, yellow, blue and black for the neutral. Bus bars shall be easily reachable.

Except where otherwise prescribed, the minimum dimensions of the Bus bars shall be 6mm x 25mm x 300mm long. A minimum clearance space of 100mm shall be maintained between bus bars.

Connection to bus bars shall be by using lugs, cadmium plated high tensile steel bolts, washers and nuts. A 6mm x 25mm x 330mm solid copper-earthed bus bar shall be installed with a minimum of eight, 8mm bolts, complete with spring washers, brass washers and nuts. The bus bar shall be provided with internal thread and the heads of the bolts shall be soldered in position at the back.

The gland plate shall be bonded to the earth bar through a 70mm<sup>2</sup> stranded copper conductor. The LV cables shall rise into the unit from below through a plinth opening and shall be fitted to the gland plate with suitable glands. The individual cores of the cables shall be equipped with lugs and connected to the bus bars. Services shall be connected to the three phases to provide a balanced load as far as possible. All wiring shall be neatly bundled with nylon ties and shall be arranged in horizontal and vertical directions only. All meters and circuit breakers shall be labelled with engraved plastic labels at least 1mm thick with 12mm letter size labels and shall be fitted to slide in frames. All kiosks shall be clearly marked to indicate the name and/or number of the kiosk and from where the kiosk is fed and the size of the feeder cable.

Danger notices type WS7 to SANS 1186 manufactured from plate aluminium, measuring approximately 150mm x 150mm, shall be fitted to each door in a central easily visible position. Brass bolts and nuts shall be used to mount all ancillaries.

The technical specifications of the kiosk shall comply with all relevant SANS standards. The Kiosk to be suitable for use and shall be a fully galvanised or 3CR12 unit. An anti-theft locking mechanism shall be included as part of the kiosk.

The kiosk must be earthed by means of an earth spike/s and 70mm<sup>2</sup> earth wire. Earthing to be carried out and tested in terms of SANS 10142. If earth resistivity is not achieved, further earth spikes and or earth wire to be installed to achieve the specified minimum readings. Rails shall be mounted in the LV compartment to accommodate the following LV equipment. The circuit breakers and switchgear shall be included in the rate. Each street light kiosk shall include the following equipment as per details on the drawings or schematic. The contractor shall arrange for an inspection of the kiosk/s by the Engineer before delivery.

## 2. LV Distribution Kiosk Components

The kiosk must be earthed by means of an earth spike/s and 70mm<sup>2</sup> earth wire. Earthing to be carried out and tested in terms of SANS 10142. If earth resistivity is not achieved, further earth spikes and or earth wire to be installed to achieve the specified minimum readings. Rails shall be mounted in the LV compartment to accommodate LV equipment. The circuit breakers and switchgear shall be included in the rate. All kiosks to be standardized and manufactured for 3 phase supply and 3 phase circuits.

Each street light kiosk shall include the following equipment as per details on the drawings or schematic.

- 1 x 63amp 3 pole on-load main circuit breaker
- 1 x set 3P+N Surge arresters
- 9 x 32amp 1 Phase streetlight circuits.
- 1 x 32amp 3 Phase streetlight circuit.
- 1 x 20amp 3 pole spare circuit breaker
- 1 X 63amp 1 phase ELU, 3 x 20amp CB's + 1 x 16 amp SSO 1 x concrete base per kiosk manufacturer's approval
- 1 x daylight switch complete with control circuit to contactors 3 x 32amp 3 pole AC1 contactors
- 1 x 5amp 1 pole CB, 1 x bypass circuit breaker

The colour finish of the kiosk shall be Moss Green. RAL 6005

## 3. Anti-Vandal Kiosk

The anti-vandal LV kiosk shall be specified for use at areas where vandalism is deemed as MEDIUM risk.

The technical specifications of the kiosk shall comply with all relevant SANS standards.  
The Kiosk to be minimum IP65 rated and suitable for use and shall be a fully 3CR12 stainless steel unit.

In addition to the standard equipment required in the LV Distribution kiosk, the anti-vandal kiosk must include:

- (i) 2 x keyed alike 61mm black all weather brass lock with a strength rating of >5,
- (ii) Security cage and fence around the kiosk.

Each Kiosk to be provided with 2 x locks and the cage to be provided with 4 x locks. All Locks provided for kiosks under this package to be of the Master lock and key alike type.

The entire enclosure (enclosure shell, roof, doors) shall be manufactured with 3mm (minimum thickness) 3CR12 (Corrosion Resistance Steel). Inner equipment mounting plates shall be 2mm 3CR12 steel.

The kiosk and cage must be earthed by means of an earth spike/s and 16mm<sup>2</sup> earth wire. Earthing to be carried out and tested in terms of SANS 10142. If earth resistivity is not achieved, further earth spikes and or earth wire to be installed to achieve the specified minimum readings.

Rails shall be mounted in the LV compartment to accommodate the LV equipment as per the kiosk schematic or with minimum requirements as noted. The circuit breakers and switchgear shall be included in the rate.

All set screws, nuts and spring washers for fitment of different parts or equipment inside the enclosure shall be stainless steel.

Enclosures shall be properly prepared in the correct manner and powder coated for protection against corrosion. The doors' surrounds shall incorporate a splash-proof sill around the inner border of the door opening of the kiosk. The enclosure shall be weather proof and safe to operate in any weather condition. Enclosures shall be adequately earthed.

The enclosures shall be manufactured from quality steel and capable of withstanding the mechanical, electrical and thermal stresses as well as the effects of humidity which are likely to be encountered in the services and at the same time ensuring the desired degree of safety.

The enclosure shall be free standing on the ground and properly mounted on an anti-vandal concrete plinth. The Enclosures shall be adequately protected against rust, dust and corrosion both from inside and outside.

The fabrication of material shall be done in such a way that there is a good finish of fabricated /moulded material. The material shall be fabricated/moulded accurately to adhere to dimensions as per the drawings. The enclosure shall be fabricated / welded such that the rain water does not enter the enclosure. A Danger notice shall be fitted on all doors. There shall be no external holes and the complete kiosk shall be robust and vandal proof. The unit shall be vermin and bug proof.

## **SANRAL ANTI-VANDAL KIOSK MINIMUM REQUIREMENTS**

### **DEPTH (mm)WIDTH (mm)HEIGHT (mm)**

- (a) Construction material
  - Enclosure Material (shell, roof and doors) 3mm 3CR12
  - Gland Plates 2mm 3CR12
  - Inner electrical equipment mounting plates 2mm 3CR12
- (b) Installation requirements
  - The enclosure should be fitted onto a suitable concrete plinth which is planted as specified.

The enclosure door/s should NOT face the road side to ensure that the field operator faces the road when working on the kiosk.

Kiosks should be visible from road to restrict opportunities of vandalism.

(c) Doors

Reinforced doors must be mounted and recessed inward by no less than 3mm. The door shall be flush with the box frame. Doors shall be manufactured with minimum 3.0mm 3CR12 and to be the same type of steel as the rest of the enclosure shell.

There shall be no external hinges or holes. Hinges and doors shall be robust and vandal proof

Doors shall be marked in the inside as well.

The door's surrounds shall incorporate a splash-proof sill around the inner border of the door opening of the kiosk.

The lock covers on the outside of the doors to be used for easy opening and closing the enclosure door

The doors shall be fitted to be vermin proof.

(d) Hinges (durable and vandal proof)

Hinges Holding Bracket: 2 x Internal hinges per door

Hinges Material: 3CR12

Hinge Load Capacity:  $\pm 100\text{kg}$  per hinge

(e) Sturdy door stays

Material: Stainless Steel

Door open stay position:  $90^\circ$  Minimum

(f) Roof: general requirements

The roof of the enclosure shall be sloping to allow water to run off.

The roof shall be manufactured with the same thickness of steel and steel type as the rest of the enclosure shell.

The roof shall be permanently secured onto the enclosure shell to form part of the enclosure as a complete unit.

The roof shall only have an overhang on the door sides, but should be fitted flush against the non-door sides

There shall be no external holes and the roof shall be robust and vandal proof. The roof shall be vermin and bug proof.

(g) Ventilation slots / louvers

Ventilation slots / louvers shall be machine punched on the sides of the enclosure shell to prevent condensation build-up, provide cross flow venting for natural draft ventilation and to remove excess heat build-up.

The ventilation slots shall be covered in the inside of the enclosure with a corrosion proof stainless steel wire mesh screen.

The ventilation slots shall be robust and vandal proof.

The ventilation slots shall be designed to prevent the ingress of rain, bugs, debris and shall be vermin proof.

Ventilation shall be adequate to allow that all installed equipment inside the enclosure shall operate normally in temperatures between  $-10^\circ\text{C}$  and  $60^\circ\text{C}$ .

The Enclosure shall be constructed to allow adequate dissipation of heat. Ventilation of the enclosure shall not compromise the security of the enclosure and the equipment housed there-in.

(h) Gland plates

Gland plates will be secured onto the chassis frame with the required stainless-steel bolts, nuts and washers

Knockout gland holes will be provided on the plates.

The knockouts shall be spot welded onto the gland plate and shall be easy removable during cable installation.

Gland Plates must not be powder coated.



- (i) Lifting lugs / hooks  
Lifting lugs shall be adequately welded on the sides of the roof of the enclosure to enable installation / removal of the enclosure with means of a lifting crane using relevant d-shackles and slings.

Enclosures shall only be moved into position safely and securely by means of lifting lugs. These lifting hooks shall be designed to hold twice the actual weight of the enclosure.

- (j) Security cage  
Cages to be constructed of a 50mm square tube frame with 20mm square tube frames with maximum openings of 100mm x 100mm. Access locks to be enclosed by means of vandal proof covers welded to the cage. All hinges and lock covers to be welded and installed in a way to prevent it being vandalised. The full frame to be hot dip galvanised to SANS 121 and painted.

Cages to be bolted to the concrete base in a way to prevent removal from outside of the fence.

Each security cage to have:

- (i) 4 x keyed alike 61mm black all weather brass lock with a strength rating of >5,
- (k) Security fence  
Anti-vandal fencing is to be secured onto the cage frame on the outside. Fence type to be galvanised Razor Ripper Wire welded to the cage frame. Openings of the Razor Ripper Wire to be maximum 300mm high and 150mm wide.

#### 4. Anti-Vandal Kiosk with Electronic Security

The anti-vandal LV kiosk with Electronic Security shall be specified for use at areas where vandalism is deemed as HIGH risk.

The technical specifications of the kiosk shall comply with all relevant SANS standards.

The Kiosk to be minimum IP65 rated and suitable for use and shall be a fully 3CR12 stainless steel unit with separate electrical and electronic sections.

In addition to the standard equipment required in the LV Distribution kiosk, the anti-vandal kiosk with electronic security must include:

- (i) 2 x Electronic locks on the kiosk
- (ii) Security cage and fence around the kiosk.
- (iii) 2 x electronic locks on the cage, including bypass
- (iv) 1 x Vibration sensor on the kiosk and 1 x vibration sensor on the cage,
- (v) UPS Backup - Minimum 2 Hrs for electronic equipment.

The entire enclosure (enclosure shell, roof, doors) shall be manufactured with minimum 3mm (minimum thickness) 3CR12 (Corrosion Resistant Steel). Inner equipment mounting plates shall be 2mm 3CR12 steel.

The kiosk and cage must be earthed by means of an earth spike/s and 16mm<sup>2</sup> earth wire. Earthing to be carried out and tested in terms of SANS 10142. If earth resistivity is not achieved, further earth spikes and or earth wire to be installed to achieve the specified minimum readings.

Rails shall be mounted in the LV compartment to accommodate the LV equipment as per the kiosk schematic or with minimum requirements as noted below. The circuit breakers and switchgear shall be included in the rate.

All set screws, nuts and spring washers for fitment of different parts or equipment inside the enclosure shall be stainless steel.

Enclosures shall be properly prepared in the correct manner and powder coated for protection against corrosion.

Each kiosk shall be provided with 2 x doors, one for the electrical equipment and other for

the electronic equipment. The doors shall be on opposite sides of each other. A timber backing board in the centre of the kiosk shall separate the electrical and electronic equipment.

The doors' surrounds shall incorporate a splash-proof sill around the inner border of the door opening of the kiosk.

The enclosure shall be weather proof and safe to operate in any weather condition Enclosures shall be adequately earthed.

The enclosures shall be manufactured from quality steel and capable of withstanding the mechanical, electrical and thermal stresses as well as the effects of humidity which are likely to be encountered in the services and at the same time ensuring the desired degree of safety.

The enclosure shall be free standing on the ground and properly mounted on an anti-vandal concrete plinth.

The Enclosures shall be adequately protected against rust, dust and corrosion both from inside and outside.

The fabrication of material shall be done in such a way that there is a good finish of fabricated /moulded material. The material shall be fabricated/moulded accurately to adhere to dimensions as per the drawings.

The enclosure shall be fabricated / welded such that the rain water does not enter the enclosure. A Danger notice shall be fitted on all doors. There shall be no external holes and the complete kiosk shall be robust and vandal proof. The unit shall be vermin and bug proof.

## SANRAL ANTI-VANDAL KIOSK MINIMUM REQUIREMENTS

DEPTH (mm)WIDTH (mm)HEIGHT (mm)

### (a) Construction material

Enclosure Material (shell, roof and doors)3mm 3CR12

Gland Plates2mm 3CR12

Inner electrical equipment mounting plates2mm 3CR12

### (b) Installation requirements

The enclosure should be fitted onto a suitable concrete plinth which is planted as specified.

The enclosure door/s should NOT face the road side to ensure that the field operator does not have their back facing the road when working on the kiosk.

Kiosks should be visible from road to restrict opportunities of vandalism.

### (c) Doors

Reinforced doors must be mounted and recessed inward by no less than 3mm. The door shall be flush with the box frame.

Doors shall be manufactured with minimum 3.0mm 3CR12 and to be the same type of steel as the rest of the enclosure shell.

There shall be no external hinges or holes. Hinges and doors shall be robust and vandal proof Doors shall be marked on the inside as well.

The door's surrounds shall incorporate a splash-proof sill around the inner border of the door opening of the kiosk.

A pull handle / knob shall be welded onto the outside of the doors on the opposite side of the hinges in the middle of the vertical dimension of the door for easy opening and closing the enclosure door

The doors shall be fitted to be vermin proof.

### (d) Hinges (durable and vandal proof)

Hinges Holding Bracket:2 x Internal hinges per door

Hinges Material:3CR12

Hinge Load Capacity:±100kg per hinge

### (e) Sturdy door stays

Material:Stainless Steel

Door open stay position:90° Minimum

### (f) Roof: general requirements

The roof of the enclosure shall be sloping to allow water to run off.

The roof shall be manufactured with the same thickness of steel and steel type as the rest of the enclosure shell.

The roof shall be permanently secured onto the enclosure shell to form part of the enclosure as a complete unit.

The roof shall only have an overhang on the door sides, but should be fitted flush against the non-door sides

There shall be no external holes and the roof shall be robust and vandal proof. The roof shall be vermin and bug proof.

(g) Ventilation slots / louvers

Ventilation slots / louvers shall be machine punched on the sides of the enclosure shell to prevent condensation build-up.

Cross flow venting for natural draft ventilation and to remove excess heat build-up.

The ventilation slots shall be covered in the inside of the enclosure with a corrosion proof stainless steel wire mesh screen.

The ventilation slots shall be robust and vandal proof.

The ventilation slots shall be designed to prevent the ingress of rain, bugs, debris and shall be vermin proof.

Ventilation shall be adequate to allow that all installed equipment inside the enclosure shall operate normally in temperatures between -10°C and 60°C.

The Enclosure shall be constructed to allow adequate dissipation of heat. Ventilation of the enclosure shall not compromise the security of the enclosure and the equipment housed there-in.

(h) Gland plates

Gland plates will be secured onto the chassis frame with the required stainless-steel bolts, nuts and washers.

Knockout gland holes will be provided on the plates.

The knockouts shall be spot welded onto the gland plate and shall be easy removable during cable installation.

Gland Plates must not be powder coated.

(i) Lifting lugs / hooks

Lifting lugs shall be adequately welded on the sides of the roof of the enclosure to enable installation / removal of the enclosure with means of a lifting crane using relevant d-shackles and slings.

Enclosures shall only be moved into position safely and securely by means of lifting lugs

These lifting hooks shall be designed to hold twice the actual weight of the enclosure.

(j) Security cage

Cages to be constructed of a 50mm square tube frame with 20mm square tube screen with maximum openings of 100mm x 100mm. Access locks to be enclosed by means of vandal proof covers welded to the cage. All hinges and lock covers to be welded and installed in a way to prevent it being 22 galvanized. The full frame to be hot dip 22 galvanized to SANS 121 and painted.

Cages to be bolted to the concrete base in a way to prevent removal from outside of the fence.

Each security cage to have:

(i) 2 x vandal-proof, electronically controlled locks. A vandal resistant bypass system to be incorporated in case of electronic failure.

(k) Security fence

Anti-vandal fencing is to be secured onto the cage frame on the outside. Fence type to be galvanised Razor Ripper Wire welded to the cage frame. Openings of the Razor Ripper Wire to be maximum 300mm high and 150mm wide.

### **F3.20. LABELLING AND ASSET TAGGING**

All Luminaires, poles, Mini subs and Distribution kiosks shall be labelled as specified in the Standard Specification (Labels and Notices).

Labels must indicate the functions of equipment and components in the distribution boxes and/or distribution boards.

The terminology on the identification labels must be in English.

The contractor shall arrange for the labelling of all equipment, instruments, meters, relays, cables, etc., as indicated below.

Where identical items of equipment can be removed from their housings, e.g. MV circuit breaker carriages, plug-in relays etc., both the fixed and withdrawal portion are to be labelled identically. All labels shall be of a non-corrosive material or other back engraved white on black labels of the sizes indicated. They are to be located in purpose made holders or otherwise are to be screwed or riveted into position. "Dymo" tape or similar labels will not be accepted nor will labels, which are glued in position only. Labels on light poles shall comprise a black on yellow PVC sticker with the designated number. These labels shall be stuck onto the pole 4.0m above ground level facing direction of vehicle travel to ensure easy identification by maintenance personnel.

Prior to any equipment being labelled, the contractor shall request the Engineer to provide a complete labelling schedule for all items of equipment. Under no circumstances is equipment to be labelled in accordance with the tender drawings since any description thereon is for identification purposed during construction only and is unlikely to apply to the completed Works.

This size shall be used to designate the conductor size and number of cores of each cable installed under this Contract. In addition, all feeder cables shall be labelled at both ends indicating from where/to cables are feeding.

All kiosks shall be provided with a label in both official languages reading "In case of leakage or accidental contact, put off main switch immediately". All kiosks shall be provided with notices as required by the Occupational Health and Safety Act. All doors to such locations shall be fitted with the appropriate notices. Where more than one similar item of equipment is fed from the same board or control panel, the item itself shall be labelled, this being fixed in a permanent position, i.e. not attached to motors, pumps, etc., but to bases or adjacent thereto. The lettering shall be 50mm high. All poles, cables, Distribution kiosks, min-sub, transformers and equipment must be labelled and have the statutory labels as per SANS prominently visible. All SANRAL poles, Distribution kiosks, min-sub and transformers must be labelled with an asset tag. Every Lighting structure, Kiosk, Transformer, Mini-substation, Substation and cable on a project must be asset tagged with all components labelled as specified below. All notices, labels or rating plates that are required in terms of SANS 10142 shall be durable and not removable except by determined and deliberate action. The inscriptions shall be legible and indelible. Equipment not detailed below shall be labelled or tagged in a similar way as specified.

#### **(a) Labelling**

Labels must indicate the functions of equipment and components in the distribution boxes and/or distribution boards.

The terminology on the identification labels must be in English.

The contractor shall arrange for the labelling of all equipment, instruments, meters, relays, cables, etc., as per SANS 10142-1 with additional requirements as indicated below.

Where identical items of equipment can be removed from their housings, e.g. MV circuit breaker carriages, plug-in relays etc., both the fixed and withdrawal portion are to be labelled identically.

All labels shall be of a non-corrosive material or other back engraved white on black labels of the sizes indicated. They are to be located in purpose made holders or otherwise are to be screwed or riveted into position. "Dymo" tape or similar labels will not be accepted nor will labels, which are glued in position only.

Prior to any equipment being labelled, the contractor shall provide the Engineer a complete labelling schedule for all items of equipment for approval. Under no circumstances is equipment to be labelled in accordance with the tender drawings since any description thereon is for identification purposed during construction only and is unlikely to apply to the completed Works.

The following list indicates the general labelling requirements but does not limit the extent of labelling required, which shall encompass the full extent of the equipment supplied, or in the case of existing equipment, any such which is affected by this Contract.

50mm high lettering: -

- Substation and mini sub designation.
- Outdoor switch gear designation.
- Transformer designation.
- Distribution kiosk and fused feeder panel designation.
- Lighting Structures

20mm high lettering: -

- Main or sub-main board designation.
- Control panel designation.
- Indoor switch gear designation.

5mm high lettering: -

- Mini sub feeder breakers and isolators.
- Distribution kiosk feeder breakers and isolators.
- General distribution switchgear.

All meters and circuit breakers shall be labelled with engraved plastic labels at least 1mm thick with letter size labels specified and shall be fitted to slide in frames.

All kiosks shall be provided with notices as required by the Occupational Health and Safety Act. All doors to such locations shall be fitted with the appropriate notices.

An A4 copy of the Single Line Diagram (SLD) indicating all the circuits fed from the Kiosk shall be laminated and secured within a slide-in pocket on the inside of the kiosk door. This should be replaceable if the circuit information has changed.

Where more than one similar item of equipment is fed from the same board or control panel, the item itself shall be labelled, this being fixed in a permanent position, i.e. not attached to motors, pumps, etc., but to bases or adjacent thereto. The lettering shall be 50mm high.

#### (b) Asset Tagging

Every Lighting structure, Kiosk, Transformer, Mini-substation, Substation and cable on a project must be asset tagged with components labelled as indicated.

Asset tags to be yellow stick-on labels with black letters. Tag size to be 200mm x 200mm with letter size of 50mm. Where this tag cannot fit on the enclosure, smaller tags can be installed on the approval of the Engineer.

Asset tags must prominently display the road route (eg. N002 for N2), road section number (eg. 25N), and the equipment number.

Each item installed shall be considered as an asset item.

(i)Parent Asset: Major items e.g.:

Lighting Structure  
Kiosk  
Transformer  
Mini-substation  
Substation  
Cables

(ii)Components within a parent Asset:

Lighting Structure: Mast / pole, Luminaire,

Kiosk: Enclosure, Circuit breakers, meters, control circuits. Transformer: Transformer.

Minisub: Transformer, MV & LV circuit breakers, Meters, etc

Sub Station: Building or enclosure, MV Switchgear, DB's, Panels, transformer within substation.

Cables: All cables forming part of the distribution system.

(iii)Description of an Asset:

Lighting Structure: A lighting structure is any structure that has one or more luminaire.

Kiosk: Any street lighting control kiosk or distribution kiosk or meter box. All items within a kiosk will be classified as components of the kiosk.

Transformer: A stand alone transformer.

Mini substation: A complete mini substation including the MV switch, Transformer, LV circuit breakers and components enclosed as one unit.

Substation: The physical building together with its components within.

Cables: All MV and LV cables installed that forms part of the distribution network.

#### (iv) Tag Location

Luminaire: Tags shall be secured on the underside of the luminaire so that it is easily identifiable from the ground by maintenance staff.

Lighting Structure: Asset tags shall be stuck onto the pole 4.0m above ground level facing direction of vehicle travel to ensure easy identification by maintenance personnel.

Where structures are in the median, labels shall be in the direction of travel of increase of the road section numbering. Eg labels should face direction of travel from Route section 25N to 26N.

Kiosk / Transformer / Mini substation: Asset tags shall be stuck onto the equipment at the top half facing direction of vehicle travel to ensure easy identification by maintenance personnel.

Substations: Asset tags shall be stuck onto the top half of the substation door. A substation sign shall be mounted above the door of the substation. All tags to be facing direction of vehicle travel to ensure easy identification by maintenance personnel. Additional substation signage per OHS Act to be prominently displayed at the entrance.

#### (v) Tag Colours:

Lighting structures, Mini substation and kiosk tags shall comprise a black text on yellow PVC sticker with the designated number as per tag dimensions specified.

LED Luminaire shall be tagged with black text on white PVC sticker with the luminaire details as per tag dimensions specified or suitably scaled to fit under luminaire.

#### (vi) Tag Dimensions

Labels letters can be in a 3 tier or 1 tier configuration, dependent on the size of the surface area where the tag is installed. The critical item is a full view of the tag while driving to ensure easy identification by maintenance and security personnel.

N002-25N-L001

#### 3 TIER LABEL

##### (vii) Tag Description

ASSET TAGPART 1

ROUTE

N002-25N-L001 N002 - National

Route 2

N002-25N-K001 N002 - National

Route 2

N002-25N-M001 N002 - National

Route 2

#### 1 TIER LABEL

PART 2PART 3\*

SECTIONASSET NUMBER

25N - Section 25L001 - Light mast

North Directionnumber

25N - Section 25K001 - Kiosk

North Directionnumber

25N - Section 25M001 - Minisub  
North Directionnumber

**\*Part 3 Asset Prefix description**

L - Lighting structure  
K - Kiosk  
T - Transformers  
M - Mini-substation  
C - Cable

**(viii) Lighting Structure Identification**

Lighting structures to be numbered per circuit starting from Kiosk 1, Circuit 1 using consecutive numbers starting at L001. Next Circuit 2 in Kiosk 1 will commence on the next consecutive after the last number in Kiosk 1, circuit 1.

The last number on a lighting structure will indicate the total number of lighting assets on the particular project.

New or additional lights installed after final handover shall be numbered the next number after the last asset number of the system, no matter where or which circuit it is located.

**(ix) Kiosks, Mini-substations and Transformers**

Kiosks, Min-substations and transformers to be numbered using consecutive numbers starting at 001 with a prefix for each type of equipment

**(x) Cable identification**

Cables shall be tagged, cable routes marked and terminated as per the requirements.

All feeder cables shall be tagged at both ends indicating from where/to cables are feeding.

Cables shall be numbered with engraved or other approved tags, which are cable tied onto both ends of the cable. Cable tags must be visible when doors or panels are opened for maintenance or repairs. The label should indicate the source, destination and consecutive cable number. Eg: Cable fed from Kiosk 1, circuit 1 to Kiosk 7 will be K001-K007-C001.

The last cable number will indicate the total number of cable runs on the particular project. Each cable run will be considered as a cable Asset.

**(xi) Luminaire identification**

Lighting outlets are numbered on the drawings.

Each luminaire shall be tagged with the Type, Model and wattage as specified or as implied by the catalogue number of the luminaires specified.

LED Luminaire shall be tagged with black text on white PVC sticker with the luminaire details as per tag dimensions or suitably scaled to fit under the luminaire. The luminaire tag at the final mounted height must be visible from the ground.

### **F3.21. LIAISON**

The electrical contractor shall, in each case, provide the main contractor with all necessary information, dimensions, materials, etc., as called for in the specification, in good time. It is essential that the electrical contractor work in close collaboration with the principal contractor to ensure that where his services run in proximity with other services, there are no clashes.

Failure to comply with the above may mean that corrective measures will have to be taken to correctly position the equipment. Any abortive work resulting will be entirely to the electrical contractor's account. Where the electrical contractor is to provide electrical supplies to control panels forming part of other contract works, it is essential that the electrical contractor liaise fully with the particular contractor who must provide the electrical contractor with all information necessary so as to ensure that the supply cable terminates in the correct position and that the phase rotation complies with the equipment installed.

Failure to do so may result in the electrical contractor being held responsible for the cost of removing and replacing not only his own but also the equipment of the main contractor and other contractors.

### **F3.22. SUPERVISORY STAFF AND IDENTIFICATION**

All work done on site shall at all times be under the direct and full time supervision of a contract manager who shall be a qualified installation electrician who will sign the certificate of compliance. Full particulars of the site organisation, complete with names of officials the Tenderer proposes to allocate to this project are to be submitted with this tender. For the duration of this contract the above detailed officials will be permanently assigned to this project and may only be relieved of their duties after prior agreement by the Engineer or his representative/agent.

Whilst on the site all staff and labourers employed by the electrical contractor shall wear distinctively marked clothing bearing the name of the electrical contractor or his identification logo.

### **F3.23. SETTING OUT OF WORKS**

The electrical contractor shall be responsible for marking out and setting out of all equipment and plant. The position of items of electrical equipment and plant indicated on the drawings are to be taken as approximate. The exact position for fixing shall be obtained by site measurements.

In case of doubt, decisions shall be obtained from the Engineer or his representative/agent.

### **F3.24. ERECTION OF EQUIPMENT**

The contractor shall be responsible for the erection and installation of all equipment supplied by him under this contract.

In addition, the contractor shall be responsible for the care and maintenance of all electrical equipment after erection is completed until the first delivery of the specific section of the works. He shall ensure that the proper enclosure of all equipment is maintained at all times, that access doors and covers are opened only when necessary to work on the equipment and replaced afterwards, that the paint finish on all items is effectively protected and that all unused cable and conduit entries are effectively sealed.

### **F3.25. MATERIAL**

Materials and equipment used in this installation must be of the best quality of their respective types, must meet the relative SANS or BSS specifications and must be installed to the satisfaction of the electrical Engineer or his representative.

The contractor will be informed in writing if any material or workmanship is not of the required quality. In such a case the contractor must replace the material concerned or repair the installation to the satisfaction of the Engineer or its representative.

If requested to do so, the contractor must provide samples of materials or equipment, for the approval by the electrical Engineer, before it may be installed. The samples will be kept for comparison with materials and equipment actually installed and will be returned after the contract has been satisfactorily completed.

### **F3.26. DELIVERY AND COMPLETION**

All contract materials shall be ordered timeously and delivered to site at dates suited to the agreed construction program.

The successful Tenderer for the installation will be required to commence work immediately following notification of tender acceptance and shall thereafter at all times maintain the progress required by the agreed completion program.

### **F3.27. SHOP DRAWINGS**

Submit to the Engineer prints of dimensioned general arrangement drawings of all switchboards, distribution boards, motor control centres, control boards and consoles, busbar trunking systems, rising



mains systems, streetlights and poles, high masts, etc. Attend upon the Engineer, preferably with the manufacturers of the equipment, to discuss and agree any changes required in the drawings.

Modify shop drawing submissions as directed and, after approval by the Engineer, provide approved drawing prints of each for distribution to the parties to the contract.

On completion of the project, update the drawings with any changes made during the course of the contract works and furnish the Engineer with the necessary prints for record purposes. The contractor must submit one (1) hard copy or electronic copy of the following drawings to the Engineer for approval:

Transformers

Electrical equipment

Electronic equipment

Distribution Boards

Distribution kiosks

Luminaires

Poles

High masts

The Engineer's approval of these drawings does not release the contractor from his responsibility to supply the distribution kiosks in terms of this contract.

### **F3.28. LEVELLING AND PLUMBING**

All equipment shall be carefully levelled and plumbed, checked with a spirit level. Should any equipment be unsatisfactorily installed in this respect it shall be dismantled and reinstalled, the costs of making good to damaged structures, plaster and paint will be for the account of the contractor.

It must be noted that boxes for imported accessories must be levelled and plumbed when installed, since the inserts cannot be levelled independently of the boxes.

### **F3.29. INSTALLATION OF CABLES**

#### **(a) General**

Trench excavations must comply with the requirements of SANS 1200 LC and SANS 1200 DA. No cables may be laid before the site is cleaned and the mass earthworks, which is done by others, is completed.

Every trench must be kept as straight as possible and must be dug to approved levels and measurements. The bottom must have an even contour.

Trenches dug close to railway lines, walls, roads, drains, pipes, cables, structures and on similar places where the danger of sagging exists, must be secured against such dangers and it must be done in such a way as to prevent possible injuries to construction personnel and the public. All these excavations must be done to the satisfaction of the Engineer and the public authorities concerned.

Bedding materials may not be laid until the trench has been approved by the Engineer. The Engineer might expect proof from the contractor that the minimum depth of bedding material is provided before giving authority for the cables to be laid.

#### **(b) Guarding, Barricades, Lighting and Traffic Intersections**

The contractor must arrange guarding, barricades, lighting and traffic intersections for work in public roads. This arrangement must comply with the applicable Road Traffic Ordinance, the requirements of the Occupational Health and Safety Act (Act 85: 1993), the project specification and the applicable requirements of sub clause 5.0 of SANS 1200 DA.

#### **(c) Protection of Structures**

In cases where work has to be done in the vicinity of buildings, bridges, tanks or other structures, the contractor must take all the necessary precautions as required by the Occupational Health and Safety Act (Act 85: 1993) and the Mines and Industries Act of 1956, (Act 27: 1956). These precautions shall include shoring where necessary, to ensure the safety of structures which is subject to danger during installation.

#### **(d) Protection of Surface and Underground Services**

The contractor must take all the necessary precautions to protect all existing services (meaning services on the site, which is shown on the drawings) and he will be held responsible for all damages to these services, caused by his activities. All works and protection arrangements are subject to approval and it must only be done after consulting the owner(s) of the various services. Should a service be damaged, the contractor must immediately inform the Engineer and the authorities concerned. The contractor may not repair the damaged service, unless he is instructed to do so. In cases where no underground services are shown on the drawings or recorded, but the possible presence thereof cannot be discarded, the contractor must, in conjunction with the Engineer, establish if any such services exist within the applicable site area. The contractor must in good time complete such investigation before construction may start on the area concerned. A report must be issued to the Engineer whom will make the necessary arrangements for the protection, removal or relaying of the services prior to the commencement of any construction work. Upon the discovery an underground service previously not indicated on the drawings, this service will be classified as 'n known service and the contractor will be held responsible for any damages thereof during all further works. In cases where such service is damaged with the initial discovery, the Employer will cover the costs of repairing the service, except if the Employer can prove that the contractor did not take the necessary precautions and that the damage could have been prevented. Should the authorities concerned prefer to make the changes or arrangement for protection of services on their own expenses, the contractor must co-operate with such authorities, and give reasonable access, working area and time to complete the necessary work. Permanent changes to or permanent relaying of services which is necessary to complete the work and which is authorised, will be compensated for, there will be no compensation for work carried out and not previously investigated by the Engineer and for which no written instructions were issued.

- (e) **Conduct with Respect to Water on Site**  
The contractor must give proper attention to water and remove it to ensure that the works are kept dry enough so the work can be properly executed. For this purpose he must provide, use and keep in order, pump equipment, water sand pens, pipes and other equipment that might be needed. He must also provide fresh drains, trenches, coffer-dams and other temporary works that might be necessary to keep damages, inconveniences and disturbances at a minimum.
- (f) **Pollution**  
The contractor must take all reasonable precautions to the satisfaction of the Engineer to keep dust disturbance, pollution of streams and inconveniences or annoyances to the public (or others) because of the execution of the work, at a minimum.
- (g) **Safety**  
The contractor must at all times provide proper and adequate precaution and safety arrangements on site. Should the contractor fail to comply with this requirement, the Engineer will take the necessary steps to ensure that this requirement is met and any costs incurred will be for the contractor's account. Complying with this requirement does not exonerate the contractor of his responsibilities and duties in accordance with the Occupational Health and Safety Act (Act 85: 1993) and mines and Industries Act of 1956, (Act 27: 1956). Symbolic safety signs must comply with the applicable requirements of SANS 1186.
- (h) **Minimum Base Width of Trenches**  
The minimum base width of each trench must be wide enough for the cable spacing which is specified in the project specifications. Each trench must be excavated in a way that half the specified width will be left on both sides of the designated centre line of the cable or group of cables. The trench width must be adequate for the proper compacting of the fill materials when backfilling is done. (In the case of trenches for cable sleeves or -ducts, see sub clause 5.1.1 of SANS 1200 LC).
- (i) **Cleaning of Route**  
The contractor must clean an area wide enough to ensure that his inspection is not obstructed along the cable trench as specified in SANS 1200 C. In cases where the cable trench falls within a servitude or passage-way of specified width, the damage to the vegetation of the named servitude or passage-way must be limited.

### F3.30. BACKFILLING

(a) LV Cables

In trenches containing one or more low voltage cables, the approved fill material must be cautiously placed, in layers of 100mm un-compacted depth, throughout the width of the trench and then compacted to a minimum compacted depth of 150mm as specified in the Standard specification.

(b) Compaction

In areas subjected to road traffic and any other such area which is specified in the project specifications the trenches must be refilled in layers of maximum 150mm depth (after compaction) and in case of soil sticking together (clay material) it must be compacted up to 93% of the modified AASHTO-density or in the case of non-sticky soil (sandy material) up to 98% of the modified AASHTO-density.

Machine compaction will not be permitted directly above the cable(s) or sleeve(s) before a layer of 300mm depth fill material has been placed on top of the cable(s) or sleeve(s). The machine compaction must be conducted in such a way that the forces superimposed on the cable(s) or sleeve(s) does not exceed that superimposed by ordinary pedestrians or light vehicle traffic when the cover is already 1 m deep. If road traffic is involved, the cable(s) must be protected by a cable-way or -sleeve of at least 100mm in diameter, through which the cable(s) can be drawn at any time. Cable-ways beneath subways must be cast in

concrete in a suitable way, if it is required by the project specifications.

(c) Cables at different depths

In situations where cables are laid at different depths in a common trench, the same procedure for placing and compaction of the approved fill material beneath and on top of the upper cable applies as for the lower cable.

In situations where cables have to be laid on top of each other the high voltage cables must be laid under the low voltage cables.

(d) Conduct with respect to Obstructions

In cases where obstructions are encountered during excavation that demands changes to the trench or a special kind of trench, the contractor must have the Engineer's approval to implement such changes before laying the cable(s).

(e) Anti-Theft Cable Protection

It is envisaged that new innovation products will be investigated and used to prevent vandalism on the project. One such product in the Synthetic resin Hydrocarbon Ground Glue. This is an applicator to the in-situ soil that hardens the soil around the cable.

The anti-theft cable protection, must meet the following requirements:

To be used for the purposes of creating solid bonded soil and gravel.

The Synthetic Resin Hydrocarbon Binder must be cold mixed on site through a chemical reaction by mixing bitumen emulsion, synthetic resin, water and a proprietary catalyst.

The mixture must be added to crushed stone, natural gravels or insitu material to form a water resistant, elastic and robust layer.

The product must improve the compressive, tensile and shear strength including abrasion and water resistance of the particular materials for cable protection.

The product must be insoluble in water and must not leach.

The Synthetic Resin Hydrocarbon Binder must be manufactured in South Africa

The Synthetic Resin Hydrocarbon Binder must be able to act as a conductor and must not isolate the heat which is dissipated by the electrical cable.

The product must be able to mix with in situ or onsite material or soil to achieve at least a C3 rating.

The product must be able to achieve a strength of 30mpa if required for certain applications.

The product will only be accepted for use after performance testing on site and approved by the Client and Engineer.

### **F3.31. INSTALLATION MATERIAL**

(a) **Stacking**

The excavated material must be placed along the trench in such a way that it does not obstruct or damage adjacent fences, trees, drains, gate openings and other properties and must be heaped up in such a way that traffic is not obstructed. Should this not be possible,

the material must be removed from site, with the Engineer's approval and brought back later to backfill the trench after the cable(s) has been laid. Surplus material must be removed by the contractor and on the contractors own expense.

(b) **Removal of surplus material**

Surplus material excavated from trenches must be removed from the trenches side or the servitude to a scheduled area within 0,5 km of the source, as nominated.

(c) **Admittance to Properties on Cable Routes**

Unless otherwise specified in the project specifications, the contractor must (on his own expense) provide owners, inhabitant and their vehicles with reasonable access to their properties which may be situated adjacent or near the cable route(s).

(d) **Transport of Cable Drums**

Cable drums must be carefully transported to prevent damage to the cables and to prevent disturbing the cables. Damaged cables will be rejected. Drums may not be off-loaded by simply allowing them to roll off the back of the truck onto the ground. Drums may only be rolled in the direction as indicated by the arrow painted on the drum by the manufacturer.

(This will ensure that the correct tension is maintained and prevent the cable from damage later). Every drum may only have one cable length on it. Proper attention must be given to where the drums are to be off-loaded in order to prevent unnecessary moving thereof, eg. at joint locations.

(e) **Handling of Drums on Site**

Note: It is recommended that a correctly designed spreader must be used to load and unload the drums with a crane.

Every drum must be mounted on jacks or on a cable-drum trailer with a horizontal supporting beam of suitable size and strength to handle the width and weight of the drum. The drum may not be allowed to rotate freely when the cable is rolled off. (Free rotation causes the cable to twist and loosen the windings, which can cause the inside armouring/insulation of the cable to be stretched). The cable must enter the trench from the top of the reel. All cables ends including that left on the drum or in a trench must be sealed to prevent the penetration of moisture into the cable. The free cable end on the drum must be fastened to the side of the drum.

(f) **Rollers**

Rollers must be used when each cable is laid and must be carefully placed in the trenches to make sure the cable only lies on the rollers when it is pulled in.

(g) **Communication**

The contractor must ensure good communication between the operators at the pulling end and at the reel end of the cable while laying the cable(s).

(h) **Pulling Of Cable**

The cable may be pulled by hand or by a wrench, but the maximum tension in the cable as specified by the manufacturer, may not be exceeded. A cable grip must be used to pull the cable, but if specified by the project specification, a loop connected to the cable cores and sheathing must be used. A twist connection must be used between the loop and the rope used to pull the cable. In cases where cables have to be drawn around corners, well lubricated skid-plates or special corner

rollers must be used. Skid-plates and rollers must be firmly secured and must be inspected regularly throughout the cable laying process to ensure that they work properly.

### **F3.32. CABLE BENDS**

No cable bend may have a smaller radius than the minimum radius specified by the cable manufacturer. This radius shall never be less than the radius prescribed by the relevant SANS specification.

### **F3.33. CABLES LAID IN SLEEVES, CABLE WAYS, ETC**

Cables laid under roads or railway lines, must be laid through sleeves or cable-ways that are strong enough to withstand the expected shock loads applied by traffic. The laying of cableways and sleeves must comply with the applicable requirements of SANS 1200 LB and SANS 1200 LC. After the cableways and sleeves had been laid, they must be cleaned thoroughly to remove roughness and sharp edges that can damage the cable. The ends of spare sleeves and cable-ways must be properly sealed and if the project specification requires a pull wire, this must be installed. The position of these sleeves and cable-ways must be identified in the project specifications.

### **F3.34. SPACING BETWEEN CABLES AND OTHER SERVICES**

The minimum spacing between electrical cables and other services must be in accordance with the project specifications.

In case of trenches used for a number of electrical cables the minimum horizontal free space required to prevent de-rating of the cables, are as follows:

a) In the case of cables with a conductor size of not more than 70mm<sup>2</sup>:

75mm

b) In the case of cables with a conductor size of at least 70mm<sup>2</sup>: 150mm

### **F3.35. LUMINAIRES**

(a) Luminaires identification

Lighting outlets are numbered on the drawings.

The numbering of the outlets defines the pole tag number, circuitry and control required.

Each luminaire shall be furnished with the wattage and colour as specified or as implied by the catalogue number of the luminaires specified.

The luminaire shall be manufactured by an ISO 9002 accredited company.

(b) Streetlight Luminaires

All luminaires shall be supplied, installed, commissioned and aimed by the contractor. The Tenderer shall be responsible for installation of the fittings strictly according to the supplier's requirements.

Any defective luminaires found after installation will be the responsibility of the contractor and shall be replaced at his cost.

The Tenderer shall supply a copy of the LDT / IES files on Flash drive and a printed copy of the simulation report in a CIE compliant format of the proposed luminaires.

It is vital that valid and readable LDT / IES files are submitted at time of tender. Valid and readable files will be used to carry out simulation reports to verify paper copy simulation reports submitted. LDT / IES files will also be tested by the client to verify that luminaires are compliant. The luminaire simulation report shall be done on the latest CIE compliant software and submitted in paper copy at time of tender. Only offered compliant luminaires will be further considered.

Luminaires are to be suitable for use as per photometric data referred to in Form A15.

The Tenderer will be responsible for installation of the fittings strictly according to the supplier's requirements. Any defective luminaires found after installation will be the responsibility of the contractor and shall be replaced at his cost.

All Luminaires must be supplied complete with components that are compatible and suitable for use with a Lighting Management System.

Specific luminaire components to be supplied are a suitable dimmable 1-10V or other approved driver, 7-wire connector block, minimum 10kV/10kA surge protection and earth stud.

All luminaires to be supplied complete with a Lighting Management system where specified.

NO	Requirements	Minimum requirements
1	Luminaire Type	LED Street light
		CIE 121, The photometry and gonio photometry of luminaires.
		SANS 9227/ISO 9227:2007, Corrosion tests in artificial atmospheres – Salt spray tests. Amdt 2
2	Performance Requirements	SANS 10098-1, Public lighting – Part 1: The lighting of public thoroughfares.
		SANS 60529/IEC 60529, Degrees of protection provided by enclosures (IP Code).
		SANS 60598-1/IEC 60598-1, Luminaires – Part 1: General requirements and tests.
		SANS 60598-2-1/IEC 60598-2-1, Luminaires – Part 2: Particular requirements – Section 1: Fixed general purpose luminaires.
		SANS 60598-2-3/IEC 60598-2-3, Luminaires – Part 2-3: Particular requirements – Luminaires for road and street lighting.
3	Luminaire efficacy	>100 lumens/watt
4	Colour Temperature	CCT maximum 4000K Neutral White CRI≥70
5	LED Engine	Modular (Tenderers to state number of LED's per module)
6	LED Driver Current	700mA to 1A (maximum)
7	LMS compatibility	Luminaires fitted with NEMA/ANSI C136.41 compliant 7-pin socket
8	Operating Voltage	150-270VAC
9	Frequency	50Hz
10	Electrical class	Class I (SANS 62262)
11	Power Factor	>0.9

12	Harmonic Distortion	THD shall not exceed 5% of the supply voltage and no single harmonic shall exceed 3%.
		Nominal discharge current: 10kA
13	Surge Arrestor	Voltage protection level: 2kV
		Response time: $\leq 25\text{nS}$
		Luminaire cut-out
14	Lifetime at 25oC	>50 000 hrs (lumen depreciation not more than 30% - L70)
		-5oC to +45oC
15	Operating Temperature	No external part of luminaire shall exceed temperature of 70oC during or after operation
16	Thermal Management	Optimal external heat exchange surface
		Temperature sensor and cut out to prevent overheating
	IP Rating:	
17	Control gear compartment	IP66 certified (SANS 60508)
	Optical compartment	
18	Housing	Weather and corrosion proof. Marine grade die cast aluminium alloy grade AC-44300 or better in accordance with DIN EN 1706
19	Front Protector	Heat and Impact resistant. High impact clear glass, with sealed joint in housing
20	Impact resistance	Per SANS 62262 >IK 08
21	Screw, bolts and metal parts	Stainless steel S316
22	EMA Socket	NEMA/ANSI C136.41 compliant 7-pin socket
23	Finish	Unpainted Aluminium

### F3.36. PHOTO-ELECTRIC SWITCHES

This unit must consist of a photocell, thermal starter and switch. The body of this unit must be manufactured from strong material to protect it against tampering, and it must also have good anti-weathering features; it must be capable of withstanding ultra-violet rays and long periods of exposure to the sun.

The unit must be a wall-mountable type and it must be fitted with a suitable mounting frame. The unit must be mounted over a 60mm (diameter) round draw-box of which the lid must be fitted with a grommet to protect conductors entering the draw-box. The unit must be installed in such a way that it is not activated by any of the other light fittings.

The unit must be pre-set in the factory so that it will switch on at an illumination level of approximately 54 Lux and switch off again at 108 Lux. A time delay of at least 15 seconds must be provided for to prevent the switch from being activated by lightning or other brief changes in the illumination level.

### F3.37. MAST LIGHTING

(a)Design



The high masts shall be designed to SANS 10225 standards.

(b)Design wind speed

Terrain Category 2 with wind speed of 144km/ hour

(c)Construction

The mast shall be tapering uniformly to the top. All welds are to be carried out by coded welders, using both the CO<sub>2</sub> and submerged-arc welding processes, depending on plate thicknesses and weld positions. Sample testing, using the DPI weld test procedure, shall be carried out as required.

A full mast shaft design is to be submitted with the tender document. Failure to submit this documentation will result in a disqualification from the tender.

The mast shall have sufficient space to permit the mounting of electrical equipment such as circuit breakers and a multi-pin socket.

The mast shall be designed to carry the specified Luminaires in strict accordance with SANS 10225 code of practice for the design and construction of lighting mast.

(d)The following design calculations shall be submitted:

The mast in wind conditions

The mast during lowering

(e)Material and Corrosion protection

All material used in the pivot construction shall be of AISI grade 316 stainless steel or equivalent.

All parts of the masts shall be hot dip galvanized to SANS 121 and ISO 1461 specifications after manufacture. No drilling, machining or welding shall be performed on the masts after galvanizing.

(f)Earthing and Lightning Protection

A suitable lightning arrestor shall protrude at the top of the mast to protect the luminaires from a direct lightning strike. The lightning arrestor shall not be terminated directly on the connection box.

The earthing and lightning arrestor shall comply with the following standards:

SANS 1063: Earth rods, couplers and clamps, SANS 10199: The design and installation of an earth electrode, SANS 10313 / SANS 62305: The protection of structures against lightning.

Earthing of the masts shall be by means of two 3m lengths of 70mm<sup>2</sup> bare copper conductors in opposite directions of the mast 1000mm below final ground level and terminate each on a 1,8m x 16mm<sup>2</sup> copper earth electrodes driven into the trench.

Additional to this earthing the LV cable armouring shall also be connected to the earth stud of the mast.

The cost of this earthing shall be included in the rate.

(g)Electrical Portion

An electrical York box (IP 65) shall be included in the rate. It shall contain a circuit breaker mounting rail and a 15A double-pole circuit breaker (curve 3, 5kA, 230V). Waterproof glands shall be included to terminate a 16mm<sup>2</sup> or 25mm<sup>2</sup> 4-core cable in the York box.

The wiring to the luminaires shall be included in the rate as well as the glands needed to terminate these wires in the York box and luminaire. The York box must be securely affixed to the pole and shall be fully accessible.

All masts shall be labelled on both sides by means of matt black paint and a minimum letter size of 75mm. The labels shall be painted on the sides of each mast, facing 45 degrees towards approaching traffic at a height of 1,5 m from the ground.

### **F3.38. STREETLIGHT POLES**

#### **1.0Scope**

This specification details the manufacture, supply, delivery, off-loading and stacking of vertical street lighting poles as specified in the Bill of Quantities or as depicted on drawings.

#### **2.0Tender submittals**

2.1Tenderers may submit alternatives that, in the tenderer's opinion, are to the Clients advantage economically and technically. Full technical details of these alternative offers shall be submitted with tender documents.



2.2 Tenderers shall quote on a per unit basis for the estimated quantities stated in the Bill of Quantities.

2.3 All drawings and documentation submitted shall become the property of SANRAL.

2.4 Tenderers shall note that the cost of all tests, required in this specification, shall be borne by the TENDERER. Payment for deliveries shall not be made until test certificates have been submitted and approved.

2.5 Tenderers shall note that price, availability, and both installation and maintenance costs will be taken into account in the adjudication process.

2.6 Tenderers shall note that SANRAL reserves the right to accept more than one technically and contractually compliant tender and orders will be placed on the basis of price and availability.

### 3.0 Normative References

The following standards contain provisions which, through reference in this text, constitute requirements of this specification. At the time of publication, the editions indicated were valid.

SANS 10225: The design and construction of lighting masts  
SANS 15607: Specification and qualification of welding procedures for metallic materials - General rules  
SANS 15609: Specification and qualification of welding procedures for metallic materials - Welding procedure specification Part 1: Arc welding  
SANS 62: Steel pipes Part 1: Pipes suitable for threading and of nominal size not exceeding 150 mm  
SANS 62: Steel pipes Part 2: Screwed pieces and pipe fittings of nominal size not exceeding 150 mm

SANS 657:

SANS 121/ISO 1461:

### 4.0 Design Data

Steel tubes for non-pressure purposes Part 1:

Sections for scaffolding, general engineering and structural applications Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods

4.1 The steel tubes shall comply fully with SANS 657: Part 1 except where amended herein.

4.2 The steel street lighting poles shall be designed to support two luminaires of unit

mass of approximately 20 kg each.

4.3 The steel street lighting poles shall be manufactured of grade 300W steel or equivalent, in accordance with SANS 657 with a minimum yield stress of 300 MPa and a minimum tensile strength of 450 MPa.

4.4 The steel street lighting poles shall be capable of withstanding a fluctuating wind load in accordance with the requirements of SANS 10225. The maximum horizontal deflection at the spigot end, when subjected to two thirds of the design loading, shall not exceed 0,025 of the developed length above ground. The maximum vertical deflection at the spigot end, when subjected to the mass of the luminaires shall not exceed 1,5 % of the total length of the pole. Tenders must be accompanied by full technical details including comprehensive strength calculations certified by a qualified professional structural engineer.

### 5.0 Street lighting poles

5.1 The steel street lighting poles shall have minimum wall thicknesses as indicated on the drawings.

5.2 Protection sleeves shall be fully seal welded onto the steel street lighting poles. The dimensions of the protection sleeves shall be 600 mm long mild steel with a thickness of at least 3,5 mm and shall extend 300 mm above and below ground level.

5.3 Base plates, as per drawings shall be fitted to all steel street lighting poles.

5.4 A hatch opening 300 mm long, 95 mm wide shall be provided 3000 mm above the groundline. All edges are to be free from burrs and protrusions. The pole dimensions shown shall be increased to provide the required modulus of section or, alternatively, interior reinforcing shall be provided, should either of these requirements be necessary. A M6 stainless steel set screw (for earthing purposes) shall be fitted adjacent to the stud which is used to fasten the cover plate for the hatch opening.

Alternative shapes of hatch openings may be considered but drawings showing full details of the proposed alternative arrangements shall be submitted with tender for approval.

5.5 Cover plate for hatch opening:

5.5.1 A curved mild steel cover plate of the same wall thickness as the steel pole shall be fitted to cover the hatch opening. The cover plate shall be permanently attached to the pole by a fixing mechanism eg chain which shall be welded onto both the cover plate and pole.

The plate shall be secured in the closed position by means of a M10 \_ 25 mm galvanized or stainless steel stud welded to the pole, and a unique heptagonal (seven-sided) M10 stainless steel or brass nut. Once the cover is secured to the pole the nut shall not protrude beyond the diameter of the pole, and it shall only be possible to remove the nut with the aid of a tube spanner. The tenderer shall submit a fully detailed working drawing of any alternative cover and fixing mechanism offered, eg for cover plates of UV stabilised, impact resistant plastic. Due to the prevalence of removal and theft of cover plates by vandals within the area of supply, preference will be given to designs whereby the cover plate sits flush with the exterior surface in order to prevent external leverage by means of tools and other implements.

5.5.2 The cover plate shall fit against the steel streetlight pole to give a flush exterior appearance. A one piece silicon gasket (approximately 2 mm thick) shall be provided for sealing the cover plate to the pole.

5.6 Cable access:

5.6.1 For all steel street lighting poles, two 100 mm \_ 65 mm slot shall be cut opposite one another at 90o to the hatch opening.

5.6.2 The slots shall be well radiused and free of burrs.

5.6.3 Anti-rotation fins to be welded below the protection sleeve. A minimum of 2 x fins is required.

6.0 Alternative Designs

6.1 Alternative designs of steel street lighting poles may be considered for acceptance provided that the poles are supplied in one piece.

6.2 For the alternative design, the tenderer shall submit with its tender, fully dimensioned drawings, and design calculations. These designs and calculations shall have been carried out by a qualified professional structural engineer. Documentary proof of compliance with this requirement will be required. It shall be required that the hatch opening, cover plates, cable entries, protection sleeves, fins, spigots and joints be in accordance with the drawings submitted.

7.0 Anti-vandalism

Pole design and manufacture to include anti-vandalism plates welded on the inside of the pole to prevent the poles being cut down. Manufacturer designs and recommendations would be considered in this regard. The anti-vandal plates to be welded within the pole in a cross-plate formation from bottom of pole up to the height of the access hatch. Refer to drawings.

8.0 Marking

8.1 The steel street lighting pole shall be clearly stamped, 50 mm below the hatch cover plate, with 12 mm number and letter punches with the following:

- (a) the Contract number,
- (b) the manufacturer's name, and
- (c) the pole size.

8.2 The lettering and numbers shall be clearly visible after hot-dip galvanizing.

8.3 Alternative methods of marking poles may be considered provided that a full description of the marking process shall be submitted with the tender documents.

9.0 Inspection

In addition to the requirements listed below, all poles shall comply with the test requirements of SANS 0225.

10.0 Anti-Vandal Streetlight Poles

The anti-vandal streetlight poles shall be specified for use at areas where vandalism is deemed as MEDIUM and HIGH risk.

The technical specifications of the anti-vandal street light poles shall comply with all relevant SANS standards and pole specifications in the general specifications. In addition to the requirement of the general specification, the following items shall apply.

(a) Pole dimensions

The pole dimensions for the streetlight poles are noted below. Any deviations to these requirements will only be considered as an alternative submission. Non compliance may render the tender non-responsive.

Technical Details Requirements

Total Length of pole 5 000 mm - 12 000mm  
Length of bottom section 6 000 mm  
Diameter of bottom section 152 mm  
Thickness of bottom section 3.5 mm  
Length of middle section 3 000 mm  
Diameter of middle section 114 mm  
Thickness of middle section 3.0 mm  
Length of top section 2 800 mm  
Diameter of top section 76 mm  
Thickness of top section 3.0 mm  
Length from bottom of pole to ground line 1 800 mm  
Hatch opening 3000mm from finished  
ground level to centre of  
hatch.  
Anti-rotation fins x 2450 x 125 x 6mm

(b) Anti-Rust Protection Sleeve

An anti-rust Protection sleeve shall be fully seal welded onto the steel street lighting poles at the interface point between the section of pole that is buried and part that is exposed. Poles to be buried in a way that the protection sleeve is partially buried and balance exposed, ideally buried midway between the protection sleeve.

The dimensions of the protection sleeves shall be 600 mm long mild steel with a thickness of at least 3,5 mm and shall extend 300 mm above and below ground level.

(c) Anti-Vandalism Plates

Pole design and manufacture to include anti-vandalism plates welded on the inside of the pole to prevent the poles being cut down. Manufacturer designs and recommendations would be considered in this regard. The anti-vandal plates to be welded within the pole in a cross-plate formation from bottom of pole up to the height of the access hatch. Anti-vandal galvanised pipes for the cables and anti-cut jagged plates to be installed to protect the cables inside the pole.

(d) Inspection

In addition to the requirements listed below, all poles shall comply with the test requirements of SANS 10225.

The finish of the poles shall be natural hot dipped Galvanised finish.

11.0 Anti-Vandal Streetlight Poles with Electronic Security

The anti-vandal streetlight poles with electronic security shall be specified for use at areas where vandalism is deemed as HIGH risk.

The technical specifications of the anti-vandal street light poles shall apply with the following additional requirements.

Each anti-vandal pole to be provided with components of approved electronic security system. The electronic security to be as specified in the security section of this specification.

(a) Electronic security system

The pole shall be fitted with the following electronic security (i) One vibration sensor should be fitted on the inside of the anti-vandal pole.

### F3.39. MINI SUBSTATIONS

#### ANTI-VANDAL MINI-SUBSTATION

The anti-vandal Min-substation shall be specified for use at areas where vandalism is deemed as MEDIUM risk.

The technical specifications of the mini-substation kiosk shall comply with all relevant SANS standards. The mini-sub to be minimum IP65 rated and suitable for use and shall be a fully 3CR12 stainless steel unit.

The min-substation shall be supplied complete with a security cage around the unit.

All LV distribution circuits to be standardised and manufactured for 3 phase supply and 3 phase circuits

Each LV distribution circuit shall include the following equipment as per details on the drawings or schematic.

1 x 3 pole on-load main circuit breaker (Based on transformer size) 1 x set 3P+N Surge arresters

9 x 32amp 1 Phase streetlight circuits.

1 x 32amp 3 Phase streetlight circuit.

1 x 20amp 1 pole spare circuit breaker

1 X 63amp 1 phase ELU, 3 x 20amp CB's + 1 x 16 amp SSO

1 x concrete base per Mini-substation manufacturer's approval

4 x keyed alike 61mm black all weather brass lock with a strength rating of >5, 1 x daylight switch complete with control circuit to contactors

3 x 32amp 3 pole AC1 contactors

1 x 5amp 1 pole CB, 1 x bypass circuit breaker

The colour finish of the Mini-substation shall be Moss Green. RAL 6005

The entire enclosure (enclosure shell, roof, doors) shall be manufactured from 4mm (minimum thickness) 3CR12 (Corrosion Resistant Steel)

The enclosure is to be custom built to match the transformer, MV and LV compartments Anti-vandal covers over Locks shall be fitted on each door.

All non-lockable doors shall be fitted with two 20mm stainless steel sliding pin locks, locking in the vertical position. The sliding pins shall be fitted with a retaining spring. The pins must slide into a receiver plate or receiver housing mounted on the top and bottom of the mini-sub inside panel plates and lock in that position.

The enclosure shall be suitable for mounting onto the existing / new miniature substation base.

The Enclosure Shell must be bolted onto the concrete plinth from the inside of the enclosure; it should be easily removed from the plinth if required.

The enclosure shall house the entire miniature substation, with the transformer cooling fins exposed to allow natural cooling of the transformer Nothing must obstruct the operator from operating the switchgear when doors are opened. The enclosure shall be weather proof and safe to operate in any weather condition The enclosure shall be robust enough to prevent tampering.

Bottom entrance prevention 3CR12 plates shall be inserted between the enclosure and plinth on the LV side of the enclosure. The purpose of the plates is to prevent access to circuit breakers, meters and any other installed equipment should someone dig a hole underneath the plinth to obtain entrance to the equipment. The Steel Plates should be at least 3mm thick.

Enclosures should be properly earthed both on the MV & LV sides as per specification.

All set screws, nuts and spring washers for fitment of different parts or equipment inside the enclosure shall be stainless steel.

Enclosures shall be properly prepared in the correct manner and powder coated for protection against corrosion.

Ventilation shall be adequate to allow that all installed equipment inside the enclosure shall operate normally in temperatures between -10°C and 60°C.

At the interface between the Mini-substation and the concrete base, the sides of the Mini-substation shall overlap over the sides of the base to restrict attempts to cut the mounting or holding-down bolts using a grinder.

The enclosures shall be manufactured from quality steel and capable of withstanding the mechanical, electrical and thermal stresses as well as the effects of humidity which are likely to be encountered in the services and at the same time ensuring the desired degree of safety.

The Enclosures shall be adequately protected against rust, dust and corrosion both from inside and outside.

The fabrication of material shall be done in such a way that there is a good finish of fabricated/moulded material. The material shall be fabricated/moulded accurately to adhere to dimensions as per the drawings

The enclosure shall be fabricated / welded such that the rain water does not enter the enclosure.

A Danger notice shall be fitted on all doors. The enclosure shall be fitted as per requirements on the schematic drawing.

The mini-substation and cage must be adequately earthed by means of an earth spike/s and 16mm<sup>2</sup> earth wire. Earthing to be carried out and tested in terms of SANS 10142. If earth resistivity is not achieved, further earth spikes and or earth wire to be installed to achieve the specified minimum readings.

Rails shall be mounted in the LV compartment to accommodate the LV equipment as per the Mini-substation schematic or with minimum requirements as noted below. The circuit breakers and switchgear shall be included in the rate.

All set screws, nuts and spring washers for fitment of different parts or equipment inside the enclosure shall be stainless steel.

Enclosures shall be properly prepared in the correct manner and powder coated for protection against corrosion

The doors' surrounds shall incorporate a splash-proof sill around the inner border of the door opening of the Mini-substation.

The enclosure shall be weather proof and safe to operate in any weather condition Enclosures shall be adequately earthed.

The enclosures shall be manufactured from quality steel and capable of withstanding the mechanical, electrical and thermal stresses as well as the effects of humidity which are likely to be encountered in the services and at the same time ensuring the desired degree of safety.

The enclosure shall be free standing on the ground and properly mounted on an anti-vandal concrete plinth.

The Enclosures shall be adequately protected against rust, dust and corrosion both from inside and outside.

The fabrication of material shall be done in such a way that there is a good finish of fabricated /moulded material. The material shall be fabricated/moulded accurately to adhere to dimensions as per the drawings.

The enclosure shall be fabricated / welded such that the rain water does not enter the enclosure. A Danger notice shall be fitted on all doors. There shall be no external holes and the complete Mini-substation shall be robust and vandal proof. The unit shall be vermin and bug proof.

(a)Construction material

Enclosure Material (shell, roof and doors)4mm 3CR12

Gland Plates2mm 3CR12

Inner electrical equipment mounting plates2mm 3CR12

(b)Installation requirements

The enclosure should be fitted onto a suitable concrete plinth which is planted as specified.

The enclosure door/s should NOT face the road side to ensure that the field operator does not have their back facing the road when working on the Mini-substation.

Mini-substations should be visible from road to restrict opportunities of vandalism.

(c)Doors

Reinforced doors must be mounted and recessed inward by no less than 4mm. The door shall be flush with the box frame.

Doors shall be manufactured with minimum 4.0mm 3CR12 and to be the same type of steel as the rest of the enclosure shell.

There shall be no external hinges or holes. Hinges and doors shall be robust and vandal proof

Doors shall be marked in the inside as well.

The door's surrounds shall incorporate a splash-proof sill around the inner border of the door opening of the Mini-substation.

A pull handle / knob shall be welded onto the outside of the doors on the opposite side of the hinges in the middle of the vertical dimension of the door for easy opening and closing the enclosure door. The doors shall be fitted to be vermin proof.

(d) Hinges (durable and vandal proof)

Hinges Holding Bracket:

Hinges Material:

Hinge Load Capacity:

(e) Sturdy door stays

Material:

Door open stay position:

2 x Internal hinges per door

3CR12

±100kg per hinge

Stainless Steel

90° Minimum

(f) Roof: general requirements

The roof of the enclosure shall be sloping to allow water to run off.

The roof shall be manufactured with the same thickness of steel and steel type as the rest of the enclosure shell.

The roof shall be permanently secured onto the enclosure shell to form part of the enclosure as a complete unit.

The roof shall only have an overhang on the door sides, but should be fitted flush against the non-door sides.

There shall be no external holes and the roof shall be robust and vandal proof. The roof shall be vermin and bug proof.

(g) Ventilation slots / louvers

Ventilation slots / louvers shall be machine punched on the sides of the enclosure shell to prevent condensation build-up.

Cross flow venting for natural draft ventilation and to remove excess heat build-up.

The ventilation slots shall be covered in the inside of the enclosure with a corrosion proof stainless steel wire mesh screen.

The ventilation slots shall be robust and vandal proof.

The ventilation slots shall be designed to prevent the ingress of rain, bugs, debris and shall be vermin proof.

Ventilation shall be adequate to allow that all installed equipment inside the enclosure shall operate normally in temperatures between -10°C and 60°C.

The Enclosure shall be constructed to allow adequate dissipation of heat. Ventilation of the enclosure shall not compromise the security of the enclosure and the equipment housed there-in.

(h) Gland plates

Gland plates will be secured onto the chassis frame with the required stainless-steel bolts, nuts and washers.

Knockout gland holes will be provided on the plates.

The knockouts shall be spot welded onto the gland plate and shall be easy removable during cable installation.

Gland Plates must not be powder coated.

(i) Lifting lugs / hooks

Lifting lugs shall be adequately welded on the sides of the roof of the enclosure to enable installation / removal of the enclosure with means of a lifting crane using relevant d-shackles and slings.

Enclosures shall only be moved into position safely and securely by means of lifting lugs.

These lifting hooks shall be designed to hold twice the actual weight of the enclosure.

## (j) Security cage

Cages to be constructed of a 50mm square tube frame with 20mm square tube screen with maximum openings of 100mm x 100mm. Access locks to be enclosed by means of vandal proof covers welded to the cage. All hinges and lock covers to be welded and installed in a way to prevent it being vandalised. The full frame to be hot dip galvanised to SANS 121 and painted.

Cages to be bolted to the concrete base in a way to prevent removal from outside of the fence.

## ItemDescription

1Unit type

2Continuous maximum rating at rated voltage of transformer

3Indoor or Outdoor?

4Number of phases

5Dry type or oil immersed?

6Rated frequencyHz

7Normal "ON LOAD" phase-to-phase voltages for transformer:

8System highest operating voltage for transformer:

9Vector group of transformers

10Type of cooling

11Tapping

12Cable boxes or outdoor bushings for line terminals of transformer:

13Cable Connections

14MV Compartment

15LV Compartment

## Detail

## Mini-Substation

100/200/315/500kVA

Outdoor

3

Oil immersed / Dry Type

50Hz

MV: 11000/6600/3300 Volts

LV: 400 Volts

MV: &gt;10% of operating voltage

Dyn 11

ONAN

Fixed

MV: air filled cable box

LV air filled cable

MV: As required

LV: As required

3 x circuits:

2 x 125Amp fused isolators for ring

1 x 20Amp fused isolator tee to transformer

1 x 150Amp Main Circuit Breaker

9 x 32Amp 1 Pole Circuit Breakers  
 1 x 32Amp 3 Pole Circuit Breaker  
 2 x 20Amp 3 Pole Circuit Breakers  
 3 x contactors, 1 x 5Amp CB + bypass  
 1 x 230V 63amp CB and ELU, 3 x 20Amp 1 Pole Circuit Breakers

ItemDescriptionDetail

16PSC Rating for circuit breakers and10kA  
 busbars  
 17EnclosureIP65  
 18Enclosure Material3CR12  
 19ColourMoss Green  
 20WindingsCopper  
 21Shop Drawings requiredYes  
 22FAT Test certificates requiredYes  
 23Equipment & Installation Guarantee12 Months from handover to client

(k)Security fence

Anti-vandal fencing is to be secured onto the cage frame on the outside. Fence type to be galvanised Razor Ripper Wire welded to the cage frame. Openings of the Razor Ripper Wire to be maximum 300mm high and 150mm wide.

(l)Distribution transformers

The technical specifications of the transformers shall comply with all relevant SANS standards.

ANTI-VANDAL MINI-SUBSTATION WITH ELECTRONIC SECURITY

The anti-vandal Mini-substation with electronic security shall be specified for use at areas where vandalism is deemed as HIGH risk.

The technical specifications of the anti-vandal mini-substation shall apply with the following additional requirements.

- (i) UPS Backup - Minimum 2 Hrs and electronic equipment. (ii) Electronically activated locks
- (iii) door sensors,
- (iv) vibration sensor on kiosk and cage.
- (v) an electronic back-up / override system

The electronically activated door layout positions of the front side of the mini-sub should remain the same for all enclosures as far as practically possible

Door sensors shall be fitted on each door, door sensors on the LV side shall be connected in series as one zone and all sensors on the MV side shall be connected in series to form a second zone  
 Two vibration sensors should be fitted on the mini-sub enclosure one on the LV side and one on the MV side, both vibration sensors should be connected into series to form one protection zone

All non-electronically activated doors shall be fitted with two 20mm stainless steel sliding pin locks, locking in the vertical position. The sliding pins shall be fitted with a retaining spring. The pins must slide into a receiver plate or receiver housing mounted on the top and bottom of the mini-sub inside panel plates and lock in that position.

(a)Distribution transformers

The technical specifications of the transformers shall be as per anti-vandal mini-substation specification with the following additional requirements.

ItemDescriptionDetail

25ELV CompartmentSpace for electronic equipment. To be separated physically for access by nonqualified electrical staff.



### **F3.40. ELECTRONIC SECURITY SYSTEM FOR KIOSK, MINI SUBSTATIONS AND POLES**

The enclosure and cage shall be fitted with the following electronic security: (i) electronically activated locking mechanism per door, (ii) door sensors, (iii) vibration sensor on kiosk and cage. (iv) an electronic back-up / override system

#### **(a) Hardware Requirements**

Tampering detection modules- end devices

For the detection of tampering of electrical substations, mini-substations, outdoor transformers, LV kiosks, lighting structures, fences and gates using Radio Frequency technology.

Minimum Requirements:

(i) Ingress Protection Rating- IP 66

(ii) Communications- Long Range Bi-directional RF (RX: 863-873MHz, TX: 864-873MHz)

(iii) Range - 2km radius

(iv) End-to-End encryption- AES 128-bit

(v) Rated Current - <1A

(vi) Operating Voltage-3-5V DC

(vii) Battery Type- Lithium

(viii) Ambient Temperature Range- -10°C to +50°C

(ix) Relative Humidity - 40% to 90% RH

(x) PCB Coating- Conformal Coating

(xi) PCB Surge Protection- Integrated

#### **(b) Magnetic & optical open/close sensors**

For Substations, Mini Substations, Outdoor Transformers, LV Kiosks, Enclosures, and Gates)

Minimum Requirements:

(i) Sensor devices should be robust in construction for industrial use.

(ii) The sensor should have a reliable detection against tampering with high immunity against false alarms.

(iii) The sensors should have a multi-level, application specific sensitivity adjustment to ensure that the sensors can be easily fine-tuned to the environmental conditions in which it is installed.

(iv) All access doors of vandalized substations, mini-substations or enclosures shall be fitted with door sensors (magnetic or optical).

To be installed strategically for optimal functioning.

#### **(c) Vibration sensors**

(For Substations, Mini Substations, Outdoor Transformers, LV Kiosks, Enclosures, Lighting Structures and Fences)

Minimum Requirements:

(i) Vibrations are detected through a piezo element.

(ii) The sensitivity should be subject to three parameters i.e. vibration, time and frequency.

(iii) Sensor devices should be robust in construction for industrial use.

(iv) The sensor should have a reliable detection against tampering with high immunity against false alarms.

The sensors should have a multi-level, application specific sensitivity adjustment to ensure that the sensors can be easily fine-tuned to the environmental conditions in which it is installed.

To be installed strategically for optimal functioning.

#### **(d) Change in direction / tilt sensors**

(For Lighting Structures)

Minimum Requirements:

(i) The sensor shall detect the tilt or deflection in multiple axes of the reference plane

and is to be used for the detection of the change of orientation or extreme deflection of equipment.

- (ii) The sensitivity should be subject to two parameters i.e. deflection angle and time.
- (iii) Sensor devices should be robust in construction for industrial use.
- (iv) The sensor should have a reliable detection against tampering with high immunity against false alarms.
- (v) The sensors should have a multi-level, application specific sensitivity adjustment to ensure that the sensors can be easily fine-tuned to the environmental conditions in which it is installed.
- (vi) To be installed strategically for optimal functioning.

(e) Gateway device

(For each project location with end devices)

Minimum Requirements:

- (i) Single Gateway to control up to 1000 devices in range of at least 2km radius.
- (ii) Gateways are to be used in long range star network architectures.
- (iii) Ingress Protection Rating IP 66
- (iv) Communication to devices- Long Range Bi-directional RF (RX: 863-873MHz, TX: 864-873MHz)
- (v) Communication to server/s - Primary GSM communication with fibre where available as back-up.
- (vi) Controller to have option to add a Wi-fi module for communication.
- (vii) Range - 2 km radius
- (viii) End-to-End encryption- AES 128-bit
- (ix) Ambient Temperature Range- -10°C to +50°C
- (x) Relative Humidity -40% to 90% RH
- (xi) PCB Coating- Conformal Coating (xii) Internet Communication- Protocol IPv4

(f) CCTV camera system

(For each project location with end devices)

Each Camera system to include the following components:

- (i) 2MPx PTZ IR Camera
- (ii) Ethernet/Fibre Switch
- (ii) Power Supply for Camera and Switch
- (ii) LAN Cabling
- (ii) Fibre Cabling
- (iii) 12m Concrete Pole

(g) CCTV Camera

Minimum Requirements:

- (i) Rugged outdoor infrared camera that captures details in poorly lit situations
- (ii) 2 MPx, PTZ Camera complete with pole bracket
- (iii) 850nm IR Illumination to 150m
- (iii) Resolution: 1920x1080
- (iv) 30 x Optical zoom
- (v) 32 x Digital Zoom
- (vi) H.265, H.264 and MJPEG Video encoding
- (vii) Tilt range +15° to -90°
- (viii) Digital Image Stabilization
- (ix) Range - 2 km radius
- (x) Day/Night capabilities
- (xi) Auto Iris with manual override
- (xii) Built-in anti-vandal analytics alarm

(h) Fibre / Ethernet switch

(i) Minimum Requirements:

- (ii) 5-port full gigabit unmanaged Ethernet switch with 4 IEEE 802.3AF/AT POE + ports

- (iii) Industrial EDS-G205-1GTXSFP series
- (iv) Full Gigabit Ethernet ports
- (v) IEEE 802.3af/at, PoE+ standards
- (vi) Up to 36 watts output per PoE port
- (vii) 12/24/48 VDC flexible redundant power inputs
- (viii) Supports 9.6 KB jumbo frames
- (ix) Intelligent power consumption detection and classification
- (x) Smart PoE over current and short circuit protection
- (xi) -10 to 60°C operating temperature range
- (xii) Power supply for switch and Camera

(i) Electronic controller

(For the access control of all Substations, Mini Substations, Outdoor Transformers, LV Kiosks, and Enclosures fitted with electronically activated locksets)

The controller shall be a Bi-Directional Communication device. The main controller output should be the primary source for all required locking arrangement systems and sensor devices. The battery back-up power will be the secondary source for the controller when the primary source is not available.

Controller and software shall be capable of sending and accepting instructions to perform remote switching from a control room or office by means of a smart device, desktop computer, laptop computer, or any other pc system available.

The Controller and software shall be compatible with wireless technology (Internet of Things), Low Power, Long Range Radio Frequency (RF), Wi-Fi, and Bluetooth Communication Systems. The main controller should be the master controller and the override controller should only be utilised when the main controller fails, or no controller communication is present. Override controller should report via the same Master Control and Monitoring Software.

Electronics and software shall be capable only to open and close enclosures by means of approved methods such as remote keys, tag readers or via smart devices utilising password protected software.

The override controller shall have its own unique serial number and displayed on the software program and can't be operated if the serial number is not allocated to a specific master controller.

The controller must be adequately protected against lightning and power surges. Controllers should be RTC (Real-Time-Clock) compatible for date/time stamping of all events and alarms. The Main Controller shall be compatible with both solenoid and motor driven locking arrangement systems.

(j) Event/ alarm logging & reporting

The Controller with the software shall identify the authorized person opening and closing any enclosure and store the information on a database which will upload information to the client server via the gateway device.

The controller and software shall store the record of the date and time when the enclosure was opened and closed on a data base.

A health / status check should be performed every 60 minutes automatically between the controller and software (Bi-directional Communication).

The controller shall be fitted with a visual and audible alarm and must make a sound when the enclosure is accessed in an authorised / unauthorised manner.

The preferred operation shall be from a Smart Device and Centralised Control Centre with Authentic Cloud Base Software.

Any events/ alarms that occur in the field shall be automatically sent to the control and monitoring system. The event shall be identified and displayed together with the address of the enclosure (geographical area, street address, enclosure number, controller serial number).

The Controller and software shall constantly monitor the back-up battery voltage and condition and immediately report when the battery voltage drops below 11.6 V or is nonexisting / removed.

Communication Signal Strength should be monitored and a weak or no signal event should be recorded and reported immediately for the required attention.

Mains power failure should report to the main server and only sends a SMS to the standby staff after 4 hours to accommodate load shedding conditions.

Mains power failure time period should be accurately as possible be recorded in regards when power was disconnected and when power was restored again.

Three phase monitoring and any missing phase must be reported if required.

Any abnormal operation of accessing the enclosure should be immediately reported by means of the controller and software to selected persons.

Any abnormal vibration for example from a grinder, hammer or any other forces should be immediately reported by means of the controller and software to selected persons.

The controller and software shall report normal authorised access activities to a software database for record keeping.

The controller and software shall alert selected people when enclosure doors are open for longer than 4 hours at a time.

The controller and software shall be capable to detect and store at least the last hundred (100) events of any enclosure before it is overwritten. An early alarm should warn specified pc stations if the event recording has reached 80% of its capacity for an operator to

download and store the information on backup server/s.

The system should be able to notify / alert selected people of any alarm events via sms and / or e-mails.

#### (k) Ups unit

On-line UPS to be provided for the electronic equipment during power failure.

UPS to be suitably sized to ensure the minimum back-up time of 2 Hours on UPS power is achieved on Full load of all the controllers and electronic equipment.

The UPS should have one main supply input connection point and at least three battery backup outlet connection points.

Frequency - 50Hz

UPS to be line interactive technology with a sine-wave output waveform.

Battery technology to be Lead acid or Nickel Cadmium.

UPS to be suitably rated to operate between -5oC to 40oC

The UPS to be installed in a way to be easily unplugged for replacement.

#### (l) Battery backup

Battery backup power should be available for at least 48 hours and controllers should be fully functional for at least 20 operations during this 48-hour period.

The backup power source shall be rated for at least 4 years operating life The backup power shall be protected against incoming surges

The system should have an automatic change over facility between mains and battery operations without losing any operation of the controller and any of its sensors

The backup power source shall be protected against excessive discharges

On-board charger to be used to not overcharged batteries to prolong their useful lifespan

The charger must monitor the battery's voltage, temperature or time under charge to determine the optimum charge current and to terminate charging

Charger should fast-charge the battery up to about 85% of its maximum capacity in less than two hours, then switch to trickle charging, which charges the battery to its full capacity in less than 24 hours.

#### (m) Power requirements

The power supply to the electronic controller shall be protected by a suitable circuit breaker against overload and short circuit conditions and to disconnect the supply to the controller when required

A clip-on neutral screw type terminal connection block shall be mounted next to the controller, a neutral conductor from the main neutral bus-bar shall be utilised to supply the neutral terminal connection block, the neutral supply shall be from the connection block and not directly from the bus-bar

A clip-on earth screw type terminal connection block shall be mounted next to the controller, an insulated earth conductor from the main earth bus-bar shall be utilised to supply the earth terminal connection block, the earth supply shall be from the connection block and not directly from the bus-bar

The circuit breaker, neutral and earth connection terminal blocks shall be mounted side to side to one another next to the controller on a Din Rail

The controller and control circuit equipment shall be clearly labelled / marked

#### (n) Antenna

As far as possible all antennas should be internal Should be RoHS compliant  
Antennas should be high gain omni-directional and should match the correct communication controller module and operating frequencies for the application  
Antennas should be omni-directional i.e. no faraday cage must be formed  
Where communication is inadequate with an internal fitted antenna, an external antenna should be fitted  
External / Outdoor Antennas Should Conform to The Following: A moulded (eg. resin type) robust, heavy duty vandal proof type Weather resistant, IP67 rated.  
Can only be removed with the means of tools  
The housing should be a direct mount antenna package with excellent isolation (10dB+). The antenna should have its own ground-plane and must radiate on any mounting environment like metal or plastic without affecting performance.  
Should be fitted with a suitable waterproof seal not to allow water inside enclosure

(o) Data usage

Data usage should be kept to the minimal to reduce costs but not to compromise required performance  
The controller required is for access control and asset management purposes, data usage is basically for an hourly health status check and when alarm or other events are triggered  
Data usage of the RF Communication system is the Data between the Gateways and Server/because of the RF communication between end-device and Gateway it is important to determine the total Data usage between Gateways and Servers and relate to an average usage per controller.

(p) Override controller

The override controller shall be powered from an external 12V DC supply as connection points are fitted on the outside of the enclosure for this purpose, controller should be protected against any other voltage input not rated for correct operation.  
The override controller should be connected that it operates all doors at the same time where electronically activated locking arrangements are fitted in metering and distribution enclosures, in the case of mini-sub, two override controllers should be installed, one on the LV side and one on the MV side to ensure different level of access are maintained and connected to the electronically activated locking arrangement doors  
The override controller shall be protected against incoming surges any harmful overcurrent, short-circuit and earth fault conditions  
The override controller shall be protected against incoming voltages greater than 12V DC and up to 415V AC  
The override controller shall have its own unique serial number and displayed on the software program and can't be operated if this serial number is not allocated to a specific authorised user.  
The override controller should have a 12V DC (10A) output and the output wires should be directly connected to the electronically activated door locking arrangement.  
The override controller should be Bluetooth / Wi-Fi operated  
The override controller must be operated by a Bluetooth Smart Device and only receive commands via the Master Access Control and Monitoring Software to ensure only authorised users are allowed to have access to the locking arrangement devices.  
The operation is via the Master Software and must still record all access events including the user details Should be compatible with the latest Android operating system.

SOFTWARE & USER INTERFACE

(For the monitoring and management of all security devices installed at the various project locations)

(a) Software: access control and monitoring minimum requirements for electronic controllers

(i) Software (general requirements)

Software shall make provision for the following 3-Type of users:

(1) Administrator / Master User: (Will be able to edit and access the software with no restrictions).

(2) Supervisor Level: Can access all reports and e-mail sections, and clear certain alarms from the system, but is restricted to add or delete users and to add or delete node end-devices or make any changes to them

(3) Restricted Field User: Can only access the program to unlock an electronically activated device within a certain set GEO / Group Fence zone

Software should be Subscription-based and Cloud-managed for simplified remote access control, monitoring and management of the entire network accessible via SANRAL dashboard to avoid individual user software installations, delivering a ready-to-deploy solution that saves time and money.

Users should be restricted by a Geo Fenced allocation, by region, or project location

Software shall provide for easy access to information and Real-time notification of network alarms, alerts and event logs

Map based interface should provide a quick overview of the installed end-devices displaying on the same page information of the end-devices as follows:

- (1) Device Name
- (2) Stand No.
- (3) Street No.
- (4) Suburb / Area
- (5) Health Status
- (6) Sensor Type
- (7) Sensor Status

All events must be logged into the Access Control System database, date and time stamped and should be available for customized reporting.

In addition to logging all events in the Access Control System, the System shall be able to provide the historical record of all events of a specific electronically activated control and monitored end-device since commissioning of the end-device

Each event (if selected) shall trigger an alert and an SMS and / or an Email shall be sent for each event to individually program mobile numbers and email addresses. SMS / email should be configurable based on priority. Several user accounts should receive SMS-email, and the list of users should be customizable.

Automated Backup of Software and data base populated information must also be made available to SANRAL.

Remote update of unit firmware functionality should be available.

Logs of all events must be made available automatically on a scheduled time via e-mail and from direct access of the software in a \*.xls format.

The populated information of the end-devices in the software data basis must also be used as an asset control management tool.

The software should have a user-friendly search option to quickly locate an installed node / controller device on the GIS map. The sort / filter fields are:

- (1) Street Number
- (2) Stand Number
- (3) Street Name
- (4) Suburb / Area
- (5) Town

There should be a function whereby the user can be directed / navigated to the location of a specific node / controller from the position he / she is in.

Software should be compatible with Windows 10/8/7 and with Android to allow for communication via Android Smart Devices

An Android Application is required on the Smart Devices to easy access the electronically activated device application

Software should be able to generate automated reports

The data base / server system shall be minimum SSL (Secure Sockets Layer) 128-bit encrypted

Software should be able to communicate with selected controllers at the same time

especially when the same command needs to reach all controllers. The system shall allow for individual selections as well as group selections.

A health / status check should be performed every 60 minutes automatically between the controller and software updating the status of the end device (Bi-directional Communication)

Software should be able to send SMS and / or E-mail messages in selected alarm events occurrences

Software should be able to remotely control and managed the controllers and perform diagnostic tests in the back end and must be able to re-boot / reset the controller if needed.

(b) Software (required information fields)

Controller Serial Number

Controller Installation Location (Street Number, Street Name, Suburb, Town, GPS Coordinates - Decimal Degrees)

Controller Initial Installation Date

Enclosure Type: (Mini-Sub, Ground Mounted Metering Kiosk, Ground Mounted Distribution Kiosk, Ground Mounted MV Switching Kiosk / Ring Main Unit, Pole Mounted Metering Kiosk, Pole Mounted Distribution Kiosk etc.)

Controller Status: (Healthy / Forced Open / Off-line / Normally Accessed / Alarm Status if triggered)

User Details: (Registered Name and Login Name)

All Event Logs of End-Device (Should display a summarised report of all actions of the end-device)

All User Logs (Should display a summarised report of all the actions performed by the authorised user)

(c) Software (access control requirements)

Log on to the server software will only be possible when the server data base determines the validity of the cellular number / ID number + the user selected password permitted on the server of the user.

Verification via a smart device / pc / laptop / tablet shall only be when the authorised operator log onto the GIS based software and provides a user name + a 6-digit (minimum) password; the system must be able to change the password on a daily basis automatically if required to do so.

The user should create his / her own password after a Master User has enrolled the normal user on the system.

Access permissions for each individual user should be based on time, date, GEO Group Area and authority level

Software shall restrict operators per working area / GEO Group area and access hours to the system, eg. a person can only work in a certain area and the access is only for 1 day (8hours) from 08h00 until 16h00 or any other required period from 1 minute until unlimited access as desired.

The software shall identify the authorized person opening and closing any enclosure and store the information on a data base (preferably a client server).

The software shall store the record of the date and time when the enclosure was opened and closed on a data base.

Software should be able to report which specific door is open if it is an enclosure with more than one door.

Software shall be capable to identify the installed GPS position / location of any controller.

Controller and software shall be capable of sending and accepting instructions to perform remote control and monitoring from a control room or office by means of a smart device, desktop computer, lap top computer, or any other pc system available.

Controllers and software must be capable to allow independent programming of a specific enclosure door, as an example at a mini-sub an operator is only allowed to have access to the low voltage (LV) compartment of the mini-sub and not to the medium voltage (MV) compartment.

Software (monitor requirements) features

Mains power status

Battery status

Authorised and unauthorised access user monitoring Vibration sensor status

Temperature sensor status if fitted

Door sensor/s status

Health status of Main controller

Status of the Auxiliary Controller

Communication status and signal strength (Poor, Average, Good) Solenoid / Motor Output Status

The Time the Enclosure is accessed

The Time the Enclosure is closed

Total Time spend at enclosure

Power supply status of all phases

Power consumption of entire enclosure load

Software (GIS map based alarm events & icon indicators)

(d) Software (alarm, alert and monitoring events)

All Key Alarm events must be dispatched immediately via a sms or/and e-mail to selected users at the set time periods below, the system must be capable to generate multiple messages / e-mails simultaneously. The sms and e-mail systems should have a functionality to “force” the receiver to accept the alarm / event condition as proof that the alarm has been dispatched and received. If a sms / e-mail has not been accepted in a specified time (15 minutes’ maximum) then it should be escalated to the next level for action. System should cater for at least 4 levels of escalation.

All alarm and other events must be updated automatically on the web-based program within the time periods indicated below. All outstanding alarm events should be escalated to all relevant user levels for attention.

The system should be able to have an escalation function if the alarm event is not accepted and attended to within a selected time period, as an example: The first line user is Electrician A and receives a forced opened alarm of enclosure XXX via sms after a half an hour the alarm still remains unattended, then the first escalation must be triggered and the next inline the immediate Supervisor of the Electrician must be informed, if the alarm still remains unattended after 15minutes the second escalation must be triggered and the direct Responsible Engineer / Manager of the Supervisor must be informed, if the alarm is still unattended after another 15minutes a third escalation should be triggered and the Area Manager / Engineer should be informed and if necessary a fourth escalation whereby the Divisional Head is informed.

Event Monitor Alarm and Reporting shall provide visibility into active alarms on a real-time basis

All alarms require an operator response and must be presented at a rate that the operator can respond to it

It must be clear when the alarm monitoring system is not performing as intended, what alarms have been suppressed if any and why

A special report must be generated and automatically dispatched via a message and e-mail when more than 5 alarm events have occurred from one end-device within 30 days or any other specified time period

Service Providers shall only supply equipment that is immune against false triggers / operation to ensure that alarm events are true and to avoid nuisance call outs which might result in a user distrust / dislike in the system The System shall report on all the following items: Anomalies Events / alarms / alerts Tamper

Users (All users: Administrator, Supervisor & Field Users) Assigned Smart Devices.

Extensive reporting on the alerts is required.

Each alert shall have a priority level:

Status of alert shall be:

Accepted (Any intruder alarm condition shall be dispatch for immediate attention)

Outstanding (Escalation of outstanding alert depends on the severity of the alarm / event) Resolved / Authorised Clearing of Alarm

Reported via SMS and / or E-mail

Only supervisor and administrator users can reset key alarms on the web program after it has been cleared onsite

No alarm / event / alert condition should be cleared on the web program without the required action onsite; the system should escalate alarm / event / alert conditions to relevant action / responsible users if not cleared in specified time frame

## SOFTWARE INTEGRATION

It might be a requirement that the Service Provider needs to integrate their software with the above mentioned to ensure effective software and systems integration methods and to allow the understanding and importance of critical factors such as planning, systems design, requirements, software design, configuration management, integration, testing, quality integration, test facilities or any other requirements.



Rates will be called for if there is a need for investigations into all systems and proposals to execute such integration whether using middleware or any other methods.  
SANRAL has a converged server environment where all applications shall be hosted if requested

Software (subscription / maintenance / operations / upgrading / updates)

It shall be noted that the software should be made available to SANRAL for the entire duration of this contract.

Monthly "Subscription" / SLA based system, to benefit and receive software updates automatically, to ensure the latest and greatest version is available as soon as new functionality is ready and released. Along with updates, the service provider should provide unlimited full technical support at no additional cost for the duration of the contract

There shall be no additional costs for the first year of this contract from date of appointment for any server costs, software subscription / license fees, software access fees or any maintenance or operational costs in terms of the software program/s.  
Subscription fee escalation after the first year will be applicable on an annual basis  
Software should be continuously upgraded throughout the contract period at no additional cost to SANRAL

It is the Service Provider's responsibility to maintain and ensure the software program and all data captured is available 24/7/365 via their own secure servers  
All data captured shall be kept for record purposes for a minimum period of 3 years  
It will also be a requirement that the data bases be stored on SANRAL servers as well and be available and accessible 24/7/365

If the Service Provider ceases to trade and can't successfully complete his / her contract obligations for the contract period, then the Service Provider will be obliged to provide SANRAL full access to hardware, firmware and software to ensure that SANRAL can continue with its business for the contract duration period.

Asset/ works order management

The Asset / Access Control and Monitor System shall have a works order management module for the tracking of alerts and events raised. The module's functionality shall include but not limited to:

Assignment of Periodically Asset Inspection & Maintenance works orders, alerts / events to specific resource for resolution into the system and generation of a printable form of the work-order.

Date and frequency of the alert/event occurred

The option to update the status of the alert into the system and logging of the user who has updated the status

Date of resolution / completion

Software (support)

Service Providers should have the ability:

To provide general pre-and post-sales product information

To provide Hardware and software configuration and upgrade support To Collect relevant technical problem identification information

To Perform base problem determination

To Provide Support on the products, protocols and features

To Replace Field Replaceable Units (FRUs) or whole Hardware units as and when required

To resolve mis-configurations, troubleshoot and simulate complex configuration, hardware, and software problems

To perform Hardware diagnostics to determine Hardware malfunction and support problem isolation and determination of product specification defects

To provide lab simulation and interoperability and compatibility testing for new software and hardware releases prior to being deployed into a Customer production network

To define an action plan; provide advanced Support on all products, protocols and features; have the ability to analyze traces, diagnose problems remotely, and provide Customer with complete steps to reproduce a problem

To provide software enhancements such as patches and Hotfixes, fixing or generating workarounds that address software bugs; troubleshoot bugs that were not diagnosed during installation  
To work with Customers to resolve critical situations, and building action plans with Customers to address complex issues

### **F3.41. LIGHTING MANAGEMENT SYSTEM (LMS)**

Supply, install and commission a Lighting Management System suitable to the client's requirements and subject to approval by the client.

The user interface and central point of control of the lighting management system is via the Central Management System (CMS) component of the system. Via, the CMS one is able to perform several oversight, monitoring and control functions, inter alia:

- Real-time control
- Equipment failure reporting
- Energy consumption monitoring
- Equipment inventory
- Equipment failure analysis
- Event scheduling
- Work Orders generation

Via the CMS, the Service provider will be required to perform the following functions:

(i) Monitor, analyse and generate custom reports for the Employer for energy consumption, energy savings, equipment failures, fault alarms, device lifetime, work orders, equipment status and failure trends.

(ii) Manage the Contractor access and privileges on the system, with requisite approvals from the Employer

The System to be made up of the following components as a minimum:

#### **Luminaire Controller (LC)**

A luminaire controller should be installed in each Luminaire point. Luminaire controllers must communicate with the Zone Controller (ZC) / System server using a protocol that does not require additional wiring from the kiosk to each Luminaire. Communication should be in the form of wireless or other approved form.

LC's receive commands (ON, OFF, dimming, set values and parameters) and send data (e.g. lamp and ballast failures, low power factor, voltage, current, power, energy, burning hours, lamp feedback etc...) back to the Zone Controller (ZC) / System server. The software needs to be an open source software to be able to be supported with other similar software and the integration software used in the client's Control Room system.

#### **Zone Controller (ZC) (If Required)**

The Zone Controller is to be installed in the streetlight control kiosk if required as part of the system architecture. The ZC must have a 3 phase smart meter for billing of street lights, modem and scenario button. All information must be transmitted to the control room via fibre optic cables.

The Controller (ZC) must have its own clock to trigger the lamps as per scenario selected. It must also be able to send dimming commands at fixed and/or sunlight time. Lighting scenes must consider external conditions for switching and dimming). All information must be able to be transmitted and stored in the central database.

#### **(c) Software and server connectivity**

The software must be open source software and compatible with other similar lighting controllers. The software must be compatible with the integration software provided by the client in their control room server in Pietermaritzburg, Kwazulu-Natal. Control room staff must be able to monitor, control all the

streetlights fitted with controllers. Billing software must be provided to provide billing costs for the street lights. Communication to the Clients Server , located at the SANRAL offices in Pietermaritzburg, Kwazulu-Natal to be via Fibre optic cable or GMS is a fibre link is not suitable or available.

(d)User Management

Technical and control room staff must be able to monitor and control each street light installed with a controller. There should be a hierarchy system with password control for staff with different functional control. Monitoring should be accessible by all staff. Staff must also be able to access the software for monitoring and controlling via the web browser.

(e)System Architecture

Software must be open source and compatible with other similar systems. System architecture to include the following components:

Server  
Database  
Control and technical staff monitors  
Zone controllers  
Individual light controllers.

### **F3.42. APPROVED MANUFACTURERS**

Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

The manufacturer must be an ISO9001 certified company. Proof of certification is to be submitted together with the tender document, failing which the tender may be disregarded.

Products must carry the SABS mark or an international certification and approved for use in South Africa.

Installers must be certified or registered installers of the manufacturers or their representatives. Manufacturers or their representatives must also have registered offices in South Africa and the local office must carry sufficient stock and spare parts for the project.

### **F3.43. PRIORITY OF WRITTEN SPECIFICATION**

In the event of any disagreement between the written specification and the drawings, the written specification will take priority over the drawing(s).

### **F3.44. SCHEDULE OF STANDARD DRAWINGS**

The following drawings are part of the Sanral standard electrical drawings

Drawing No.	Title
TD-E-P-1000-1-V1	Anti-Vandal MSS
TD-E-P-1001-1-V1	AntiVandal MSS with Electronic Security
TD-E-P-1002-1-V1	Anti-Vandal Kiosk
TD-E-P-1003-1-V1	AntiVandal Kiosk with Electronic Security
TD-E-P-2000-1-V1	Anti-Vandal Pole 6-12 m
TD-E-P-2001-1-V1	Anti-Vandal Pole with Electronic Security
TD-E-P-3000-1-V1	LV Cable Trench
TD-E-P-3001-1-V1	MV Cable Trench
TD-E-P-3002-1-V1	Sleeve Installation
TD-E-P-4000-1-V1	LMS Topology
TD-E-P-4001-1-V1	Nema Socket on Luminaire
TD-E-P-6000-1-V1	Labeling & Tagging Detail

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## **PART C4: PROJECT INFORMATION**

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**PART C4: PROJECT INFORMATION**

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### Information Only

All data and descriptions contained in this section of the contract documents are given for information purposes only and cannot be interpreted as prescriptive or as an instruction despite the fact that the text may give the opposite perspective. If any conflict arises between the content of this section and other sections of the contract documents, the latter take precedence.

## C4.1 DESCRIPTION OF THE WORKS

The description of the works shall inter alia contain the following particulars regarding the work to be constructed and maintained under the contract.

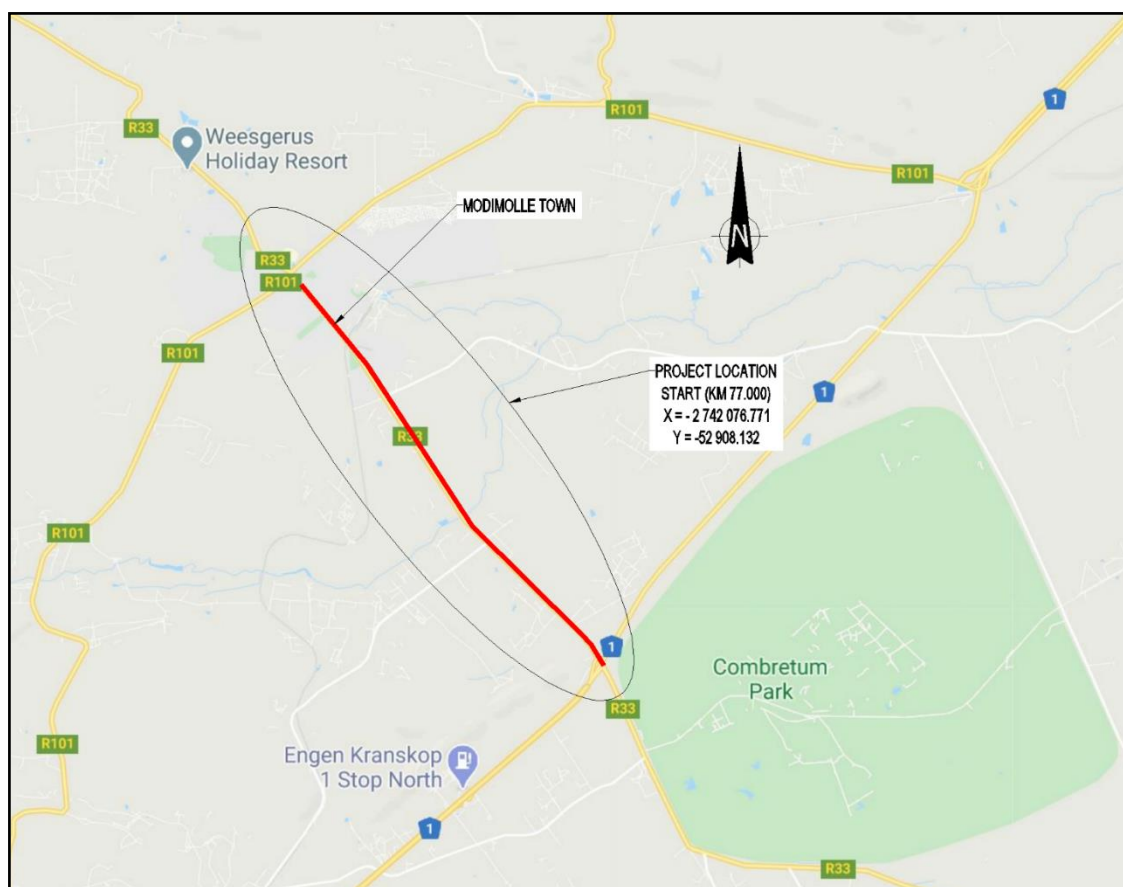
### C4.1.1 ROADWORKS

#### a) Route description

Project NRA R.033-120-2019/1 is located in the Limpopo Province along National Road R33 between the N1 and Modimolle. The section starts at Section 12 (Km 77.0), east of the eastern terminal of the N1 interchange and ends at Section 13 (Km 0.6) adjacent to the Correctional Services Facility. The limit of contract lies 600m after the intersection of R33 with R101 and falls adjacent to the Modimolle Correctional Centre. The total project length is 12.3km and includes the section through the town of Modimolle. The project is divided into two distinct sections namely:

- Section 12 Km 77.0 to Km 85.7 (8.7km): This section has rural characteristics.
- Section 12 Km 85.7 to Section 13 Km 0.6 (3.6km): This section has urban characteristics.

The project route is depicted in red below.



### Locality Map

## b) Intersections and accesses

There are four major intersections along the project length, the intersections' data is summarised below. Generally, intersections have substandard lanes widths and passive tapers which are used to allow lateral transition of traffic. The areas of concern/non-conformance are highlighted in red.

**Intersections summary**

Chainage	Description	Type	Lane Width	Bellmouth Radii	Skew Angle	Deceleration length	Passive Taper
(Km-)			(m)	(m)	(Degrees)	(m)	Y:X
77.6	N1	On& Off Ramps	3.7	15*	90	150	1:15
81.3	D599 (Bela Bela Road)	3-way (T)	3.3	15*	80	30	1:10
85.25	D1087 (Jasper Road)	3-way (T)	3.0	15*	100	-	1:11
88.7	R101	4-way (T)	3.3	15*	90	30	1:10

Further to the major intersections discussed above, there are several other roads intersecting the R33, these mostly serve as accesses to amenities/properties or local streets in Town.

There will be little or no work at access except where the access is impacted by the proposed widening design. A detailed access management plan forms part of the drawings.

## c) Current traffic

The road can be divided in two distinct sections namely:

- Section 12 Km 77.00 to Km 85.7 (8.7 km): This section has rural characteristics
- Section 12 Km 85.70 to Section 13 Km 0.6 (3.6 km): This section has urban characteristics

A broad overview of the route characteristics for the two sections is provided below:

- Section 12 Km 77.00 to Km 85.7
  - Traffic along this section is a combination of through traffic and origin/destination (OD) traffic resulting from inter-town movements. The land use is characterised predominantly by farming activities.
  - According to the classified movement counts, the average daily traffic (ADT) on this portion of the R33 varies between 3800 and 5800 veh/day. The Average Daily Truck Traffic (ADTT) is approximately 13.5%.
  - The road is a single carriageway, two-lane facility with no shoulders.
  - There are two major intersections, four minor intersections and approximately 20 access roads to farms along this portion of the R33.
  - Castle de Wildt, a point of sale auction house established exclusively for the selling and marketing of rare game, is situated along this portion of the R33.
- Section 12 Km 85.7 to Section 13 Km 0.60
  - This portion of the road passes through the town of Modimolle and currently operates as an urban road.
  - According to the classified movement counts, the ADT on this portion of the R33 varies between 5500 and 13300 veh/day. The ADTT makes up approximately 7% of the total ADT. The results of the classified movement counts are summarised in Table 3 6.

- The road has no shoulders and varies between a two-lane and four lane facility. There is on-street parking available at some sections.
- There are 18 intersections along this portion of the road. The most prominent intersection is the R33 (Nelson Mandela Drive) with R101 (Thabo Mbeki Drive).
- There is visible pedestrian movement along this road, especially adjacent to shopping centres.
- There are informal trading areas along this portion of the R33.

d) Existing lane configuration

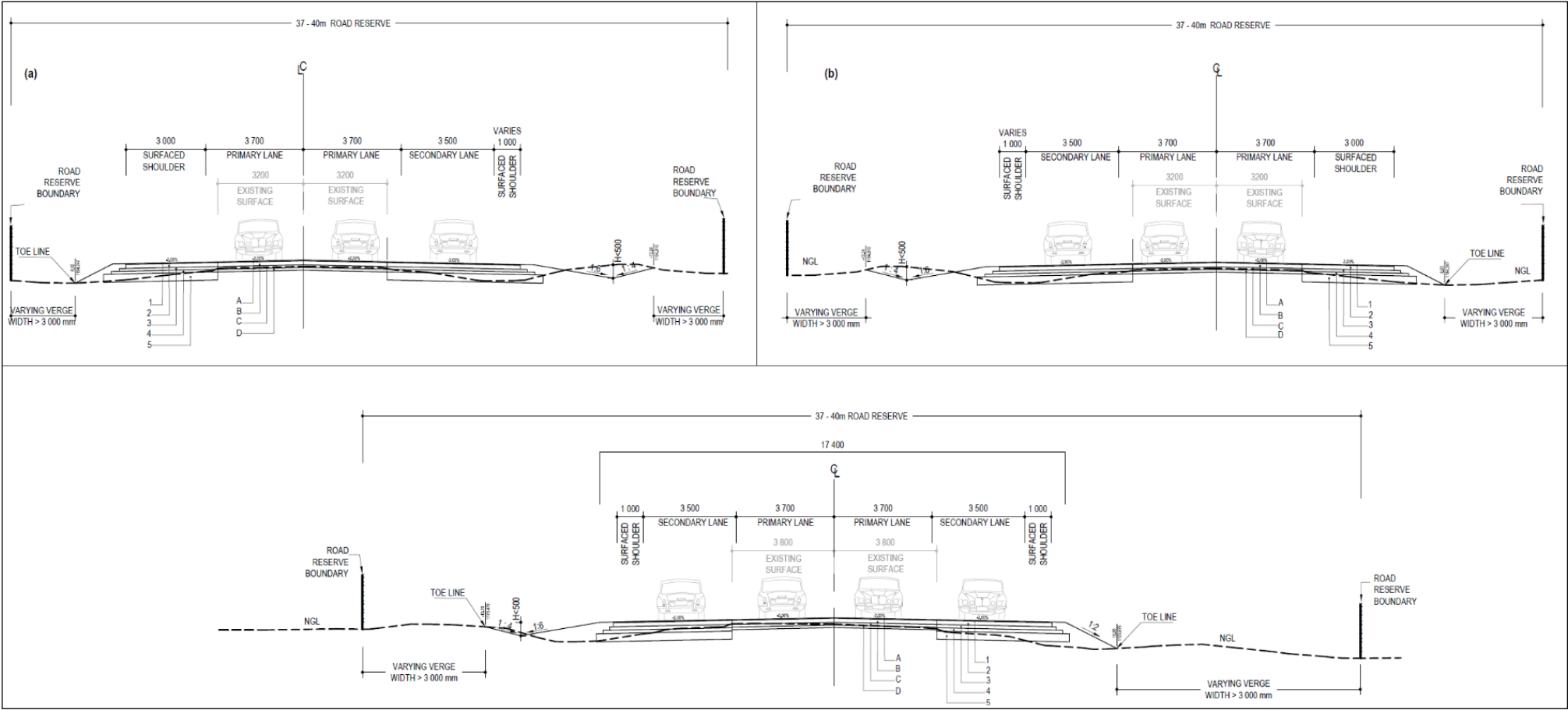
The existing cross section along the project route is as follows:

- Rural - Section over the N1 (Km 77.0-78.0):
  - 3.7m primary lane width,
  - 3.7m secondary lane width,
  - 2.5m paved shoulders.
- Rural/Urban - Section between the N1 and Rail bridge (Km 78.0 – 87.0):
  - 3.5m primary lane width,
  - 0 - 5m gravel shoulders.
- Urban - Section through Modimolle Town (R33-12\_Km 87.0 to R33-13\_Km 0.6):
  - 3.0 to 3.7m primary lane width,
  - 3.0m secondary lane,
  - 3.0m dedicated right turning lane,
  - 2.5m parallel parking.

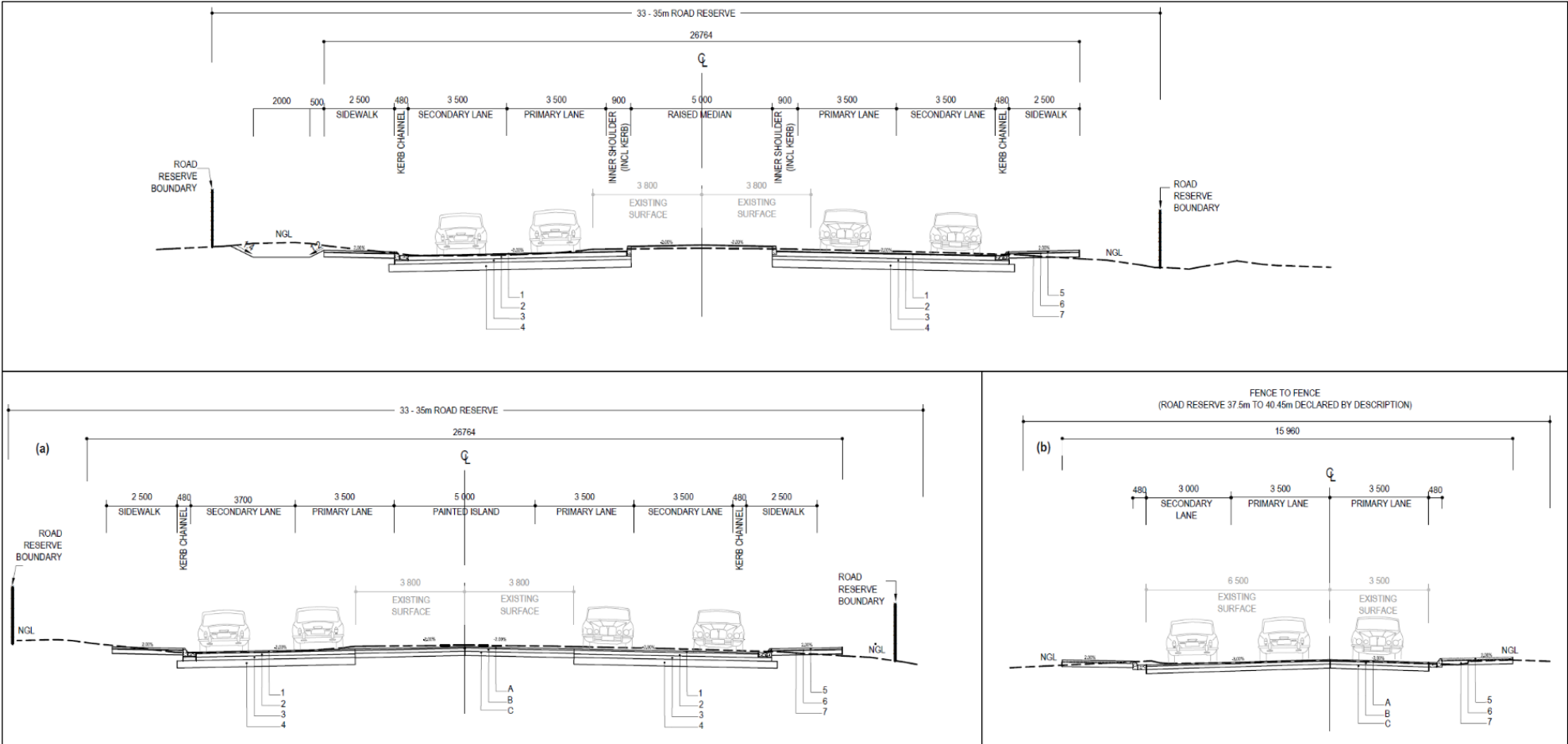
e) Carriageway improvements

The SANRAL recommended standard cross sections are based on the design vehicle and Annual Average Daily Traffic (AADT) figures for the infrastructure. The minimum AADT along the R33 corridor is 3 891 vehicles per day which triggers a 13.4m wide cross section (3.7m lanes and 3.0m shoulders). There are jurisdictional constraints on site at the N1 Bridge, the Rail Bridge and Section through Modimolle Town (i.e. kerb to kerb road reserve limitation). SANRAL's typical cross section as per typical drawings TD-R-XS-1201 Single Carriageway - AADT greater than 3 000vpd in 10 years have been adopted as far as practically possible. The cross-section application is shown on Drawing No 20568/TCS/01 and 20568/TCS/01. Typical details of the rural and urban cross-sections are shown in the figures below. Details of the roundabout at Km 85+260 is shown on Drawing No. 20568/LP/09 and 20568/RM/08.





Typical Rural Cross-Sections



Typical Urban Cross-Sections

## f) Guardrails

The guardrails observed along the project route are generally in good condition with minor defects that will be repaired under this contract. The existing guardrails will be adjusted to the new standard. Furthermore, there is a requirement for guardrails between Km 82.020 and Km 82.580 due the recommended vertical alignment lift at the river bridge. The guardrails will be on both sides of the road.

## g) Fencing

Fencing along the R33 is predominantly in a good condition, there were limited cases of missing fencing observed. The Figure below shows the general condition of fencing along the project length.

**Fencing general condition**

Majority of existing fences will remain in place apart from the areas where land is acquired such as the traffic circle and for the temporary deviation at the river bridge. Affected fences will be reinstated according to SANRAL standards once the roadworks are complete.

## h) Road signs

The main objective of road traffic signs is to regulate traffic in such a manner that road traffic flow and safety are promoted. The following road signage types were observed on site:



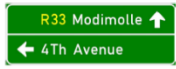











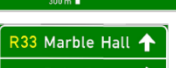




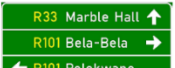



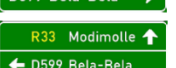

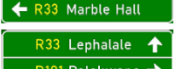



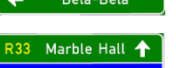




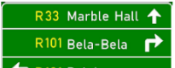
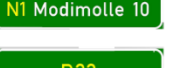










- Guidance/direction signs,
- Regulatory signs,
- Warning signs,
- Tourism signs,
- Private advertising,
- Information, and
- Illegal signs.

Generally, the road signs along the R33 are in a good condition with the exception of private tourism signage which is vastly degraded. Furthermore, private information/advertising signage was observed along the route and the condition is degrading. There is also a case of incorrect application. Majority of the road signs were replaced in October 2017, Some signs will be removed, stored and re-used while other will be removed and disposed off. New signs will also be erected to augment the new road prism. The Figure below is a depiction of road signage general condition along the project route.



### Typical road sign condition

The proposed road signage schedule is included below as well as part of the tender drawings.

ROAD SIGNS SCHEDULE											
SYMBOL	DESCRIPTION / REF	SIZE(mm)	QUANTITY	SYMBOL	DESCRIPTION / REF	SIZE(mm)	QUANTITY	SYMBOL	DESCRIPTION / REF	SIZE(mm)	QUANTITY
	R1	900	29		R217	1200	7		GD2/S16	3050x1200	1
	R2	1200x675 #20	2		W406	450x450	0		GD1/S11	3012x1200	1
	R2.2	1200x675 #20	4		W408	400x450	1		GD8/S12	8200x400	1
	R3	900	2		W409	1200x450	15		GD8/S14	11080x4200	1
	W201 + IN11.3	1200	3		R103	1200	9		GD2/S15	3240x1200	1
	R201-60	900	6		R211	1200	1		GD8/S16	8200x400	1
	R201-80	1200	2		GD2/S1	4750x2200	1		GD2/S17	3518x1200	1
	R201-100	1200	6		GD2/S2	4750x2200	1		GD2/S18	3450x1200	1
	W102 + IN11.3	1200	8		GD2/S3	4810x2200	1		GD1/S19	3018x1200	1
	GS205	3902 X 1600	3		GD2/S4	4750x2200	1		GD1/S20	3073x1200	1
	GS205/200	3902 X 1600	3		GD1/S5	4770x2200	1		GD1/S21	2880x400	1
	GS205/400	3902 X 1600	3		GD1/S6	4770x2200	1		GD1/S23	2360x1000	1
	GS101	1200 X 600	9		GD2/S7	3518x1600	2				
	GS101/200	1200 X 600	9		GD2/S8	3870x1200	1				
	GS101/400	1200 X 600	9		GD2/S9	4800x1200	1				
	R327	1200x900	7								
	W401	600x150	12								
	W402	600x150	12								
	W413	600x200	4								

## Road Signage Schedule

### i) Road markings

The assessment of the existing road markings was carried out in accordance with the SARTSM. Generally, the road markings observed on site are in accordance with the SARTSM. However, the condition of the road markings had severely degraded in most instances and affects the paint reflectivity, especially at night and during inclement weather conditions. The general condition of road markings along the R33 is shown below.





### Road marking condition

Provision for reinstatement and new road markings, in accordance with the SARTSM, forms part of the contract. Water based roadmarking will be used at the end of construction and thermoplastic roadmarking paint will be instated at the end of the defects liability period.

#### j) Landscaping

Landscaping and grassing will be required on the cut and fill batters where the roadway has been widened. Further grassing will be required in areas where erosion on the existing embankments are observed.

#### k) Utilities

A detailed services investigation was carried out to identify the exact locations and service owners. Electricity, telephone, water and sewer servitudes were observed on site. There is also the Magalies Water Pipeline located in a servitude adjacent to the road reserve. The waterline is not affected along majority of the route apart from at km 85.3 where the new proposed traffic circle will be implemented. The waterline will only need to be lowered and protected by a culvert for maintenance purposes. The contract details for the Magalies Water Pipeline are the following:

Name: Donald Montoedi  
Tel: 062 448 0733  
Email: donaldm@magalieswater.co.za

The identified relocation of services with it's schedule is indicated in Drawings 20568//US/01 to 20568//US/12.

It is also a requirement of this project that lighting is to be provided through the urban area. The lighting will form part of second tier procurement for a specialist subcontractor. The specifications and design will be issued by the Engineer during this procurement process. The main contractor shall be responsible for the civil works for the lighting.

#### l) Side drains

There are existing concrete lined side drains along the route. These drains will be rehabilitated. Some of these drains are silted with gravel and require cleaning. The chute outlets are also blocked or silted in some instances. Dilapidated side drains require maintenance and repair. Specific attention will be given to the transportation of soil in the run-off in areas with very steep and very flat slopes. The areas where erosion and

siltation occur have been redesigned to ensure ease of access for maintenance and adequate slopes to allow for self cleaning. Typical pictures of the cross drain conditions are shown in the figures below.



### Typical surface drainage problems

Provision is made for approximately 3034m of Figure 3 kerbs and 3567m of kerb and channel.

#### m) Down chutes

Drainage at high fills and large drainage structures will be managed by means of concrete kerbing and channelling as well as the addition of chutes with the necessary inlet and outlet structures. Existing positions of down-chutes will need to be retained and where widening of the roadway occurs, down-chutes need to be reinstated as per Drawing No 20568/TD/33.

#### n) Mitre banks and catchwater banks

Catchwater banks are to be provided along the top of cut embankments where necessary with strategically positioned down-chutes to accommodate stormwater run-off from catchment areas.

Mitre chutes will be constructed which will aid in restricting water from accessing the toe of the fills and embankments where flow lengths may exceed 150 m. Mitre banks and catchwater banks are to be provided as shown on Drawing no. 20568/CS/01, 20568/CS/02, 20568/TD/31 and 20568/TD/34.

#### o) Subsoil drainage

Existing subsoil drains are located predominantly along the cut sections of this route. The subsoil drains are silted at the outlets and require cleaning and maintenance.

3880m of new subsoil drains are to be installed, as the majority will not be able to be retained during the construction of the shoulder widenings. Drawing no. 20568/TD/42 provide details of the subsoil drainage.

#### p) Minor drainage structure

There are six (6) existing culverts along the route. A summary of the existing culverts are as indicated below.

## Existing culverts

EXISTING							
PIPE NAME	CHAINAGE (KM)	UNIT LENGTH (m)	NUMBER OF UNITS	CROSS SECTIONAL SHAPE	SIZE AND CLASS	NUMBER OF BARRELS	Total Lengths
PC01	81.793	21.747	9	Circular	0.600	1.00	21.75
PC02	82.498	12.495	20	Rectangular	1,6 * 1,8	2.00	24.99
PC03	83.335	13.821	6	Circular	0.600	1.00	13.82
BC04	83.520	12.431	10	Rectangular	1,5 * 1,8	1.00	12.43
PC05	85.899	25.373	10	Circular	0.850	1.00	25.37
PC06	86.111	35.707	15	Circular	0.850	1.00	35.71

Only minor culverts are discussed in this chapter. Inspection of the minor drainage culvert structures revealed that the culvert conditions range from fair to poor. The most common defects include:

- Blocked openings
- Ponding (upstream and downstream)
- Embankment erosion
- Silting
- Missing danger plates

### Lesser/Minor Culvert Capacity Hydrology

The catchments along the R33 are generally from the south western to north eastern. There are six (6) small catchments along the R33. These small catchments were determined where existing culverts are present.

The catchments can be summarized as follows:

### Catchment peak flows for lesser culverts

Catchment No.	Catchment Position	Catchment Area	Rational Method			Alternative Rational Method			SDF Method		
			Return Intervals			Return Intervals			Return Intervals		
			1:10	1:20	1:50	1:10	1:20	1:50	1:10	1:20	1:50
1	81.80	0.04	0.48	0.63	0.86	0.59	0.77	1.01	0.57	0.84	1.25
2	82.50	0.31	2.67	3.50	4.80	3.0	3.90	5.20	2.92	4.31	6.40
3	83.35	0.28	2.56	3.35	4.60	2.90	3.80	5.02	2.84	4.20	6.20
4	83.54	3.20	20.0	26.11	35.74	21.56	28.20	37.27	21.04	31.02	46.00
5	85.90	0.20	1.85	2.41	3.31	2.10	2.74	3.62	2.05	3.02	4.47
6	86.15	0.01	0.14	0.18	0.25	0.18	0.23	0.3	0.17	0.25	0.73

These catchments are predominantly in a rural area with few patches of cultivated land which were defined as rural in the analysis. It must be further noted that although the majority of the flows at these sections either flow parallel with the road, or only cross the road from very small catchment areas.

### Lesser Culvert Capacities

From the discharge and capacity calculations, the summary can be made as shown below.

### Existing culverts capacity assessment



Culvert Position	No. of Barrels	Dia /Height (D)	Width (B)	Road Class	T		2T		Evaluation Criteria		
					Design Flood- $Q_T$	Flood Capacity - $Q_{C1}$	Overtopping Design Flood- $Q_{2T}$	Flood Capacity- $Q_{C2}$	$Q_{C1} > Q_T$	$Q_{C2} > Q_{2T}$	Capacity Upgrade
									(Yes /No)	(Yes /No)	Required
81.80	1.00	0.600		3	0.50	0.41	0.60	0.89	No	Yes	No
82.50	2.00	1.600	1.8	3	2.80	14.70	3.50	15.73	Yes	Yes	No
83.35	1.00	0.600		3	2.60	0.44	3.40	0.94	No	No	Yes
83.54	1.00	1.500	1.8	3	20.00	6.67	26.11	8.17	No	No	Yes
85.90	1.00	0.850		3	2.00	1.03	2.40	1.81	No	No	Yes
86.15	1.00	0.850		3	0.14	1.06	0.18	2.28	Yes	Yes	No

As seen a (3 of 6) number of these crossings as marked in red, it was found that the these culverts do not meet the required capacity. After assessments, capacity and/or erosion issues were identified at some of the existing culvert positions. These issues are addressed by the addition of culverts and/or the construction of berms and/or earth channels.

#### Proposed Culverts

A number of the existing culverts have limited function mainly due to the siltation of inlets and outlets. This is largely resultant from the inherently drainage plain. Provision is made to the cleaning and lengthening of existing culverts in the urban area. To prevent siltation the outlet channels will be shaped to allow culverts to daylight in particular where the road alignment is not raised.

The hydrological and hydraulic assessments is undertaken indicates that the existing culverts are not adequate to cater for the cross drainage. The cross-section development and vertical profile takes cognisance of this and has adjusted to allow for additional drainage structures as indicated in the below.

**Proposed Culverts**

Drainage schedule (Pipe Crossings)														
Pipe name	Chainage (km)	Skew angl	Start invert level (m)	End invert level	3d length to inside edges	Unit length (m)	Number of units	Slope	shape	Size and class	Barrels	Catchment area (km2)	Design q (m3/s) v(m/s)	Status
BC01	81.796	90°00'00"	1145.575m	1144.964m	21.168	28.935	12	2.11%	Rectangular	h 450 x w 1 200 mm	1	0.57127	1.538 3.138	UPGRADE EXISTING
BC02	82.498	63°00'00"	1142.536m	1142.054m	31.081	33.229	82	1.45%	Rectangular	h 1 500 x w 1 800 mm	3	3.203494	12.595 5.771	UPGRADE EXISTING
BC03	83.52	130°00'00"	1149.619m	1149.390m	22.311	22.826	28	1.00%	Rectangular	h 1 200 x w 2 100 mm	3	0.18434	16.151 5.437	UPGRADE EXISTING
BC04	85.254	130°00'00"	1169.320m	1168.431m	79.819m	79.819	98	1.11%	Rectangular	h 450 x w 1 200 mm	1	0.20025	1.535 2.814	UPGRADE EXISTING
BC05	85.9	131°00'00"	1157.718m	1157.256m	44.652m	44.652	55	1.03%	Rectangular	h 450 x w 1 200 mm	2	0.20615	1.551 2.842	UPGRADE EXISTING
PC06	86.109	106°00'00"	1155.282m	1154.960m	32.886m	32.886	13	1.00%	Rectangular	h 450 x w 1 200 mm	1	1.01035	1.520 3.100	NEW
PC07	86.28	131°00'00"	1153.721m	1152.915m	47.721m	47.721	20	1.69%	Rectangular	h 600 x w 1 200 mm	2	0.60644	1.855 3.786	NEW
Total						290	308							

## q) Sequence of construction and traffic accommodation

It is noted that the traffic volumes over the project length exceed 3000 veh/day. Construction activities adjacent to the road will have an impact on normal flow of traffic, however such impact will be actively managed throughout the construction period to ensure the following:

- Keep roadwork related accidents to a minimum,
- Maintain roadway capacity and traffic flow at the highest levels possible, and
- To develop a communication system to road users that keeps them vigilant of oncoming activities or lane width changes, thereby increasing road user safety.
- Maintain two-way traffic at all times.

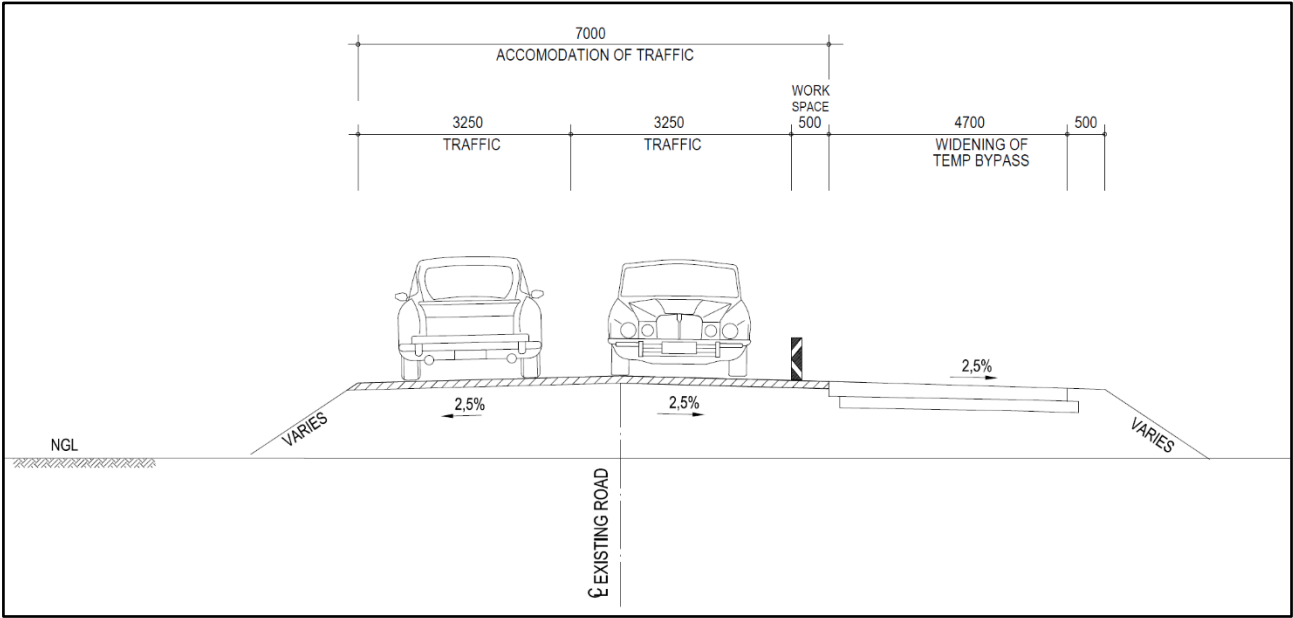
The aforementioned objectives will be achieved through the following traffic management norms and standards:

1. All temporary signs will conform to the exclusive colour code except for regulatory control signs e.g. STOP, YIELD and NO ENTRY, and existing direction signs which can be easily re-positioned at traffic deviations,
2. Regulatory and warning sign sizes will be increased a minimum size equivalent to that applicable to a design speed 20 km/h higher than the speed limit within the roadworks,
3. Where high approach speeds and/or large traffic volumes pertain, sign messages are repeated at a minimum of 100m intervals along the length of a roadway, and
4. Tapers and crossover design are directly related to the design speed of the temporary change of alignment.

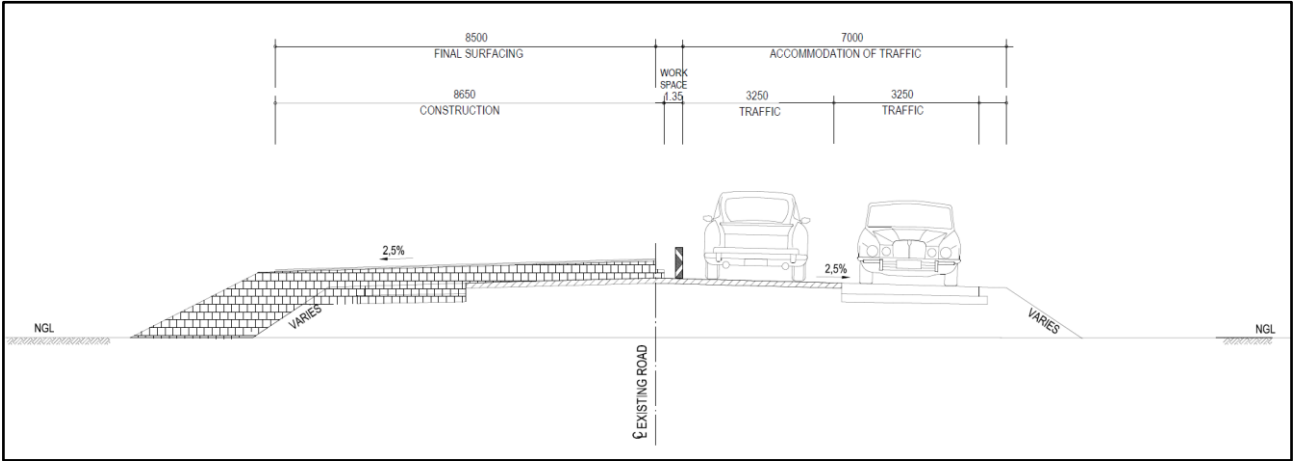
The traffic management strategy proposed for the R33 is contraflow. The minimum width required for safe operations and traffic manoeuvre is 8m which comprise 3.25m bi-directional lanes, 0.8m width for barrier/delineators and a 0.8m inner shoulder for traffic traveling on the work zone side.

A temporary pavement strip will be constructed to widen the existing surface to the minimum width required. The Figures show the phased traffic management strategy to be employed during construction for the rural section. The speed will be posted at 40km/h during construction to accommodate the narrow working spaces, especially during the initial stage for constructing the temporary bypass widening.

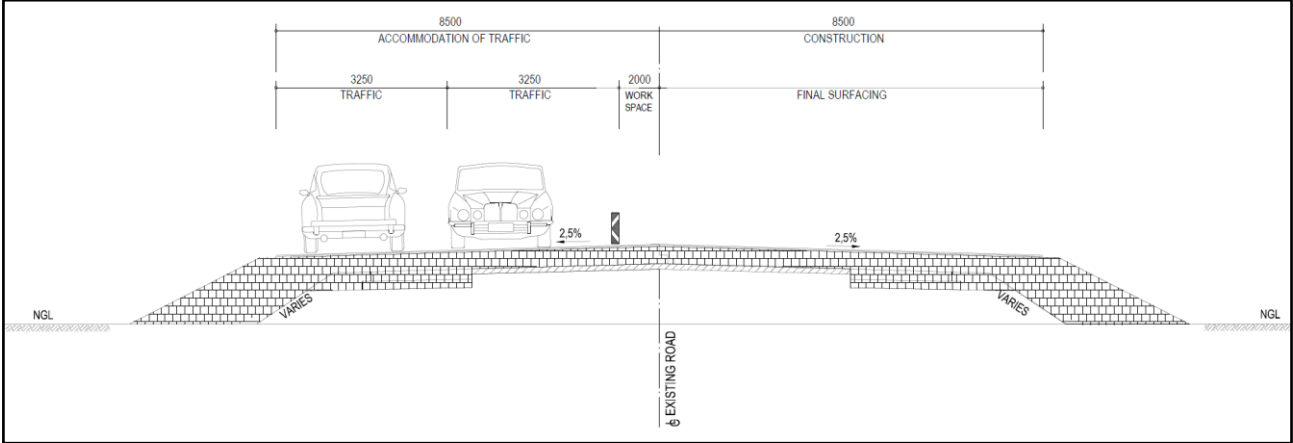
A 1.1km temporary bypass will be constructed to enable construction of the new river bridge. The bypass is constructed for a 1:5 year flood. It is also designed as an over-toppable structure. Should the flood exceed a 1 in 5 year flood it is a requirement that the traffic will have to be diverted to alternate routes.



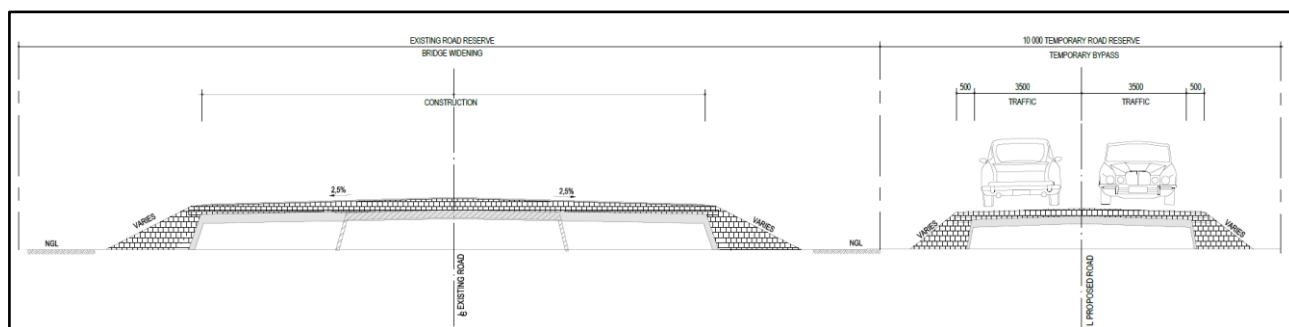
Contraflow traffic accommodation strategy (Rural Phase 1)



Contraflow traffic accommodation strategy (Rural Phase 2)



Contraflow traffic accommodation strategy (Rural Phase 3)



## Temporary Bypass during river bridge construction (Rural Phase 2)

### C4.1.2 PAVEMENT DESIGN FOR ALL PARTS OF THE VARIOUS ROADS

#### a) Existing pavement

No as-built pavement information could be sourced for the project route. Volume 6 does have the insitu materials test pits results and summary available for consideration. Details regarding the existing pavement derived from test pits is described in Volume 6.

#### b) Pavement improvement and widening

The pavements structures can be divided in several uniform sections based on the Geometric cross-sectional development, insitu treatments and the widenings applicable. The cross-section application is shown on Drawing No 20568/TCS/01 and 20568/TCS/01. Details of the roundabout at Km 85+260 is shown on Drawing No. 20568/LP/09 and 20568/RM/08.

These sections is as follows:

- Section 1: Km 77 to km 77.8
- Section 2: km 77.8 to km 81.08
- Section 3: km 81.08 to km 85
- Section 4: km 85 to 86.27 (Round about)
- section 5: km 86.27 to 86.66
- Section 6; KM 86.66 TO 88.7
- Section 7: km 88.7 to 89.3 (SECTION 13 KM 0.6)

A summary of the pavement design is contained in the table below. For more detail on the proposed pavement refer to Volume 6.

Uniform Section	Pavement Structures per section	
	On existing road footprint	Widening of road prism and where fill allies
<b>Uniform Section 1 (Km 77 – 77.8)</b>	S2 (20/10) (PG58E-22) 200mmNME2 (Import 0 mm to 100 mm G2 and insitu recycle using NME technology and compact to 102% MDD)	No Widening
<b>Uniform Section 2 (Km 77.8 - 81.08)</b>	S2 (20/10) (PG58E-22) 150mm G1 100mm C3 Upper (At least G5b) (import materials) 100mm C4 Lower subbase (at least G6) (combination of import and insitu)	S2 (20/10) (PG58E-22) 150mmG1 @ 88% ARD 100mmC3@ 97% MDD 100mmC4 @95% MDD 300mmG7 @ 93% MDD Fill / R+R 150mm G9 @95% MDD Impact rolling of roadbed

	<p>The existing pavement material in the upper subbase level of the final road level, shall to be milled off or removed by other means and used in the lower subbase.</p> <p>The reclaimed materials shall be used as either top up for lower subbase on either the existing road profile or as lower subbase of the widening. (55% of road section length)</p> <p>On areas of fill the lower Subbase layer shall be imported from Employers sources (G6) or commercial sources (G6). (45% of the road section length)</p>	
<p><b>Section 3</b> <b>(Km 81.08 - 85.0)</b></p>	<p>S2 (20/10) (PG58E-22) 150mm G1 125mm C3 Upper (At least G5b) (import materials) 125mm C4 Lower subbase (At least G6) (combination of import and insitu)</p> <p>The existing pavement material in the upper subbase level of the final road level, shall to be milled off or removed by other means and used in the lower subbase.</p> <p>The reclaimed materials shall be used as either top up for lower subbase on either the existing road profile or as lower subbase of the widening. (51% of road length)</p> <p>On areas of fill the lower Subbase layer shall be imported from Employers sources (G6) or commercial sources (G6) (49% of the road section length)</p>	<p>S2 (20/10) (PG58E-22) 150mmG1 @ 88% ARD 125mmC3@ 97% MDD 125mmC4 @95% MDD 300mmG7 @ 93% MDD Fill / R+R 150mm G9 @95% MDD Impact rolling of roadbed</p>
<p><b>Section 4</b> <b>(Km 85.0 - 86.2)</b> <b>Round About.</b></p>		<p>50mm AC Sa-E14 (PG64E-22) [EVA] 110mm BTB St-E20 (PG64E-22) [SBS] 150mm C4 @ 95% MDD 300mmG7 @ 93% MDD Fill / R+R 150mm G9 @95% MDD</p>
<p><b>Section 5</b> <b>(Km 86.27 - 86.66)</b></p>	<p>50mm AC Sa-E14 (PG64E-16) [EVA] 110mm BTB St-E20 (PG64E-16) [SBS] 150mm C4 insitu recycle and stabilise.</p> <p>The insitu material to be box cut in areas of cut, with minor fill between km 86.2 and 86.3. Cut material to be used in lower subbase.</p>	<p>50mm AC Sa-E14 (PG64E-16) [EVA] 110mm BTB St-E20 (PG64E-16) [SBS] 150mm C4 @ 95% MDD 300mmG7 @ 93% MDD Fill / R+R 150mm G9 @95% MDD</p>
<p><b>Section 6</b> <b>(Km 86.6 - 88.7)</b></p>	<p>50mm AC Sa-E14 (PG64E-16) [EVA] 110mm BTB St-E20 (PG64E-16) [SBS] 150mm C4 insitu recycle and stabilise.</p> <p>The insitu material to be box cut of 160mm. Cut material to be used in lower subbase of close point.</p>	<p>Urban section – No widening</p>

<p><b>Section 7 (Km 88.7-89.3)</b></p>	<p>50mm AC Sa-E14 (PG64E-16) [EVA] 110mm BTB St-E20 (PG64E-16) [SBS] 150mm C4 insitu recycle and stabilise.</p> <p>The insitu material to be box cut of 160mm. cut materials to be used in the widening lower subbase.</p>	<p>50mm AC Sa-E14 (PG64E-16) [EVA] 110mm BTB St-E20 (PG64E-16) [SBS] 150mm C4 @ 95% MDD 300mmG7 @ 93% MDD Fill / R+R 150mm G9 @95% MDD</p>
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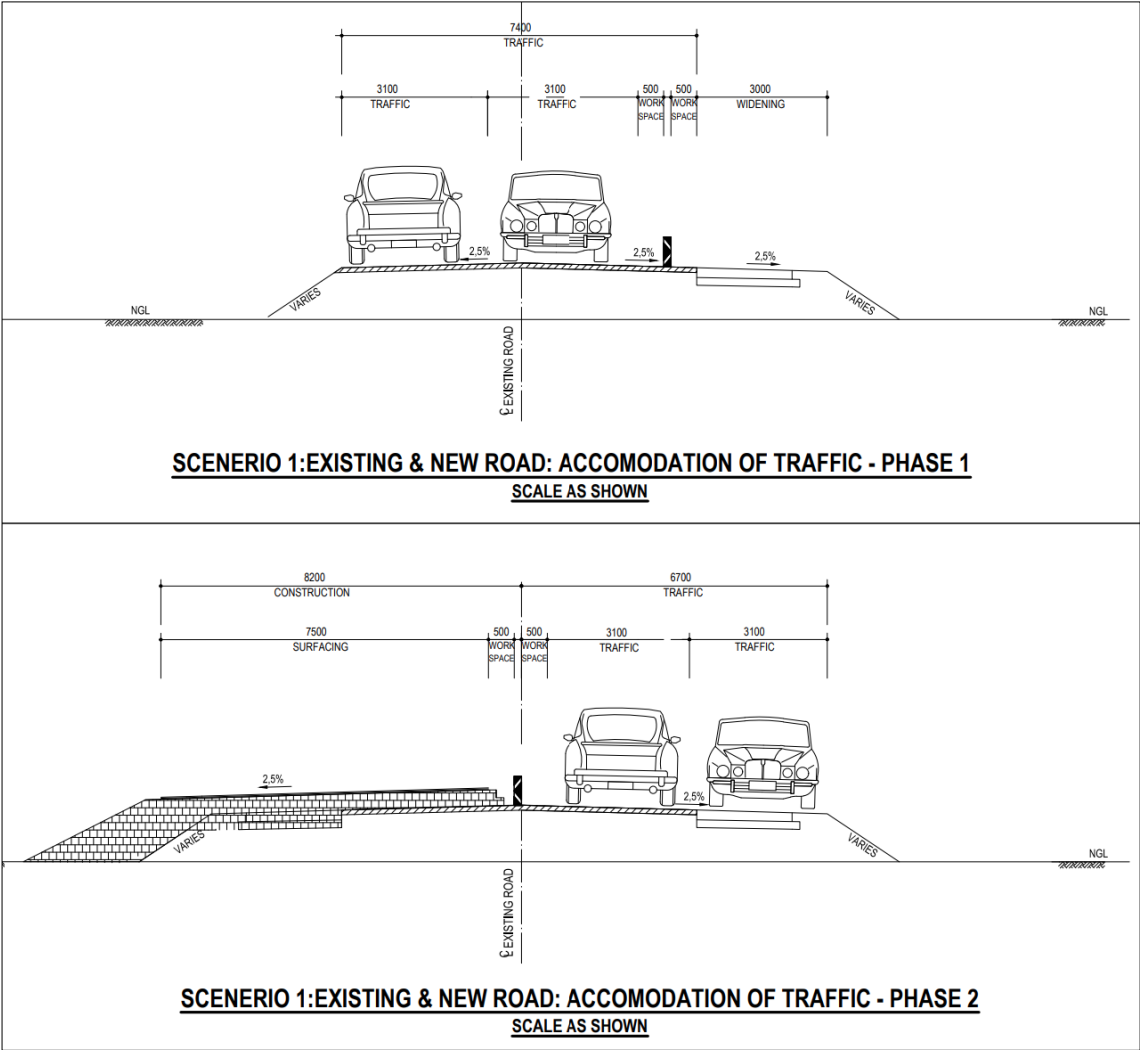
### c) Widening for temporary pavement structure

Where the existing road prism is be widened to accommodate traffic, the widening, shall conform the requirements of the permanent works including benching. The widening shall be constructed as per the drawings, to the final width of the permanent works.

The temporary pavement will be built up to the level of the existing road surface as per the drawing below. The Base shall be Grade 5b layer to ensure durability during the contraflow stage.

The pavement structure shall tie in with the permanent works and shall be as follows:

S1 (7mm) (70/100) PG58V-22	S1 (7mm) (70/100) PG58V-22
150mm Base	G5b Imported from Employer source or commercial, Compacted to 98% MDD.
150mm Subbase	At least G6, Imported from Employer source or commercial, Compacted to 95% MDD
300mm Selected	At least G7, Imported from Employer source or commercial, Compacted to 93% MDD
Fill/ Subgrade	Imported from Employer source or commercial, Compacted to 95%MDD



d) Bypass temporary pavement structure

A bypass shall be constructed at km81+620 to km 82+840. The bypass shall be constructed with the pavement structure as indicated below in the areas that is not overtopped. Km to km is excluded.

S1 (7mm) (70/100) PG58V-22	S1 (7mm) (70/100) PG58V-22
150mm Base	NME3, G5b Imported from Employer source or commercial, Compacted to 98% MDD.
150mm Subbase	C4 Imported from Employer source or commercial, Compacted to 95% MDD
300mm G7	Imported from Employer source or commercial, Compacted to 93% MDD
Fill/ subgrade	Imported from Employer source or commercial, Compacted to 95%MDD

Between km ?? and km ?? the pavement structure is changed to included a 150mm concrete slab.

S1 (7mm) (70/100) PG58V-22	S1 (7mm) (70/100) PG58V-22
150mm Base	Concrete slab (structural drawings,
150mm Subbase	C4 Imported from Employer source or commercial, Compacted to 95% MDD



300mm G7	Imported from Employer source or commercial, Compacted to 93% MDD
Fill/ subgrade	Imported from Employer source or commercial, Compacted to 95%MDD

#### e) Asphalt mix requirements for project

The following mix types will be used:

##### Urban section:

##### St-E20 (PG64E-16{SBS})

Stone skeletal mix -

Asphalt mix: Hot-mix asphalt

NMPS: 28 mm

For use in: Extreme heavy traffic loading and speed conditions ("E")

Binder Modifier: Homogeneous modified (SBS)

##### Sa-E14 (PG64E-16{EVA})

Sand skeletal mix - Continuous

Designated: "Sa"

Asphalt mix: Hot-mix asphalt

NMPS: 14 mm

For use in: Extreme heavy traffic loading and speed conditions ("E")

Binder Modifier: Homogeneous (EVA)

##### On Bridge and culvert decks

##### Sa-E14 (PG64E-16{EVA})

Sand skeletal mix - Continuous

Designated: "Sa"

Asphalt mix: Hot-mix asphalt

NMPS: 14 mm

For use in: Extreme heavy traffic loading and speed conditions ("E")

Binder Modifier: Homogeneous (EVA)

##### Sa - V7(PG64V-16)

Sand skeleton mix (i.e. continuously graded mix - levelling course)

Designated: "Sa"

Asphalt mix: Hot-mix asphalt

NMPS: 7 mm

For use in: Extreme heavy traffic loading and speed conditions ("E")

Binder Modifier: none

#### f) Traffic accommodation on existing roads

##### Existing road roads for traffic accommodation:

For the temporary works on the existing pavement to allow for traffic accommodation the following is considered:

- Base and surface repair of pavement failures

Details in Volume 6 and the repairs to be done as per COTO chapter 4 and 5. Refer to Contract Data.

#### g) Treatment of the foot print for widenings

The major concern for widenings and fill is the top 2m horizon of the insitu material which requires densification. The footprint between km 78 to 85 indicated collapsible materials. These materials shall be treated by means of HEIC (high impact compaction rollers) or Impact roller (25KJ) to ensure that the upper 2m of the insitu materials are identified and the materials are collapsed.

As the collapsible horizon is some 1.5m thick impact rolling is deemed sufficient. More intense methods such as dynamic compaction will therefore not be required.

The top 0 to 1.0m of the in-situ material should be compacted via impact rolling to between 85 to 90% Mod AASHTO at a moisture content greater than optimum.

#### C4.1.3 STRUCTURAL WORKS

The structural scope of works consists of two bridges and one major culvert. The locations of the structures are as shown in Figure 1. Further details of the structure (inclusive of structure type, name, chainage and envisaged work on structures) are summarised in Table 1.

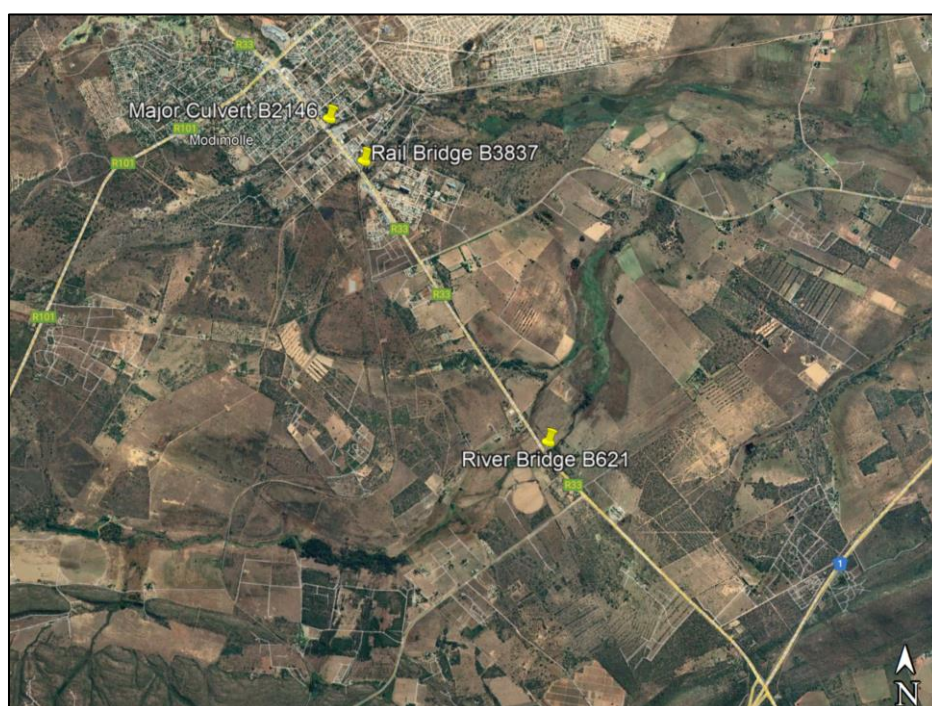


Figure 1: Existing Structures' Locality Along the R33 Section 12

Table 1: List of existing Structures

Road km	Structure No. & Name	Overpass / Underpass	Feature Crossed	New or Existing	Structure Description	Envisaged Work
82.1	B621 Nyl River Bridge	Overpass	River	Existing	5 x 3.5m simply supported spans	New Bridge
86.6	B3837 Rail Bridge	Overpass	Rail	Existing	Continuous solid slab deck (3 span: 2x6.4m and 1x9.6m)	Rehabilitation of Bridge

87.5	B2146 Major Culvert	Overpass	River	Existing	Multi cell box culvert (4 cells)	New Culvert
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(a) *Culverts*

## (i) General

The scope of works consists of the demolition of the existing major culvert and construction of a new major culvert to comply with SANRAL drainage requirements.

## (ii) Traffic Accommodation

The new culvert can be constructed in half widths as the existing roadway is wide enough to accommodate two lanes of traffic during the construction of the new culvert.

Major Culvert B2146: Major Culvert in Town (km 87.5)

## Existing Culvert Details

The major culvert is in the CBD of Modimolle and is located along a straight horizontal alignment of route R33, Section 12. The culvert provides access across a stream and is orientated perpendicular to the road alignment. The structure consists of 4 cell openings (previously upgraded from a 3-cell structure). The culvert edges are flanked by single sided steel guardrails. The overall structure length is 9.6m whilst the overall roadway width is 15.1m including 2 x 1.550m raised sidewalks. The existing roadway width from kerb to kerb is 11.1m divided as follows:

- 2 x 3.7m through lanes
- 1 x 2.7m on the Northbound and
- 1 x 1.0m surfaced shoulders

An aerial view and elevation of the structure is shown in *Figure 2* and *Figure 3*.



Figure 2: Aerial view of major culvert B214





Figure 3: Elevation of major culvert B2146

#### New Culvert Structure

The new culvert is a 3-cell cast insitu concrete box culvert (3.0 m wide x 2.0 m high per cell). The finished surface road level will remain unchanged whilst the invert level of the culvert being lowered (by approximately 0.5m) to accommodate the peak flood level through the culvert. Earthworks channelling of the water course will be required to accommodate the new invert level of the culvert.

#### (b) Bridges

##### (i) General

The scope of works consists of the demolition of the existing bridge and construction of a new bridge to suit the upgraded road vertical alignment, whilst accommodating the peak flood through the structure.

##### (ii) Traffic Accommodation

A temporary drainage structure incorporating corrugated steel “ARMCO” culverts is required at the stream crossing with the proposed by-pass during demolition and construction of the new bridge.

The existing bridge will be demolished in preparation for the construction of the new bridge as soon as the traffic can be diverted over the temporary drainage structure. The temporary structure will be demolished once construction of the new road and bridge are complete and operational.

#### Bridge B621: Nyl River Bridge (km 82.1)

##### Existing Details

River Bridge B621 is along the end of the curved horizontal alignment of route R33, Section 12. The bridge provides access across a river at a skew angle of 5 degrees. The bridge consists of five simply supported solid slab decks founded on reinforced concrete wall type piers and abutments. The deck edges are flanked by single sided steel guardrails.

The overall length of the bridge is 17.5m, consisting of 5 x 3.5m spans. The maximum pier height from the riverbed level is approximately 2.7m. The overall deck width is 8.530m wide, with the existing roadway width from kerb to kerb being 7.33m divided as follows:

- 2 x 3.0m through lanes
- 2 x 0.665 m surfaced shoulders

An aerial view and elevation of the structure is shown in *Figure 4* and *Figure 5*.



Figure 4: Aerial view of bridge



Figure 5: Elevation of bridge B621

New Bridge

The new bridge will be a continuous three-span, cast in-situ prestressed integral spine beam and top slab deck structure, supported on solid integral wall piers and abutments. The substructures will be supported on 900 diameter augured piles (approximately 15m in depth) socketed into rock

- (c) Other structures
- None
- (d) Rehabilitation of structures
- (i) General

The scope of works consists of the rehabilitation of one road over railway bridge. The structure is summarized in the table below.



**Table 2: Existing Bridges Requiring Rehabilitation**

Bridge Number / Name	Distance (km)	Number of Spans	Overall Length	Bridge Width	Angle of skew
B3837 Road over Rail bridge	86.6	3	28.7 m	13.2 m	30.56°

## (ii) Traffic Accommodation

The rehabilitation work on the bridge will be carried out concurrently with traffic accommodation in place for the upgrading of the road over the bridge. The rehabilitation works through the rail bridge itself will have to be coordinated with Transnet.

Work on the balustrades and deck (after milling) can be done in half widths when the traffic is crossing the bridge in contra-flow.

For the installation of joints stop-and-go traffic accommodation shall be used if it cannot be completed during the accommodation of traffic in contra-flow for the upgrade of the road.

Bridge B3837: Road over Rail Bridge (km 86.6)

## Existing Details

Bridge B3837 is situated at km 86.6, along a straight horizontal alignment of route R33 - Section 12. It provides access across the railway line. Bridge B3837 consists of a continuous solid slab deck supported on reinforced multi-column piers and abutments. The span layout of the bridge is 8.2 x 12.3 x 8.2m and the overall length of the bridge is 28.7m. The existing road width across the bridge kerb to kerb is 11.4m divided as follows:

- 2 x 3.7m through lanes
- 1 x 3.0m turning lane
- 1.0m surfaced shoulder

The overall deck width inclusive of 2 x 0.9m raised sidewalks is 13.2m. An aerial view and elevation of the structure is shown in Figure 6 and Figure 7.



Figure 6: Aerial view of bridge B3837



Figure 7: Elevation of Bridge B3837

#### Upgrading and Rehabilitation

Upgrading works for the existing bridge structure includes the following:

- Construction of inlets and down-chutes at bridge approaches to dissipate storm water to the surrounding areas beyond the bridge approaches

Rehabilitation works proposed for the existing bridge structure include:

- Milling and replacing of surfacing on the deck (and deck approaches)
- Corroded guardrails to be replaced, with guardrails bolted to end-blocks
- Damaged stone pitching will be replaced
- OHTE specialist to be appointed to determine if there are stray currents prevalent at the bridge due to the overhead electrical lines and to propose solutions for the mitigation thereof
- Bridge kerbs and sidewalks will be replaced
- Covered bridge joints to be replaced with asphaltic plug type joints
- New surfacing to the bridge deck
- High pressure water jetting (at least 1000 kPa to remove curing compounds, membranes etc. without producing an exposed aggregate finish) to clean all concrete surfaces
- Exposed reinforcement to be coated with corrosion inhibitor
- Crack and spall repairs to all concrete elements (superstructure, substructure, parapets, etc).
- Protective spray-applied treatments to all concrete exposed surfaces

#### C4.1.4 MAINTENANCE WORKS

Maintenance of the works during construction and defects notification periods.  
Information on Routine Road Maintenance Contracts

#### C4.1.5 Construction materials

##### **Crushed Stone Aggregate**



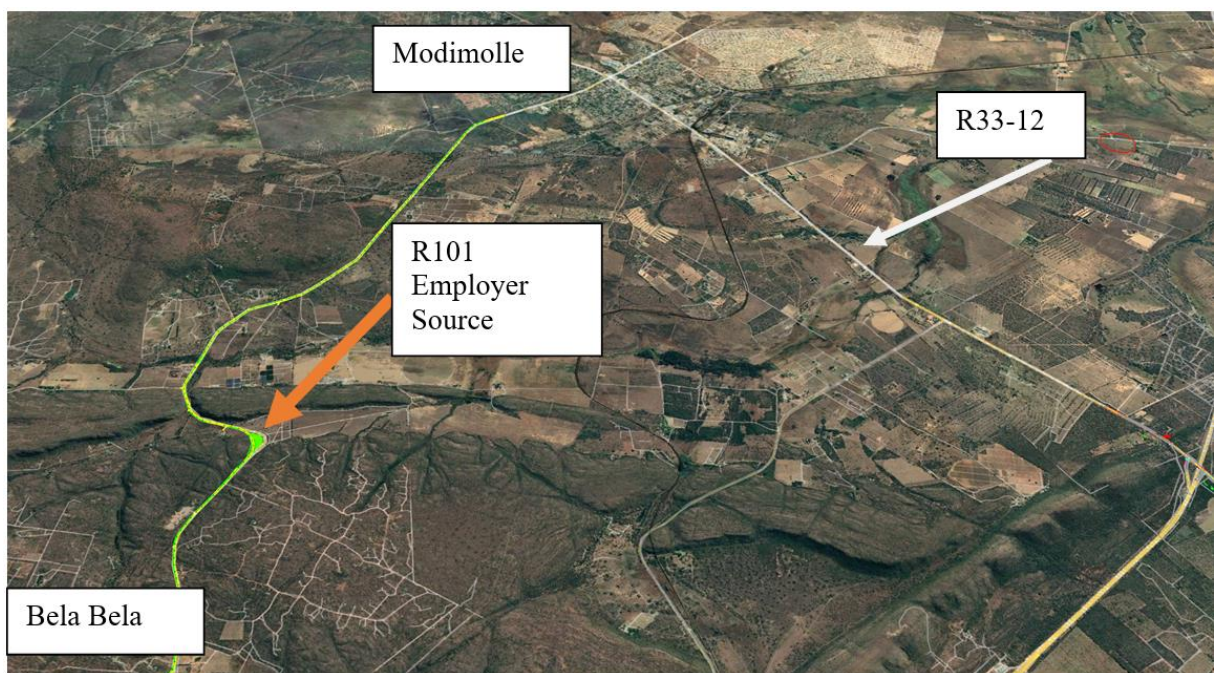
Commercial crushing operations that capable of producing aggregates suitable for producing crushed materials (G1 to G5a) are situated within reasonable proximity to the site.

The available materials sources are tabled below:

- Wearne Polokwane (146km)
- Rooiberg Stone (105km)
- Employers Source (25km)

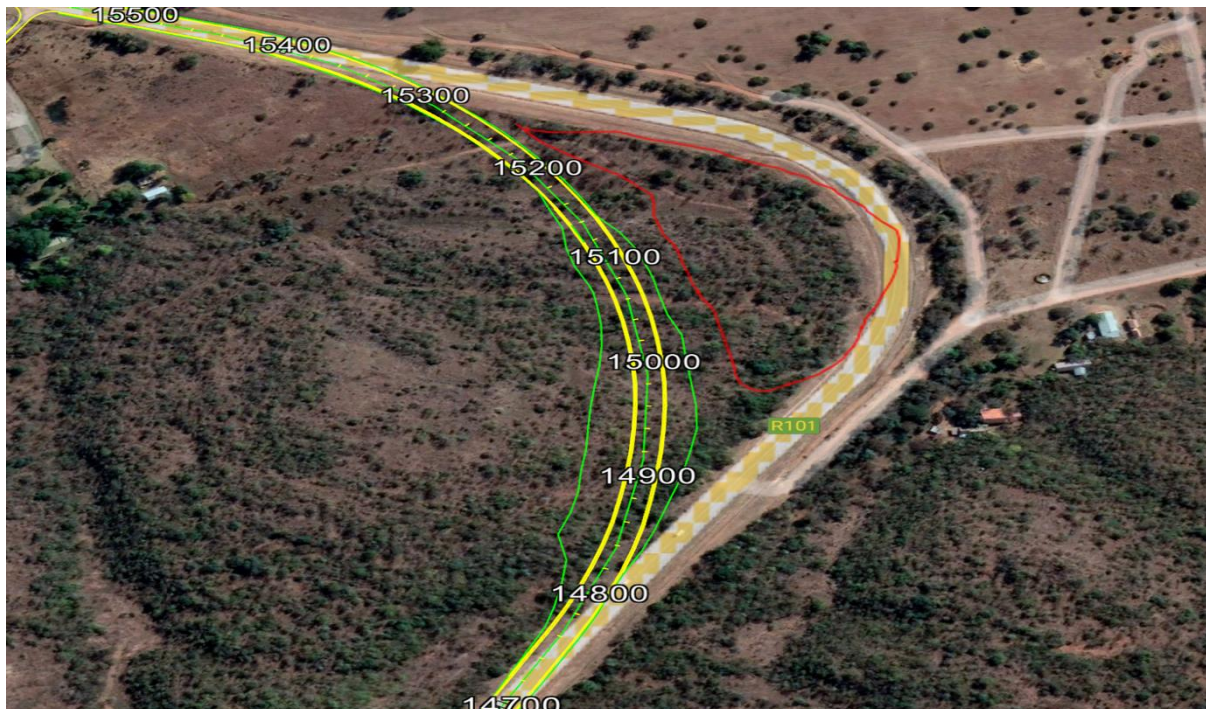
Gravel material will be sourced from Employer sources and insitu milling for lower subbase, selected layers and fill. The Employer source is currently located at km 15 on the R101, on the adjacent Contract. The purchasing of the materials will be dealt with under COTO clause C4.4.3. The tenderer will purchase the materials from the Contractor on the R101, at the Contractors, tendered rate. This will then be claimed against the provisional sum allowed under schedule COTO Clause C4.4.3. The location of the sources is indicated below.

The contractor will be permitted to use his own sources provided the necessary permissions are available.



**Figure 8: Position of Employers source in relation to the R33 project**





**Figure 9: Position of Employers source in relation to the R33 project close up**

### **Asphalt Plants**

There are existing commercial asphalt plants within hauling distance to the site. These are listed below.

- Rooiberg Asphalt (50km) - Naboomspruit- 083 825 6817
- Rooiberg Asphalt (119km)- Onderstepoort- 0838256817
- National Asphalt (119km) – Onderstepoort
- Much Asphalt (146km) – Polokwane
- Polokwane Surfacing (149km) – Polokwane
- Much Asphalt – Benoni Plant (192km)

### **Water**

The Contractor will be responsible for sourcing of water.

## **C4.2 DRAWINGS**

The drawings that form part of the tender document are issued for tender purposes only.

The contractor will be supplied with one set of paper prints plus a CD containing all the construction documentation.

Only figured dimensions may be used and drawings may not be scaled unless so instructed by the engineer. The engineer will supply all figured dimensions omitted from the drawings.

The levels given on bridge drawings are subject to confirmation on site, and the contractor shall submit all levels to the engineer for confirmation before he commences any structural construction work. It is the contractor's responsibility to check all clearances given on the drawings and to inform the engineer of any discrepancies.

## **C4.3 CAMP ESTABLISHMENT, POWER SUPPLY AND OTHER SERVICES**

The contractor is to make his own arrangements concerning the supply of electrical power and all other services. No direct payment will be made for the provision of electrical and

other services. The cost thereof is deemed to be included in the rates and amounts tendered for the various items of work for which these services are required.

#### **C4.4 CONSTRUCTION IN CONFINED AREAS**

It will be necessary for the contractor to work within confined areas. In certain places the width of the fill material and pavement layers may decrease to zero and the working space may be confined. The method of construction in these confined areas largely depends on the contractor's constructional plant.

Regardless, measurement and payment will be in accordance with the specified cross-sections and dimensions only, irrespective of the method used for achieving these cross-sections and dimensions. It is deemed that the rates tendered in the Pricing Schedule include full compensation for all special equipment and construction methods and for all difficulties encountered when working in confined areas and narrow widths, and at or around obstructions. No extra payment will be made nor will any claim for additional payment be considered in such cases. (Refer to standard specification sub-clause C1.1.3.2(b)).

#### **C4.5 MANAGEMENT OF THE ENVIRONMENT**

The contractor will be responsible for construction according to an environmental management plan in terms of Section C1000 Scope of Works.

The contractor must take the utmost care to minimise the impact of his establishment and other construction activities on the environment and must adhere to the requirements as set out in Section C of the Scope of Works. Where the contractor fails to adhere to these requirements the specifications in Section C of the Scope of Works provide the methodology and cost liability of remedy.

#### **C4.6 TRAFFIC**

Contraflow traffic is to be maintained at all times.

#### **C4.7 SMALL CONTRACTOR DEVELOPMENT, TRAINING AND COMMUNITY LIAISON**

The South African National Roads Agency SOC Limited is committed to the implementation of Government's policies and in turn expects the same from its contractors. Accordingly, it is a requirement of this project that tenderers are familiar with the specifications that relate to the transformation of the construction industry through the following:

- (i) adherence to the policies of the Reconstruction and Development Programme and other similar Government initiatives,
- (ii) employment and/or creation of Targeted Enterprises,
- (iii) arrangement of generic skills, engineering skills and entrepreneurial skills training programmes for which provision has been made in the Pricing Schedule,
- (iv) construction using labour maximisation principles and,
- (v) active participation with community-based structures.

Tenderers should note that liaison with Community Stakeholders via active participation with the Project Liaison Committee, as well as employment of people from within the community, are essential parts of the project. A provisional sum to cover costs incurred by members of the community in the liaison process has also been included in the Pricing Schedule.

Section D of the Scope of Works covers the contractor's requirements in detail, as well as defining the targets that comprise the Contract Participation Goal (CPG).

#### **C4.8 CLIMATE**

The project is located in the Limpopo Province which falls within a moderate climatic region with a Weinert N of 2 to 5 according to TRH4(1996). Thornthwaite's Moisture Index varies from -20 to 0 which indicates a dry sub-humid macro-climatic region.

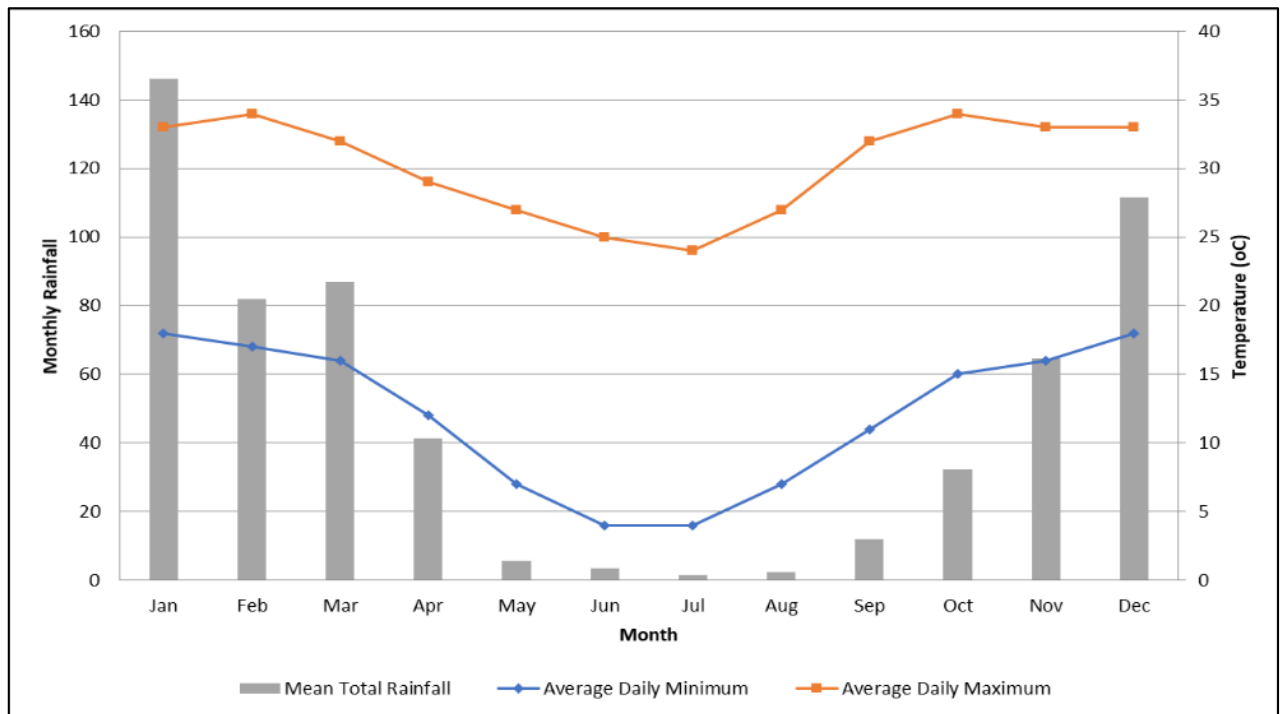
Climatic data from the nearest weather station in Warmbaths Towoomba, located 52km from Modimolle, was obtained based on weather reports collected during 2005 to 2015. The monthly average minimum and maximum temperatures and monthly average rainfall figures are summarised below.

Modimolle receives 589 mm of rain per year on average, with most rainfall occurring during summer. It receives the lowest rainfall (1.4 mm) in July and the highest (146 mm) in January. The monthly distribution of average daily temperatures ranges from 14°C in July to 25.5°C in January, February and December.

#### Summary of Climatic Data (based upon 10-year period)

Month	Temperature °C			Mean Total Rainfall (mm)
	Average Daily Minimum	Average Daily Maximum	Average Daily Temperature	
<b>Jan</b>	18.0	33.0	25.5	146.1
<b>Feb</b>	17.0	34.0	25.5	81.9
<b>Mar</b>	16.0	32.0	24.0	86.9
<b>Apr</b>	12.0	29.0	20.5	41.4
<b>May</b>	7.0	27.0	17.0	5.6
<b>Jun</b>	4.0	25.0	14.5	3.3
<b>Jul</b>	4.0	24.0	14.0	1.4
<b>Aug</b>	7.0	27.0	17.0	2.3
<b>Sep</b>	11.0	32.0	21.5	12
<b>Oct</b>	15.0	34.0	24.5	32.3
<b>Nov</b>	16.0	33.0	24.5	64.6
<b>Dec</b>	18.0	33.0	25.5	111.6
<b>TOTAL</b>				<b>589.4</b>

(Source: <https://www.timeanddate.com>)



**Average monthly rainfall and temperatures (based upon 10-year period)**

#### **C4.9 REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS 2014**

Refer to Section E of the Scope of Works for general requirements in terms of the OH&S requirements.

#### **C4.10 SAFETY PROCEDURES**

All incidents pertaining to safety transgressions, of any kind of nature, shall be reported to the Engineer's staff in writing within 24 hours of the occurrence thereof. Should the Engineer require further details such details shall be submitted to the Engineer in writing within 72 hours of the Engineer's request unless otherwise agreed between the Engineer and the Contractor in the case where further investigations are required. There is a high risk of community involvement and stoppages during construction and the contractor is required to ensure adequate safety measures are put in place to mitigate this risk.

#### **C4.11 OTHER INFORMATION**

Exceptional high traffic volumes are experienced on this section of road during Easter Weekend and during the school holidays. Traffic accommodation must take this into account to minimise delays and build-up of traffic.

All material not sourced from the construction process shall be from commercial sources.

#### **C4.12 AGREEMENT TO OCCUPY SANRAL'S PROPERTY**

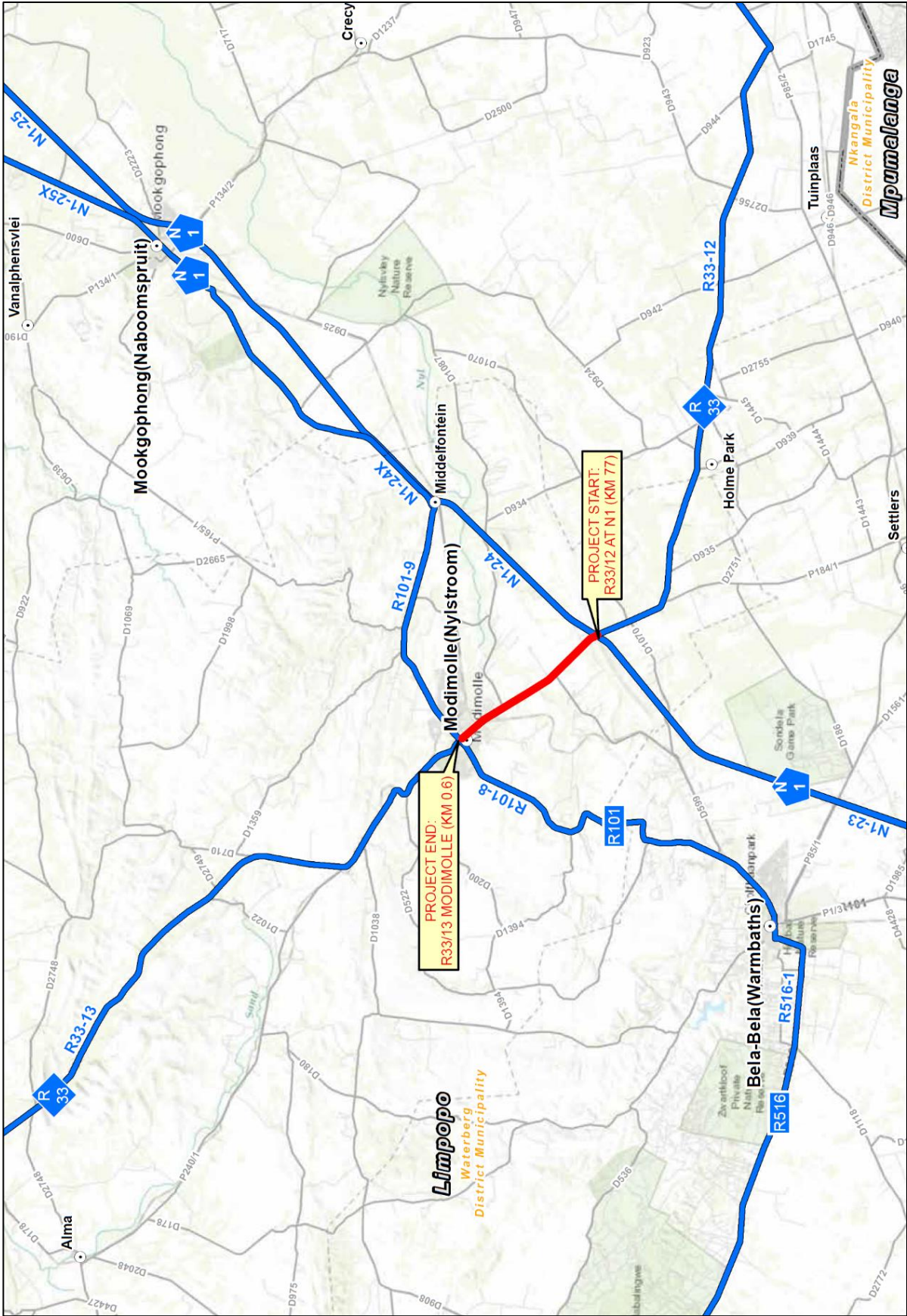
In the event that SANRAL-owned land will be made available for the use of the contractor for his construction camps, offices, stores, workshops and/or testing facilities, the use of such land will not be treated as a lease but will form part of the contract. In this regard the contractor shall complete the prescribed agreement and comply with all the conditions thereof as if it is part of the contract. The Employer's appointed service provider who administers and manages SANRAL owned land, will facilitate the process and the contractor shall liaise and co-operate with the service provider in this regard. The availability of land is indicated below.

#### **C4.13 APPENDICES**

Appendix 1:	Locality Plan
Appendix 2:	Weather Data
Appendix 3:	Traffic Data
Appendix 4:	Agreement to Occupy SANRAL's Property
Appendix 5:	Dispute Adjudication Agreement
Appendix 6:	Imported content
Appendix 7:	CPG Plan
Appendix 8:	SANRAL Project Liaison Committee Guidelines
Appendix 9:	Checklist for PLC and PLO
Appendix 10:	Proforma subcontract document
Appendix 11:	General requirements for Community Development Project.
Appendix 12:	Recycler and insitu checklist



APPENDIX 1: LOCALITY PLAN

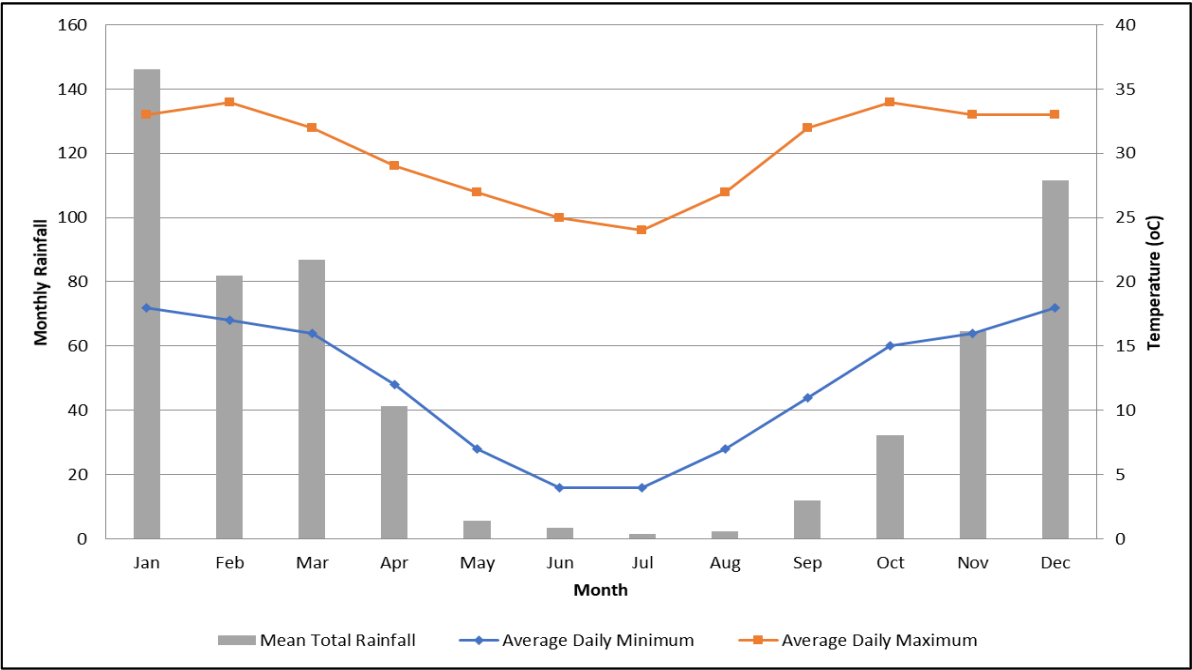


## APPENDIX 2:WEATHER DATA

## Summary of Climatic Data (based upon 10-year period)

Month	Temperature °C			Mean Total Rainfall (mm)
	Average Daily Minimum	Average Daily Maximum	Average Daily Temperature	
<b>Jan</b>	18.0	33.0	25.5	146.1
<b>Feb</b>	17.0	34.0	25.5	81.9
<b>Mar</b>	16.0	32.0	24.0	86.9
<b>Apr</b>	12.0	29.0	20.5	41.4
<b>May</b>	7.0	27.0	17.0	5.6
<b>Jun</b>	4.0	25.0	14.5	3.3
<b>Jul</b>	4.0	24.0	14.0	1.4
<b>Aug</b>	7.0	27.0	17.0	2.3
<b>Sep</b>	11.0	32.0	21.5	12
<b>Oct</b>	15.0	34.0	24.5	32.3
<b>Nov</b>	16.0	33.0	24.5	64.6
<b>Dec</b>	18.0	33.0	25.5	111.6
<b>TOTAL</b>				<b>589.4</b>

(Source: <https://www.timeanddate.com>)



Average monthly rainfall and temperatures (based upon 10-year period)



**APPENDIX 3: TRAFFIC DATA**

CTO 19984

<b>Data</b>	<b>2018</b>	<b>2019</b>
<b>Service Provider</b>	<b>SANRAL</b>	<b>UNITRAF</b>
<b>Location</b>	<b>Km 77.6</b>	<b>Km 77.6</b>
<b>Survey Dates</b>	<b>23/05/2018 – 08/06/2018</b>	<b>26/07/2019 – 08/08/2019</b>
<b>Survey Period</b>	<b>16 days 1 hour 45 min</b>	<b>14 days</b>
<b>Average daily traffic (ADT)</b>	<b>2796</b>	<b>2799</b>
<b>Total vehicle split North/Southbound</b>	<b>21.1:78.9</b>	<b>21.0:79.0</b>
<b>30<sup>th</sup> highest volume</b>	<b>-</b>	<b>-</b>
<b>Average daily truck traffic (ADTT)</b>	<b>370</b>	<b>286</b>
<b>% Trucks</b>	<b>13.2</b>	<b>10.21</b>
<b>Truck % split Northbound (Short/Medium/Long) Southbound (Short/Medium/Long)</b>	<b>57:11:32 46:17:37</b>	<b>Not recorded</b>
<b>Average light vehicle speed (km/h)</b>	<b>64.6</b>	<b>Not recorded</b>
<b>Average heavy vehicle speed (km/h)</b>	<b>49.7</b>	<b>Not recorded</b>
<b>Night traffic (%) – All vehicles</b>	<b>17.4</b>	<b>Not recorded</b>

## CTO 19095

<b>Data</b>	<b>2018</b>	<b>2019</b>
<b>Service Provider</b>	<b>SANRAL</b>	<b>UNITRAF</b>
<b>Location</b>	<b>Km 80.2</b>	<b>Km 80.2</b>
<b>Survey Dates</b>	<b>02/02/2017 – 18/02/2017</b>	<b>26/07/2019 – 08/08/2019</b>
<b>Survey Period</b>	<b>16 days 5 hours 15 minutes</b>	<b>14 days</b>
<b>Average daily traffic (ADT)</b>	<b>4936</b>	<b>4567</b>
<b>Total vehicle split North/Southbound</b>	<b>49.7:50.3</b>	<b>50:50</b>
<b>30<sup>th</sup> highest volume</b>	<b>-</b>	<b>-</b>
<b>Average daily truck traffic (ADTT)</b>	<b>583</b>	
<b>% Trucks</b>	<b>14.4</b>	<b>10.03</b>
<b>Truck % split Northbound (Short/Medium/Long) Southbound (Short/Medium/Long)</b>	<b>50:13:37 49:15:36</b>	<b>Not recorded</b>
<b>Average light vehicle speed (km/h)</b>	<b>94.4</b>	<b>Not recorded</b>
<b>Average heavy vehicle speed (km/h)</b>	<b>79.4</b>	<b>Not recorded</b>
<b>Night traffic (%) – All vehicles</b>	<b>19.7</b>	<b>Not recorded</b>

## CTO 19826

<b>Data</b>	<b>2018</b>	<b>2019</b>
<b>Service Provider</b>	<b>SANRAL</b>	<b>UNITRAF</b>
<b>Location</b>	<b>Km 1.3</b>	<b>Km 1.3</b>
<b>Survey Dates</b>	<b>24/07/2017 – 08/08/2017</b>	<b>26/07/2019 – 08/08/2019</b>
<b>Survey Period</b>	<b>14days 20 hours 30 minutes</b>	<b>14 days</b>
<b>Average daily traffic (ADT)</b>	<b>6095</b>	<b>5853</b>
<b>Total vehicle split North/Southbound</b>	<b>50.3:49.7</b>	<b>51:49</b>
<b>30<sup>th</sup> highest volume</b>	<b>-</b>	<b>-</b>
<b>Average daily truck traffic (ADTT)</b>	<b>648</b>	
<b>% Trucks</b>	<b>10.6</b>	<b>6.62</b>
<b>Truck % split Northbound (Short/Medium/Long) Southbound (Short/Medium/Long)</b>	<b>61:11:29 58:12:31</b>	<b>Not recorded</b>
<b>Average light vehicle speed (km/h)</b>	<b>78.4</b>	<b>Not recorded</b>
<b>Average heavy vehicle speed (km/h)</b>	<b>73.6</b>	<b>Not recorded</b>
<b>Night traffic (%) – All vehicles</b>	<b>14.9</b>	<b>Not recorded</b>

#### **APPENDIX 4: ROUGHNESS DATA**

EXCEL SPREADSHEET CONTAINING DATA INCLUDED ANNEXURE TO TENDER.

## **APPENDIX 5: AGREEMENT TO OCCUPY SANRAL'S PROPERTY**

### **1. Definitions**

For the purpose of this clause, the following words, phrases and expressions shall have the respective meanings assigned to each of them as set out hereunder:

- 1.1 "Commencement Date" shall mean \*\*\*.
- 1.2 "Designated Person" shall mean an employee, director, agent, independent contractor and/or representative of SANRAL, as the case may be;
- 1.3 "the Property" shall mean the property delineated on the plan annexed hereto marked "Appendix A";
- 1.4 "Termination Date" shall mean \*\*\*.

### **2. Option to occupy the Property**

- 2.1 SANRAL hereby grants the Contractor an option to occupy the Property for the purpose of:
  - 2.1.1 \*\*\*;
  - 2.1.2 \*\*\*.
- 2.2 The Contractor may exercise the option referred to above by notifying SANRAL, within 30 (thirty) days of the Tender Award that it intends to use the Property, failing which this option will lapse and be of no further force or effect.

### **3. Use of the Property**

- 3.1 In the event that the Contractor exercises the option to occupy the Property, it may do so with effect from the Commencement Date,
- 3.2 The Property may not be used for any purpose other than that prescribed above without the prior written approval of SANRAL.
- 3.3 If SANRAL is unable to give the Contractor occupation of the Property on the Commencement Date for any reason whatsoever, whether or not occasioned by the negligence of SANRAL and/or the Designated Person, the Contractor shall have no claim of whatsoever nature against SANRAL or the Designated Person.
- 3.4 SANRAL does not warrant that the Property is or will be suitable for any of the purposes for which the Contractor requires the Property.
- 3.5 SANRAL does not warrant that the Contractor will be granted or provided with any licences, consents, authorities, services or permits in respect of the Property for the proposed use thereof by the Contractor.
- 3.6 The Contractor shall comply with all laws, by-laws and regulations (including but not limited to the requirements of the Occupational Health and Safety Act 85 of 1993) relating to the Property and shall not contravene or permit contravention of any of the conditions of title under which the Property is held by SANRAL or any of the provisions of the town planning scheme applicable to the Property, nor do or cause or permit to be done in or about the Property anything which may be or cause a nuisance or disturbance to occupiers of neighbouring properties.
- 3.7 The Contractor's right to occupy the Property shall terminate on completion of Contract No. \*\*\*.

4. **Electricity, water and other services**

- 4.1 The Contractor may not install or arrange for any services such as water and electricity to be installed on the Property without the prior written consent of SANRAL.
- 4.2 In the event that SANRAL grants the consent referred to above, the Contractor shall be liable for the payment of all amounts due for the consumption of such services on the Property.
- 4.3 The Contractor hereby indemnifies and holds SANRAL harmless against any claim for payment for the consumption of services on the Property or any claim of whatsoever nature arising therefrom.

5. **Exclusion of claims**

- 5.1 The Contractor shall have no remedy against SANRAL and/or the Designated Person:
  - 5.1.1 by reason of the Property or any part thereof or any improvement thereto being in a defective condition or in a state of disrepair;
  - 5.1.2 in respect of any damage caused to furniture, equipment or any assets of any nature whatsoever kept on the Property by the Contractor, its employees, invitees, agents, directors or representatives;
  - 5.1.3 in respect of any claim of whatsoever nature for loss or damages allegedly suffered by the Contractor, its servants, invitees, agents, directors, clients or representatives arising from loss of life and/or injury to persons on the Property.
- 5.2 The Contractor hereby indemnifies and holds harmless SANRAL and/or the Designated Person against any claim arising from the Contractor's occupation of the Property.

6. **Sub-letting**

The Contractor shall not be entitled, except with the prior written consent of SANRAL:

- 6.1 to cede all or any of the rights of occupation of the Property; or
- 6.2 to sublet or give up possession of the Property, in whole or part, to any third party.

7. **SANRAL's Right of Entry**

SANRAL and/or the Designated Person shall be entitled to enter the Property at all reasonable times for the purpose of inspecting it in order to determine that the Contractor is complying with the rights and obligations granted to it with respect to the Property.

8. **Obligation to maintain the Property**

- 8.1 Prior to the Contractor taking occupation of the Property, SANRAL and the Contractor shall jointly inspect the Property.
- 8.2 During such inspection, the Contractor shall record the condition of the Property and any improvements thereto on the Inspection Form attached hereto marked "Appendix B". In the event that the Contractor does not arrange for the completion of such form, the Contractor shall be deemed to have accepted the Property as being without defect and in good order and repair.
- 8.3 At all times during the Contractor's occupation of the Property, the Contractor shall care for and maintain the Property in good order and repair, including any improvements thereto.

- 8.4 On the Termination Date or the date of termination of the Contractor's occupation of the Property, as the case may be, the Contractor shall return the Property and any improvements thereto in good order, condition and repair, fair wear and tear excepted, provided that SANRAL shall not be obliged to compensate the Contractor for any expenditure incurred by the Contractor in complying with the Contractor's obligations of maintenance, repair and replacement provided for herein.
- 8.5 Prior to the date of termination of occupation of the Property by the Contractor, SANRAL and the Contractor shall arrange a joint inspection of the Property and improvements thereto. Such inspection is to take place within a period of 3 (three) days prior to the date of termination with a view to ascertain if there was any damage caused to the Property or improvements thereto before the Contractor vacates the Property. SANRAL and the Contractor shall record the result of their inspection on the Inspection Form annexed hereto marked "Appendix C".
- 8.6 SANRAL and the Contractor shall make reference to the initial Inspection Form attached hereto marked Appendix "B" when undertaking the inspection prior to termination of the Contractor's occupation and shall record any damages or lost items which shall be repaired or replaced by the Contractor before the Contractor vacates the Property.
- 8.7 Should the Contractor fail to repair such damages to the Property or improvements thereto or fail to replace any missing articles, SANRAL may attend thereto and recover the cost thereof from the Contractor.
- 8.8 Should the Contractor fail to respond to SANRAL's request for an inspection, SANRAL shall, on termination of the Contractor's occupation of the Property, inspect the Property within 7 (seven) days from such termination in order to assess any damages or loss which occurred during the Contractor's occupancy, and may recover such loss or damages from the Contractor.

**9. The Contractor's Employees**

- 9.1 The Contractor shall not allow any of its employees and/or their relatives to live on the Property.
- 9.2 The Contractor shall be held liable for all persons entering onto the Property and such persons shall be considered to be under the control of the Contractor.
- 9.3 On the termination of the Contractor's occupation of the Property, the Contractor shall ensure that the Property is returned to SANRAL vacant and free of any unlawful or lawful occupiers.
- 9.4 In the event that any person remains in occupation of the Property on termination of the Contractor's occupation of the Property, and SANRAL is obliged to obtain a Court Order to enable it to evict such person, the Contractor shall be liable for all and any costs in this respect, including but not limited to legal costs and costs for relocating such person.

**10. Remedies for Breach and Cancellation**

Should the Contractor:

- 10.1 fail to comply with any of the terms and conditions relating to its occupation of the Property, as provided for herein; or
- 10.2 abandon the Property,

then, after having received written notification to remedy such breach within 7 (seven) days and having failed to do so, SANRAL shall have the right, but not be obliged to either:

- immediately terminate the Contractor's right to occupy the Property further notice; and/or
- take possession of the Property and claim damages arising from such breaches.

**11. Early Termination of the Right to Occupy**

- 11.1 Notwithstanding the rights granted to the Contractor in terms hereof, the Contractor acknowledges that SANRAL may terminate such rights prematurely in the event that SANRAL requires the Property for anything related to the construction, maintenance or operation of a national road.
- 11.2 Should SANRAL be required to terminate the Contractor's right of use of the Property, SANRAL shall be required to give no more than 3 (three) months' written notice to the Contractor of the required premature termination, and the Contractor shall:
- 11.2.1 vacate the Property on the premature termination date required by SANRAL;
  - 11.2.2 have no remedy against SANRAL as a result of such premature termination or its relocation arising from such premature termination.

**12. Alterations and Improvements**

- 12.1 The Contractor shall not make any alterations or improvements to the Property without SANRAL'S prior written consent.
- 12.2 In the event that SANRAL grants approval for alternations or improvements, this shall not preclude the Contractor from having to obtain any consent or approval that may be necessary from any applicable authority.
- 12.3 SANRAL shall not be liable for compensating the Contractor for the value of any improvements or alterations to the Property.

**13. Development of the Property and/or Underground Services**

- 13.1 SANRAL shall be entitled at any and at all times during the currency of the Contractor's occupation of the Property to affect such alterations, improvements and/or additions to the Property as SANRAL may deem necessary.
- 13.2 The Contractor shall have no claim against SANRAL for compensation, damages or otherwise, by reason of any interference with its occupation of the Property occasioned by any such alterations, improvements and/or additions, or arising from any failure or interruption in the supply of water and/or electricity and/or other services to the Property.
- 13.3 Where relevant, the Contractor shall bear the onus of investigating, at its expense, the existence or otherwise of any live or defunct underground services on or adjacent to the Property by making appropriate enquiries from the local municipality or any other competent authority.
- 13.4 Save in circumstances where SANRAL has in writing agreed to assume specific obligations to deal with underground services, whether live or abandoned, existing on the Property, the Contractor agrees that it shall have no claim whatsoever against SANRAL for the removal and/or modification of any underground services or abandoned services that may exist on the Property, nor for any direct or consequential losses which may be suffered by the Contractor arising out of any removal and/or modification or failure to remove and/or modify any of the said underground services or abandoned services.
- 13.5 SANRAL shall have the right to lay and use or continue using underground services of any nature on or under the Property and may grant such right to any third party without being liable for any loss or damage suffered by the Contractor as a result thereof. The Contractor shall not in any way, directly or indirectly, interfere or obstruct the laying or using of such underground services. SANRAL and/or any third party shall at all reasonable times have free access of the Property for the purpose of construction, maintenance, repairs, replacement or removal of such services.



14. **General**

- 14.1 No amendment or consensual cancellation of any of the above terms and conditions shall be binding unless recorded in a written document signed by SANRAL and the Contractor.
- 14.2 No extension of time, waiver, indulgence or relaxation or suspension of any of the provisions or terms applicable to the Contractor's occupation of the Property shall be binding unless recorded in a written document signed by the parties. Any such extension, waiver or relaxation or suspension which is so given or made shall be strictly construed as relating strictly to the matter in respect whereof it was made or given.

**APPENDIX 5.1: PLAN OF THE PROPERTY**

APPENDIX 5.2: PRE-OCCUPATION INSPECTION FORM

Exterior of the Property:

EXTERIOR	Good	Fair	Poor	None Present
ROOF				
WALLS / FENCE				
GATE				
GUTTERS				
PAVING				
GARDEN (outside taps)				
Carport				
GARAGE				

List other exterior improvements or defects not indicated above:

**Improvements on the Property:**

EXTERIOR	Good	Fair	Poor	None Present
GUTTERS				
PAVING				
OUTSIDE TAPS				
Carport				
GARAGE				
ROOMS OR OFFICES				
PARTITIONING				
FLOOR COVERING				
WALL COVERING				
CEILING				
KITCHEN				
BATHROOM & TOILET				
SECURITY GATE				
BURGLAR PROOFING				
INTERIOR DOORS				
EXTERIOR DOORS				
LOCKS				
LIGHT FITTINGS				

**Details of any other improvements:**

Occupancy Status:

- ☐ Verified – No occupants found on the Property.
- ☐ Illegal occupants: *Full details of location and names (add page with details)*

SIGNED AT: ..... ON THIS ..... DAY OF ..... 20 .....

.....  
SIGNATURE

.....  
SIGNATURE

.....  
FULL NAME OF SANRAL'S REPRESENTATIVE

.....  
FULL NAME OF CONTRACTOR'S  
REPRESENTATIVE

**APPENDIX 5.3: PRE-TERMINATION INSPECTION**

a. Verify if the status or condition of any of the items as listed during the Pre-occupation inspection have changed. If so, furnish full detail, costs to repair damages and/or replace lost keys, etc.

b. Results:

☐ Property inspected – No damages found

**OR**

☐ Damages found – The following must be repaired or replaced:

ITEM TO BE REPAIRED / REPLACED	REPAIR?	REPLACE?	COST

☐ Property inspected: Property vacant

**OR**

☐ Property inspected: Property not vacant:

Number of persons remaining on Property: .....

SIGNED AT: ..... ON THIS ..... DAY OF ..... 20 .....

.....  
SIGNATURE

.....  
SIGNATURE

.....  
FULL NAME OF SANRAL'S REPRESENTATIVE

.....  
FULL NAME OF CONTRACTOR'S REPRESENTATIVE

**APPENDIX 6: DISPUTE ADJUDICATION AGREEMENT**

**DISPUTE ADJUDICATION AGREEMENT**

between

**THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED**  
(Reg No. 1998/009584/06)  
**("Employer")**

and

---

(Reg No. \_\_\_\_\_)  
**("Contractor")**

and

---

**("Member")**

## 1. DEFINITIONS AND INTERPRETATIONS

- 1.1 In this Dispute Adjudication Agreement, unless the context otherwise indicates :
- 1.1.1 “**Contract**” means Contract SANRAL (*insert contract number*) for the (*insert contract description*) entered into between the Employer and the Contractor.
- 1.1.2 “**Contractor**” means ... (*insert contractor's details*) appointed by the Employer under the Contract.
- 1.1.3 “**DAB**” means the three person Dispute Adjudication Board as contemplated in clause 20 of the Conditions of Contract for Construction for Building and Engineering Works designed by the Employer, published by the Fédération Internationale des Ingénieurs-Conseils (hereinafter referred to as “GCC”), in accordance with the terms and conditions as set out in this Dispute Adjudication Agreement.
- 1.1.4 “**Dispute Adjudication Agreement**” means the tripartite agreement between the Employer, Contractor and Member.
- 1.1.5 “**Effective Date**” means the date that this Dispute Adjudication Agreement shall take effect, and unless otherwise stated, it shall be the latest date when the Employer, the Contractor, Member and each of the Other Members have respectively signed a Dispute Adjudication Agreement.
- 1.1.6 “**Employer**” means the South African National Roads Agency SOC Limited, Registration No. 1998/009584/06
- 1.1.7 “**Engineer**” means ... (*insert engineer's details*).
- 1.1.8 “**Member**” means Mr \_\_\_\_\_, who (*Note to compiler: Delete the following for members other than for the Chairperson's agreement*) will act as chairman of the DAB and who is one of the three persons who are jointly called the DAB.
- 1.1.9 “**Other Members**” means the persons other than the Member, forming part of the DAB
- 1.1.10 “**Parties**” means the Employer, Contractor and Member
- 1.2 In the Dispute Adjudication Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract

## 2. GENERAL PROVISIONS

- 2.1 Following the Effective Date, the Employer and the Contractor shall each give notice to the Member accordingly. If the Member does not receive either notice within six months after entering into the Dispute Adjudication Agreement, it shall be void and ineffective.
- 2.2 This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Adjudication Agreement shall terminate upon the expiry of this period.
- 2.3 No assignment or subcontracting of the Dispute Adjudication Agreement is permitted without the prior written agreement of all the Parties to it and of the Other Members.
- 2.4 The Dispute Adjudication Agreement shall be governed by the law of the Republic of South Africa.
- 2.5 All disputes will be heard in \_\_\_\_\_, Republic of South Africa, unless otherwise agreed by the Parties.

## 3. WARRANTIES

- 3.1 The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Engineer. The Member shall promptly disclose, to each of them



and to the Other Members, any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

- 3.2 When appointing the Member, the Employer and the Contractor relies upon the Members' representations that he/she is:
- a) experienced in the work which the Contractor is to carry out under the Contract,
  - b) experienced in the interpretation of contract documentation, and
  - c) fluent in the language for communications defined in the Contract.

#### **4. APPOINTMENT**

- 4.1 The Employer and the Contractor hereby jointly appoint the Member as a Member of a three-person DAB on the terms and conditions as set out in the Dispute Adjudication Agreement, which appointment the Member by his/her signature hereto accepts;
- 4.2 The conditions of the Dispute Adjudication Agreement comprise the following:
- a) The Dispute Adjudication Agreement together with any addenda or schedules hereto; including the procedural rules;
  - b) The GCC, as amended by any particular conditions, to the extent that it is applicable to the DAB and the Member.

#### **5. GENERAL OBLIGATIONS OF THE MEMBER**

*Note to compiler: Delete this clause for members other than the Chairperson's agreement*

- 5.1 The Member shall act as chairman of the DAB and shall; ensure smooth administration; keep all records; ensure compliance to procedural rules; ensure the ethics of the DAB remain unchallenged; coordinate between the Parties and the DAB; chair meetings and site visits; ensure procedural correctness of all recommendations and decisions of the DAB.
- 5.2 The Member shall have no interest financial or otherwise in the Employer, the Contractor or the Engineer, nor any financial interest in the Contract except for payment under the Dispute Adjudication Agreement.
- 5.3 The Member shall not previously have been employed as a consultant or otherwise by the Employer, the Contractor or the Engineer, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Adjudication Agreement.
- 5.4 The Member shall have disclosed in writing to the Employer, the Contractor and the Other Members, before entering into the Dispute Adjudication Agreement and to his/her best knowledge and re-collection, any professional or personal relationships with any director, officer or employee of the Employer, the Contractor or the Engineer, and any previous involvement in the overall project of which the Contract forms part.
- 5.5 The Member shall not, for the duration of the Dispute Adjudication Agreement, be employed as a consultant or otherwise by the Employer, the Contractor, any member/partner of the Contractor or the Engineer, except as may be agreed in writing by the Employer, the Contractor and the Other Members. Notwithstanding this restriction, the Member shall not be restricted to be employed as a consultant or otherwise by the Employer, the Contractor or the Engineer on another contract or matter, but shall disclose to the Employer, the Contractor, and the Other Members, before he/she consult, advises or accepts any instructions from either the Employer, the Contractor, any member/partner of the Contractor, or the Engineer and confirming that such advice, consultation or other instruction taken from such person shall not affect the Member's ability to be unbiased in relation to his/her duties under the Dispute Adjudication Agreement.
- 5.6 The Member shall comply with the annexed procedural rules and Sub-Clause 20.4 of the conditions of Contract.
- 5.7 The Member shall not give advice to the Employer, the Contractor, the Employer's personnel or the Contractor's personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules.

- 5.8 The Member shall not while a Member enter into discussions or make any agreement with the Employer, the Contractor or the Engineer regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under this Dispute Adjudication Agreement.
- 5.9 The Member shall ensure his/her availability for all site visits and hearings as are necessary.
- 5.10 The Member shall become conversant with the Contract and with the progress of the Works (and of any parts of the project of which the Contract forms part) by studying all documents received which shall be maintained in a current working file.
- 5.11 The Member shall treat the details of the Contract and all the DAB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members.
- 5.12 The Member shall be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members.

## **6. GENERAL OBLIGATIONS OF THE EMPLOYER AND THE CONTRACTOR**

- 6.1 The Employer, the Contractor, the Employer's personnel and the Contractor's personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DAB's activities under the Contract and the Dispute Adjudication Agreement, and except to the extent that prior agreement is given by the Employer, the Contractor and the Other Members. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's personnel and the Contractor's personnel respectively.
- 6.2 The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members:
- a) be appointed as an arbitrator in any arbitration under the Contract;
  - b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract;
  - c) be called as a witness or act on behalf of the Employer or Contractor, concerning any dispute that became the subject of litigation under the Contract; or
  - d) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Members functions unless the act or omission is shown to have been in bad faith.
- 6.3 The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he/she is relieved from liability under the preceding paragraph.

## **7. PAYMENT**

- 7.1 The Member shall be paid a retainer fee of R... (excluding VAT) per calendar month, which shall be considered as payment in full for:
- i) being available on 28 days' notice for all site visits and hearings;
  - ii) becoming and remaining conversant with all project developments and maintaining relevant files;
  - iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his/her duties; and
  - iv) all services performed hereunder except those referred to in sub-paragraphs 7.4, 7.5, 7.6 and 7.7 of this Clause.
- 7.2 The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Adjudication Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.
- 7.3 With effect from the first day of the calendar month following the month in which the Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by 50%. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Adjudication Agreement is otherwise terminated.

- 7.4 The Member shall be paid a site visit daily fee of R... (excluding VAT), (reduced to an hourly fee of one eighth the daily fee, for part of a day), which shall be considered as payment in full for:
- i) each day or part of a day up to a maximum of one day's travel time in each direction for the journey between the Member's home and the site or another location of a meeting with the Other Members, as agreed by the Parties.
  - ii) each working day or part of a day on site visits.
- 7.5 The Member shall be paid a dispute analysis daily fee of R... (excluding VAT), (reduced to an hourly fee of one eighth the daily fee, for part of a day), which shall be considered as payment in full for:
- i) each day or part of a day spent on dispute analysis, hearings or preparing decisions; and
  - ii) each day or part of a day spent reading submissions in preparation for a hearing.
- 7.6 The Member shall be paid a pupillage daily fee of R... (excluding VAT), (reduced to an hourly fee of one eighth the daily fee, for part of a day), which shall be considered as payment in full for:
- i) each day or part of a day spent on preparation for pupillage.
  - ii) each day or part of a day spent on offering practical experience and mentoring to assigned pupil.
- 7.7 The Member shall be paid all reasonable expenses incurred in connection with the Member's duties, including the cost of the following:
- i) Travel expenses :-
    - Own car - motor vehicle travel expenses will be recovered at the relevant South African Automobile Association rates,
    - Car hire – group B or similar,
    - Flights – economy class.
  - ii) Accommodation – any type of accommodation up to R1,300.00 per day all inclusive,
  - iii) Subsistence costs.
- 7.8 The Member shall be paid all Value Added Taxes as per the law.
- 7.9 The retainer fee and daily fees shall remain fixed for the 1<sup>st</sup> 24 calendar months and shall thereafter be adjusted by the twelve-month year on year CPI index (as published in the monthly bulletin P0141 of Statistics South Africa under table B) at each anniversary of the Effective Date. The base month shall be the 12<sup>th</sup> month following the Effective Date.
- 7.10 The Member shall be paid in South African Rands.
- 7.11 The member shall submit invoices for payment of the monthly retainer and may include an estimate of the next month's airfares which will be incurred (and which will be reconciled and adjusted in the subsequent invoice). Invoices for other expenses and for daily fees shall be submitted following the conclusion of a site visit or hearing. All invoices shall be accompanied by a DAB fee claim containing records of previous fee claims and a breakdown of activities performed during the relevant period and shall be addressed to the Contractor.
- 7.12 Notwithstanding the fact that the appointment is of the Member in his/her personal capacity the Member may invoice and receive payment to a legal entity of which he/she is a member, shareholder or partner.
- 7.13 The Contractor shall pay the Member's invoices in full within 30 calendar days after receiving each valid invoice, half of which shall be recovered by the Contractor from the Employer.
- 7.14 If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received and/or (ii) resign his/her appointment by giving notice under Clause 8.

## **8. TERMINATION**

- 8.1 At any time: (i) the Employer and the Contractor may jointly terminate the Dispute Adjudication Agreement by giving 42 days' notice to the Member; or (ii) the Member may resign as provided for under Clause 2.

- 8.2 If the member fails to comply with the Dispute Adjudication Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when received by the Member.
- 8.3 If the Employer or the Contractor fails to comply with the Dispute Adjudication Agreement, the Member may, without prejudice to his/her other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.
- 8.4 Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

## 9. DEFAULT OF THE MEMBER

- 9.1 If the Member fails to comply with any obligation under Clause 5, he/she shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members, for proceedings or decisions (if any) of the DAB which are rendered void or ineffective.

## 10. DISPUTES

- 10.1 Any dispute or claim arising out of or in connection with the Dispute Adjudication Agreement, or the breach, termination or invalidity thereof, shall be finally settled by arbitration under the Rules of Arbitration of the Association of Arbitrators of Southern Africa by one Arbitrator appointed by agreement of the Member, the Employer and the Contractor or, failing such agreement, by the Chairman for the time being of the Association of Arbitrators.

## 11. DOMICILIA AND NOTICES

- 11.1 The Parties choose as their *domicilia citandi et executandi* for all purposes under the Dispute Adjudication Agreement, whether in respect of notices or other documents or communications of whatsoever nature (including the exercise of any option), the following addresses:

### 11.1.1 Employer (*domicilia citandi et executandi*):

Address: South African National Roads Agency SOC Limited  
48 Tambotie Avenue, Val de Grace, Pretoria, 0184  
Reference: ... CEO

#### Employer (*General Communication*)

Address: South African National Roads Agency SOC Limited  
... Region, ..., ..., ...  
Fax Number: ...  
Tel. Number: ...  
Reference: ... Regional Manager, ... Region

### 11.1.2 Contractor:

Address: ...  
...  
Fax Number: ...  
Tel. Number: ...  
Reference: ..., Contract Director

### 11.1.3 Member:

Address: ...  
...  
Fax Number: ...

Tel. Number: ...  
Reference: ...,

- 11.2 Any notice or communication required or permitted to be given in terms of the Dispute Adjudication Agreement shall be valid and effective only if in writing, but it shall be competent to give notice by telefax or registered mail.
- 11.3 Any Party may by notice to the other Party change the physical address chosen as its *domicilium citandi et executandi* vis-à-vis that Party to another physical address in the Republic of South Africa or its telefax number, provided that the change shall become effective vis-à-vis that addressee on the 7<sup>th</sup> business day from the deemed receipt of the notice by the addressee.
- 11.4 Notwithstanding anything to the contrary herein contained a written notice or communication actually received by a Party shall be an adequate written notice or communication to it notwithstanding that it was not sent to or delivered at its chosen *domicilium citandi et executandi*.

## 12. SIGNATORIES

- 12.1 Signed for and on behalf of the Employer by:

.....  
Name Signature of duly authorised representative  
.....  
Date

In the presence of Witness:

.....  
Name Signature  
.....  
Date

- 12.2 Signed for and on behalf of the Contractor by:

.....  
Name Signature of duly authorised representative  
.....  
Date

In the presence of Witness:

.....  
Name Signature  
.....  
Date

- 12.3 Signed by the Member:

.....  
Name Signature  
.....  
Date

In the presence of Witness:

.....  
Name Signature

.....  
Date

## **ANNEXURE 1**

### **PROCEDURAL RULES**

1. Unless otherwise agreed by the Employer and the Contractor, the DAB shall visit the site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor and the DAB, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.
2. The timing of and agenda for each site visit shall be as agreed jointly by the DAB, the Employer and the Contractor, or in the absence of agreement, shall be decided by the DAB. The purpose of site visits is to enable the DAB to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims.
3. Site visits shall be attended by the Employer, the Contractor and the Engineer and shall be co-ordinated by the Employer in co-operation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each site visit and before leaving the site, the DAB shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.
4. The Employer and the Contractor shall furnish to each member of the DAB one copy of all documents which the DAB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the performance of the Contract. All communications between the DAB and the Employer or the Contractor shall be copied to the other Party.
5. If any dispute is referred to the DAB in accordance with Sub-clause 20.4 of the GCC, the DAB shall proceed in accordance with Sub-clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DAB shall:
  - a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
  - b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.
6. The DAB may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.
7. Except as otherwise agreed in writing by the Employer and the Contractor, the DAB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor and the Engineer, and to proceed in the absence of any party whom the DAB is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.
8. The Employer and the Contractor empower the DAB, among other things, to:
  - a) establish the procedure to be applied in deciding a dispute,
  - b) decide upon the DABs' own jurisdiction, and as to the scope of any dispute referred to it,
  - c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Rules,
  - d) take the initiative in ascertaining the facts and matters required for a decision,
  - e) make use of its own specialist knowledge, if any,
  - f) decide upon the payment of financing charges in accordance with the Contract,
  - g) decide upon any provisional relief such as interim or conservatory measures, and
  - h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Engineer, relevant to the dispute.

9. The DAB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties, unless requested by both the Employer and Contractor. Prior to giving notice to its decision:
  - a) it shall convene in private after a hearing, in order to have discussions and prepare its decision;
  - b) it shall endeavour to reach a unanimous decision: if this proves impossible the applicable decision shall be made by a majority of the Members' who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
  - c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless:
    - i) either the Employer or the Contractor does not agree that they do so, or
    - ii) the absent Member is the chairman and he/she instructs the other Members not to make a decision.

Thereafter, the DAB shall make and give notice to its decision in accordance with Sub-clause 20.4 or as otherwise agreed by the Employer and the Contractor in writing.



The following particulars must be furnished. In the case of a joint venture, separate declarations in respect of each partner must be completed and submitted.

Name of enterprise	
Contact person	
E-mail	
Telephone	
Cell	
Fax	
Physical address	
Postal address	

Company / Close Corporation registration number	
---	--

Tax reference number	
VAT registration number	(state Not Registered if not registered for VAT)

CIDB Registration number	
--------------------------	--

**Principal:** means a natural person who is a partner in a partnership, a sole proprietor, a director of a company established in terms of the Companies Act of 2008 (Act No. 71 of 2008) or a member of a close corporation registered in terms of the Close Corporations Act, 1984, (Act No. 69 of 1984)

[illegible]

C3-431

**Section 6: Record in the service of the state:**

Indicate by marking the relevant boxes with a cross, if any principal is currently or has been within the last 12 months in the service of any of the following:

- |  |  |
|--|--|
| <input type="checkbox"/> a member of any municipal council                                     | <input type="checkbox"/> an employee of any department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| <input type="checkbox"/> a member of any provincial legislature                                |  |
| <input type="checkbox"/> a member of the National Assembly or the National Council of Province | <input type="checkbox"/> a member of an accounting authority of any national or provincial public entity   |
| <input type="checkbox"/> a member of the board of directors of any municipal entity            | <input type="checkbox"/> an employee of Parliament or a provincial legislature   |
| <input type="checkbox"/> an official of any municipality or municipal entity                   |  |

**If any of the above boxes are marked, disclose the following:**

Name of principal	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

Insert separate page if necessary.

**Section 7: Record of family member in the service of the state:**

**Family member:** a person's spouse, whether in a marriage or in a customary union according to indigenous law, domestic partner in a civil union, or child, parent, brother, sister, whether such relationship results from birth, marriage or adoption

Indicate by marking the relevant boxes with a cross, if any family member of a principal as defined in section 5 is currently or has within the last 12 months been in the service of any of the following:

- |  |  |
|--|--|
| <input type="checkbox"/> a member of any municipal council                                     | <input type="checkbox"/> an employee of any department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| <input type="checkbox"/> a member of any provincial legislature                                |  |
| <input type="checkbox"/> a member of the National Assembly or the National Council of Province | <input type="checkbox"/> a member of an accounting authority of any national or provincial public entity   |
| <input type="checkbox"/> a member of the board of directors of any municipal entity            | <input type="checkbox"/> an employee of Parliament or a provincial legislature   |
| <input type="checkbox"/> an official of any municipality or municipal entity                   |  |

**If any of the above boxes are marked, disclose the following:**

Name of family member	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

Insert separate page if necessary

**Section 8: Record of termination of previous contracts with an organ of state**

Was any contract between the tendering entity, including any of its joint venture partners, terminated during the past five years for reasons other than the employer no longer requiring such works or the employer failing to make payment in terms of the contract?

☐ Yes ☐ No (tick appropriate box)

If yes, provide particulars:

Insert separate page if necessary

**Section 9: Declaration**

The undersigned, who warrants that he/she is duly authorised to do so on behalf of the tendering entity, confirms that the contents of this Declaration are within my personal knowledge, save where stated otherwise in an attachment hereto, and to the best of my belief is both true and correct, and that:

- i) neither the name of the tendering entity, nor any of its principals, appears on:
  - a) the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004 (Act No. 12 of 2004); or
  - b) National Treasury's Database of Restrict [www.treasury.gov.za](http://www.treasury.gov.za);
- ii) the tendering entity or any of its principals has not been convicted of fraud or corruption by a court of law (including a court outside of the Republic of South Africa) within the last five years;
- iii) any principal who is presently employed by the state has the necessary permission to undertake remunerative work outside such employment (attach permission to this declaration);
- iv) the tendering entity is not associated, linked or involved with any other tendering entities submitting tender offers;
- v) the tendering entity has not engaged in any prohibited restrictive horizontal practices, including consultation, communication, agreement, or arrangement with any competing or potential tendering entity regarding prices, geographical areas in which goods and services will be rendered, approaches to determining prices or pricing parameters, intentions to submit a tender or not, the content of the submission (specification, timing, conditions of contract, etc.) or intention to not win a tender;
- vi) the tendering entity has no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest;
- vii) neither the tenderer nor any of its principals owes municipal rates and taxes or municipal service charges to any municipality or a municipal entity, and are not in arrears for more than three months;
- viii) SARS may, on an on-going basis during the term of the contract, disclose the tenderer's tax compliance status to the Employer and, when called upon to do so, obtain the written consent of any subcontractors who are subcontracted to execute a portion of the contract that is entered into in excess of the threshold prescribed by National Treasury, for SARS to do likewise.

I, the undersigned .....  
 certify that the information furnished in this form above is correct. I accept that the Employer may cancel this agreement should this declaration prove to be false.

.....  
 Signature (duly authorised)

.....  
 Date

.....  
 PositionName of Enterprise

NOTE 1: Section 30(1) of the Public Service Act, 1994, prohibits an employee (person who is employed in posts on the establishment of departments) from performing or engaging remunerative work outside his or her employment in the relevant department, except with the written permission of the executive authority of the department. When in operation, Section 8(2) of the Public Administration Management Act, 2014, will prohibit an employee of the public administration (i.e. municipalities and all national departments, national government components listed in Part A of Schedule 3 to the Public Service Act, provincial departments including the office of the premier listed in Schedule 1 of the Public Service Act and provincial departments listed in schedule 2 of the Public Service Act, and provincial government components listed in Part B of schedule 3 of the Public Service Act) or persons contracted to executive authorities in accordance with the provisions of section 12A of the Public Service Act of 1994 or persons performing similar functions in municipalities, from conducting business with the State or to be a director of a public or private company conducting business with the State. The offence for doing so is a fine or imprisonment for a period not exceeding five years, or both. It is also a serious misconduct which may result in the termination of employment by the employer.

NOTE 2: Regulation 44 of Supply Chain Management regulations issued in terms of the Municipal Finance Management Act of 2003 requires that municipalities and municipal entities should not award a contract to a person who is in the service of the State, a director, manager or principal shareholder in the service of the State or who has been in the service of the State in the previous twelve months.

NOTE 3: Regulation 45 of Supply Chain Management regulations requires a municipality or municipal entity to disclose in the notes to the annual statements particulars of any award made to a close family member in the service of the State.

NOTE 4: Corrupt activities which give rise to an offence in terms of the Prevention and Combating of Corrupt Activities Act of 2004, include improperly influencing in any way the procurement of any contract, the fixing of the price, consideration or other moneys stipulated or otherwise provided for in any contract, and the manipulating by any means of the award of a tender.

NOTE 5: Section 4 of the Competition Act of 1998 prohibits restrictive horizontal practice, including agreements between parties in a horizontal relationship, which have the effect of substantially preventing or lessening competition, directly or indirectly fixing prices or dividing markets or constituting collusive tendering. Section 5 also prohibits restrictive vertical practices. Any restrictive practices that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties.

TAX COMPLIANCE PERMISSION DECLARATION

I, ..... (name)  
the undersigned in my capacity as ..... (position)  
on behalf of .....  
..... (name of company)  
herewith grant consent that SARS may disclose to the South African National Roads Agency SOC  
Limited (SANRAL) our tax compliance status on an ongoing basis for the contract term.

For this purpose, our unique security personal identification number (PIN) is .....  
our tax reference number is ..... and our tax clearance certificate number is .....

SIGNATURE: .....

DATE: .....

**APPENDIX 7: IMPORTED CONTENT DECLARATION****ANNEX D: IMPORTED CONTENT DECLARATION – SUPPORTING SCHEDULE TO ANNEX C**

(D1)	Tender No.:										
(D2)	Tender Description:										
(D3)	Designated Product(s):										
(D4)	Tender Authority:										
(D5)	Tendering Entity Name:										
(D6)	Tender Exchange Rate:	Pula	P		EU	€		GBP	£	Note: VAT to be excluded from all calculations	

A. Exempted imported content				Calculation of imported content						Summary	
Tender item no's	Description of imported content	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Exchange Rate	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl. VAT	Tender Qty	Exempted imported value
(D7)	(D8)	(D9)	(D10)	(D11)	(D12)	(D13)	(D14)	(D15)	(D16)	(D17)	(D18)
(D19) Total exempt imported value										R0	
This total must correspond with Annex C - C 21											

B. Imported directly by the Tenderer				Calculation of imported content						Summary	
Tender item no's	Description of imported content	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Exchange Rate	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl. VAT	Tender Qty	Exempted imported value
(D33)	(D34)	(D35)	(D36)	(D37)	(D38)	(D39)	(D40)	(D41)	(D42)	(D43)	(D44)
(D45) Total imported value by 3 <sup>rd</sup> party										R0	

C. Imported by a 3 <sup>rd</sup> party and supplied to the Tenderer				Calculation of imported content						Summary	
Description of imported content	Unit of measure	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl. VAT	Quantity imported	Total imported value
(D33)	(D34)	(D35)	(D36)	(D37)	(D38)	(D39)	(D40)	(D41)	(D42)	(D43)	(D44)
(D45) Total imported value by 3 <sup>rd</sup> party											R 0

D. Other foreign currency payments			Calculation of foreign currency payments		Summary of payments
Type of payment	Local supplier making the payment	Overseas beneficiary	Foreign currency value paid	Tender Rate of Exchange	
(D46)	(D47)	(D48)	(D49)	(D50)	
(D52) Total of foreign currency payments declared by tenderer and/or 3 <sup>rd</sup> party					R 0

Signature of tenderer from Annexure B:  
(SATS 1286.2011)

\_\_\_\_\_

(D53) Total of imported content & foreign currency payments -  
(D32), (D45) & (D52) above

R 0

**This total must correspond with Annex C - C 23**

Date:

\_\_\_\_\_

ANNEX E: IMPORTED CONTENT DECLARATION - SUPPORTING SCHEDULE TO ANNEX C

(E1)	Tender No.:		Note: VAT to be excluded from all calculations
(E2)	Tender Description:		
(E3)	Designated Product(s):		
(E4)	Tender Authority:		
(E5)	Tendering Entity Name:		

Local Products (Goods, Services and Works)	Description of items purchased	Local suppliers	Value
	(E6)	(E7)	(E8)
(E9) Total local products (Goods, Services and Works)			R 0
(E10)	Manpower costs	(Tenderer's manpower cost)	R 0
(E11)	Factory overheads	(Rental, depreciation & amortisation, utility costs, consumables etc.)	R 0
(E12)	Administration overheads and mark-up	(Marketing, insurance, financing, interest etc.)	R 0
(E13) Total local content			R 0
This total must correspond with Annex C - C24			

Signature of tenderer from Annexure B: (SATS 1286.2011) \_\_\_\_\_

Date: \_\_\_\_\_



### **Process when requesting exemption letters**

For exemption requests on designated products and the minimum threshold for local content cannot be met for various reasons, bidders must apply for exemption per tender. After checking with the industry, **the dti** will decide whether to grant an exemption or not.

In the official request (signed letter), the following information should be included:

- Procuring entity/government department/state owned company.
- Tender/bid number.
- Closing date.
- Item(s) for which the exemption is being requested for.
- Description of the goods, services or works for which the requested exemption item will be used for and the local content that can be met.
- Reason(s) for the request.
- Supporting letters from local manufacturers and suppliers.

**NB - Exemption letters are tender specific and applications are not transferrable.**

The turnaround time in response to exemption letters for all designated products is five working days with the exception of rail and boats/vessels which is seven working days.

Request for exemption letters are to be directed to:

**Dr Tebogo Makube**

Chief Director: Industrial Procurement

**Tel:** 012 394 3927

**E-mail:** tmakube@thedti.gov.za.

The turnaround time in response to textile, clothing, leather and footwear exemption letters request is two working days and requests are to be directed to:

**Patricia Khumalo**

**Tel:** 012 394 1390

**E-mail:** khumaloP@thedti.gov.za.



Private Bag X84, PRETORIA, 0001, the dti Campus, 77 Meintjies Street, Sunnyside, 0002, Tel: (012) 394 0000  
the dti Customer Contact Centre local: 0861 843 384 International: +27 12 394 9500, [www.thedti.gov.za](http://www.thedti.gov.za)

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## **Guidance Document for the Calculation of Local Content**

### **1. DEFINITIONS**

Unless explicitly provided in this guideline, the definitions given in SATS 1286:2011 apply.

### **2. GENERAL**

#### **2.1. Introduction**

This guideline provides tenderers with a detailed description of how to calculate local content of products (goods, services and works) by components/material/services and enables them to keep an updated record for verification requirements as per the SATS 1286:2011 Annexure A and B.

The guideline consists of two parts, namely:

- a written guideline; and
- three declarations that must be completed:
  - Declaration C: “Local Content Declaration – Summary Schedule” (see Annexure C);
  - Declaration D: “Imported Content Declaration – Supporting Schedule to Annex C” (see Annexure D); and
  - Declaration E: “Local Content Declaration – Supporting Schedule to Annex C” (see Annexure E).

The guidelines and declarations should be used by tenderers when preparing a tender. A tenderer must complete Declarations D and E, and consolidate the information on Declaration C.

Annexure C must be submitted with the tender by the closing date and time as determined by the Tender Authority. The Tender Authority reserves the right to request that Declarations D and E also be submitted.

If the tender is successful, the tenderer must continuously update Declarations C, D and E with actual values for the duration of the contract.

**NOTE:**

Annexure A is a note to the purchaser in SATS 1286:2011; and  
Annexure B is the Local Content Declaration IN SATS 1286:2011.

**2.2. What is local content?**

According to SATS 1286:2011, the local content of a product is the tender price less the value of imported content, expressed as a percentage. It is, therefore, necessary to first compute the imported value of a product to determine the local content of a product.

**2.3. Categories: Imported and Local Content**

The tenderer must differentiate between imported content and local content.

Imported content of a product by components/material/services is separated into two categories, namely:

- products imported directly by the tenderer; and
- products imported by a third party and supplied to the tenderer.

**2.3.1. Imported Content**

Identify the imported content, if any, by value for products by component/material/services. In the case of components/materials/services sourced from a South African manufacturer, agent, supplier or subcontractor (i.e. third party), obtain that information and Declaration D from the third party.

Calculate the imported content of components/materials/services to be used in the manufacture of the total quantity of the products for which the tender is to be submitted.

As stated in clause 3.2.4 of SATS 1286:2011: "If information on the origin of components, parts or materials is not available, it will be deemed to be imported content."

2.3.1.1. Imported directly by the tenderer:

When the tenderer import products directly, the onus is on the tenderer to provide evidence of any components/materials/services that were procured from a non-domestic source. The evidence should be verifiable and pertain to the tender as a whole. Typical evidence will include commercial invoices, bills of entry, etc.

When the tenderer procures imported services such as project management, design, testing, marketing, etc and makes royalty and lease payments, such payments relating to the tender must be included when calculating imported content.

2.3.1.2. Imported by a third party and supplied to the tenderer:

When the tenderer supplies components/material/services that are imported by any third party (for example, a domestic manufacturer, agent, supplier or subcontractor in the supply chain), the onus is on the tenderer to obtain verifiable evidence from the third party.

The tenderer must obtain Declaration D from all third parties for the related tender. The third party must be requested by the tenderer to continuously update Declaration D. Typical evidence of imported content will include commercial invoices, bills of entry etc.

When a third party procures imported services such as project management, design, testing, marketing etc. and makes royalty and lease payments, such payments relating to the tender must be included when calculating imported content.

2.3.1.3. Exempt Imported Content:

Exemptions, if any, are granted by the Department of Trade and Industry (**the dti**). Evidence of the exemptions must be provided and included in Annexure D.

**2.3.2. Local Content**

Identify and calculate the local content, by value for products by components/materials/services to be used in the manufacture of the total quantity of the products.

### 3. ANNEXURE C

#### 3.1. Guidelines for completing Annexure C: Local Content Declaration – Summary Schedule

*Note: The paragraph numbers correspond to the numbers in Annexure C.*

**C1. Tender Number**

Supply the tender number that is specified on the specific tender documentation.

**C2. Tender description**

Supply the tender description that is specified on the specific tender documentation.

**C3. Designated products**

Supply the details of the products that are designated in terms of this tender (i.e. buses).

**C4. Tender Authority**

Supply the name of the tender authority.

**C5. Tendering Entity name**

Provide the tendering entity name (for example, Unibody Bus Builders (Pty) Ltd).

**C6. Tender Exchange Rate**

Provide the exchange rate used for this tender, as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**C7. Specified local content %**

Provide the specified minimum local content requirement for the tender (i.e. 80%), as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MDB) 6.2.

**C8. Tender item number**

Provide the tender item number(s) of the products that have a local content requirement as per the tender specification.

**C9. List of items**

Provide a list of the item(s) corresponding with the tender item number.  
This may be a short description or a brand name.

**Calculation of local content**

**C10. Tender price**

Provide the unit tender price of each item excluding VAT.

**C11. Exempted imported content**

Provide the ZAR value of the exempted imported content for each item, if applicable. These value(s) must correspond with the value(s) of column D16 on Annexure D.

**C12. Tender value net of exempted imported content**

Provide the net tender value of the item, if applicable, by deducting the exempted imported content (C11) from the tender price (C10).

**C13. Imported value**

Provide the ZAR value of the items' imported content.

**C14. Local value**

Provide the local value of the item by deducting the Imported value (C13) from the net tender value (C12).

**C15. Local content percentage (per item)**

Provide the local content percentage of the item(s) by dividing the local value (C14) by the net tender value (C12) as per the local content formula in SATS 1286.

**Tender Summary**

**C16. Tender quantity**

Provide the tender quantity for each item number as per the tender specification.

**C17. Total tender value**

Provide the total tender value by multiplying the tender quantity (C16) by the tender price (C10).

**C18. Total exempted imported content**

Provide the total exempted imported content by multiplying the tender quantity (C16) by the exempted imported content (C11). These values must correspond with the values of column D18 on Annexure D.

**C19. Total imported content**

Provide the total imported content of each item by multiplying the tender quantity (C16) by the imported value (C13).

**C20. Total tender value**

Total tender value is the sum of the values in column C17.

**C21. Total exempted imported content**

Total exempted imported content is the sum of the values in column C18. This value must correspond with the value of D19 on Annexure D.

**C22. Total tender value net of exempted imported content**

The total tender value net of exempt imported content is the total tender value (C20) less the total exempted imported content (C21).

**C23. Total imported content**

Total imported content is the sum of the values in column C19. This value must correspond with the value of D53 on Annexure D.

**C24. Total local content**

Total local content is the total tender value net of exempted imported content (C22) less the total imported content (C23). This value must correspond with the value of E13 on Annexure E.

**C25. Average local content percentage of tender**

The average local content percentage of tender is calculated by dividing total local content (C24) by the total tender value net of exempted imported content (C22).



#### 4. ANNEXURE D

##### 4.1. Guidelines for completing Annexure D: “Imported Content Declaration – Supporting Schedule to Annexure C”

*Note: The paragraph numbers correspond to the numbers in Annexure D.*

**D1. Tender number**

Supply the tender number that is specified on the specific tender documentation.

**D2. Tender description**

Supply the tender description that is specified on the specific tender documentation.

**D3. Designated products**

Supply the details of the products that are designated in terms of this tender (i.e. buses).

**D4. Tender authority**

Supply the name of the tender authority.

**D5. Tendering entity name**

Provide the tendering entity name (i.e. Unibody Bus Builders (Pty) Ltd).

**D6. Tender exchange rate**

Provide the exchange rate used for this tender, as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**Table A. Exempted Imported Content**

**D7. Tender item number**

Provide the tender item number(s) of the product(s) that have imported content.

**D8. Description of imported content**

Provide a list of the exempted imported product(s), if any, as specified in the tender.

**D9. Local supplier**

Provide the name of the local supplier(s) supplying the imported product(s).

**D10. Overseas supplier**

Provide the name(s) of the overseas supplier(s) supplying the exempted imported product(s).

**D11. Imported value as per commercial invoice**

Provide the foreign currency value of the exempted imported product(s) disclosed in the commercial invoice accepted by the South African Revenue Service (SARS).

**D12. Tender exchange rate**

Provide the exchange rate used for this tender as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**D13. Local value of imports**

Convert the value of the exempted imported content as per commercial invoice (D11) into the ZAR value by using the tender exchange rate (D12) disclosed in the tender documentation.

**D14. Freight costs to port of entry**

Provide the freight costs to the South African Port of the exempted imported item.

**D15. All locally incurred landing costs and duties**

Provide all landing costs including customs and excise duty for the exempted imported product(s) as stipulated in the SATS 1286:2011.

**D16. Total landed costs excl VAT**

Provide the total landed costs (excluding VAT) for each item imported by adding the corresponding item values in columns D13, D14 and D15. These values must be transferred to column C11 on Annexure C.

**D17. Tender quantity**

Provide the tender quantity of the exempted imported products as per the tender specification.

**D18. Exempted imported value**

Provide the imported value for each of the exempted imported product(s) by multiplying the total landed cost (excl. VAT) (D16) by the

tender quantity (D17). The values in column D18 must correspond with the values of column C18 of Annexure C.

**D19. Total exempted imported value**

The total exempted imported value is the sum of the values in column D18. This total must correspond with the value of C21 on Annexure C.

**Table B. Imported Directly By Tenderer**

**D20. Tender item numbers**

Provide the tender item number(s) of the product(s) that have imported content.

**D21. Description of imported content:**

Provide a list of the product(s) imported directly by tender as specified in the tender documentation.

**D22. Unit of measure**

Provide the unit of measure for the product(s) imported directly by the tenderer.

**D23. Overseas supplier**

Provide the name(s) of the overseas supplier(s) supplying the imported product(s).

**D24. Imported value as per commercial Invoice**

Provide the foreign currency value of the product(s) imported directly by tenderer disclosed in the commercial invoice accepted by the South African Revenue Service (SARS).

**D25. Tender rate of exchange**

Provide the exchange rate used for this tender as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**D26. Local value of imports**

Convert the value of the product(s) imported directly by the tenderer as per commercial invoice (D24) into the ZAR value by using the tender exchange rate (D25) disclosed in the tender documentation.

**D27. Freight costs to port of entry**

Provide the freight costs to the South African Port of the product(s) imported directly by the tenderer.

**D28. All locally incurred landing costs and duties**

Provide all landing costs including customs and excise duty for the product(s) imported directly by the tenderer as stipulated in the SATS 1286:2011.

**D29. Total landed costs excl VAT**

Provide the total landed costs (excluding VAT) for each item imported directly by the tenderer by adding the corresponding item values in columns D26, D27 and D28.

**D30. Tender quantity**

Provide the tender quantity of the product(s) imported directly by the tenderer as per the tender specification.

**D31. Total imported value**

Provide the total imported value for each of the product(s) imported directly by the tenderer by multiplying the total landed cost (excl. VAT) (D29) by the tender quantity (D30).

**D32. Total imported value by tenderer**

The total value of imports by the tenderer is the sum of the values in column D31.

**Table C. Imported by Third Party and Supplied to the Tenderer****D33. Description of imported content**

Provide a list of the product(s) imported by the third party and supplied to the tenderer as specified in the tender documentation.

**D34. Unit of measure**

Provide the unit of measure for the product(s) imported by the third party and supplied to tenderer as disclosed in the commercial invoice.

**D35. Local supplier**

Provide the name of the local supplier(s) supplying the imported product(s).

**D36. Overseas supplier**

Provide the name(s) of the overseas supplier(s) supplying the imported products.

**D37. Imported value as per commercial invoice**

Provide the foreign currency value of the product(s) imported by the third party and supplied to the tenderer disclosed in the commercial invoice accepted by SARS.

**D38. Tender rate of exchange**

Provide the exchange rate used for this tender as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**D39. Local value of imports**

Convert the value of the product(s) imported by the third party as per commercial invoice (D37) into the ZAR value by using the tender exchange rate (D38) disclosed in the tender documentation.

**D40. Freight costs to port of entry**

Provide the freight costs to the South African Port of the product(s) imported by third party and supplied to the tenderer.

**D41. All locally incurred landing costs and duties**

Provide all landing costs including customs and excise duty for the product(s) imported by third party and supplied to the tenderer as stipulated in the SATS 1286:2011.

**D42. Total landed costs excluding VAT**

Provide the total landed costs (excluding VAT) for each product imported by third party and supplied to the tenderer by adding the corresponding item values in columns D39, D40 and D41.

**D43. Quantity imported**

Provide the quantity of each product(s) imported by third party and supplied to the tenderer for the tender.

**D44. Total imported value**

Provide the total imported value of the product(s) imported by third party and supplied to the tenderer by multiplying the total landed cost (D42) by the quantity imported (D43).

**D45. Total imported value by third party**

The total imported value from the third party is the sum of the values in column D44.

**Table D. Other Foreign Currency Payments****D46. Type of payment**

Provide the type of foreign currency payment. (i.e. royalty payment for use of patent, annual licence fee, etc).

**D47. Local supplier making the payment**

Provide the name of the local supplier making the payment.

**D48. Overseas beneficiary**

Provide the name of the overseas beneficiary.

**D49. Foreign currency value paid**

Provide the value of the listed payment(s) in their foreign currency.

**D50. Tender rate of exchange**

Provide the exchange rate used for this tender as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**D51. Local value of payments**

Provide the local value of each payment by multiplying the foreign currency value paid (D49) by the tender rate of exchange (D50).

**D52. Total of foreign currency payments declared by tenderer and/or third party**

The total of foreign currency payments declared by tenderer and/or a third party is the sum of the values in column D51.

**D53. Total of imported content and foreign currency payment**

The total imported content and foreign currency payment is the sum of the values in column D32, D45 and D52. This value must correspond with the value of C23 on Annexure C.

## 5. ANNEXURE E

### 5.1. Guidelines to completing Annexure E: “Local Content Declaration-Supporting Schedule to Annexure C”

*The paragraph numbers correspond to the numbers in Annexure E*

#### **E1. Tender number**

Supply the tender number that is specified on the specific tender documentation.

#### **E2. Tender description**

Supply the tender description that is specified on the specific tender documentation.

#### **E3. Designated products**

Supply the details of the products that are designated in terms of this tender (for example, buses/canned vegetables).

#### **E4. Tender authority**

Supply the name of the tender authority.

#### **E5. Tendering entity name**

Provide the tendering entity name (for example, Unibody Bus Builders (Pty) Ltd) Ltd).

#### **Local Goods, Services and Works**

#### **E6. Description of items purchased**

Provide a description of the items purchased locally in the space provided.

#### **E7. Local supplier**

Provide the name of the local supplier that corresponds to the item listed in column E6.

#### **E8. Value**

Provide the total value of the item purchased in column E6.

**E9. Total local products (Goods, Services and Works)**

Total local products (goods, services and works) is the sum of the values in E8.

**E10. Manpower costs:**

Provide the total of all the labour costs accruing only to the tenderer (i.e. not the suppliers to tenderer).

**E11. Factory overheads:**

Provide the total of all the factory overheads including rental, depreciation and amortisation for local and imported capital goods, utility costs and consumables. (Consumables are goods used by individuals and businesses that must be replaced regularly because they wear out or are used up. Consumables can also be defined as the components of an end product that are used up or permanently altered in the process of manufacturing, such as basic chemicals.)

**E12. Administration overheads and mark-up:**

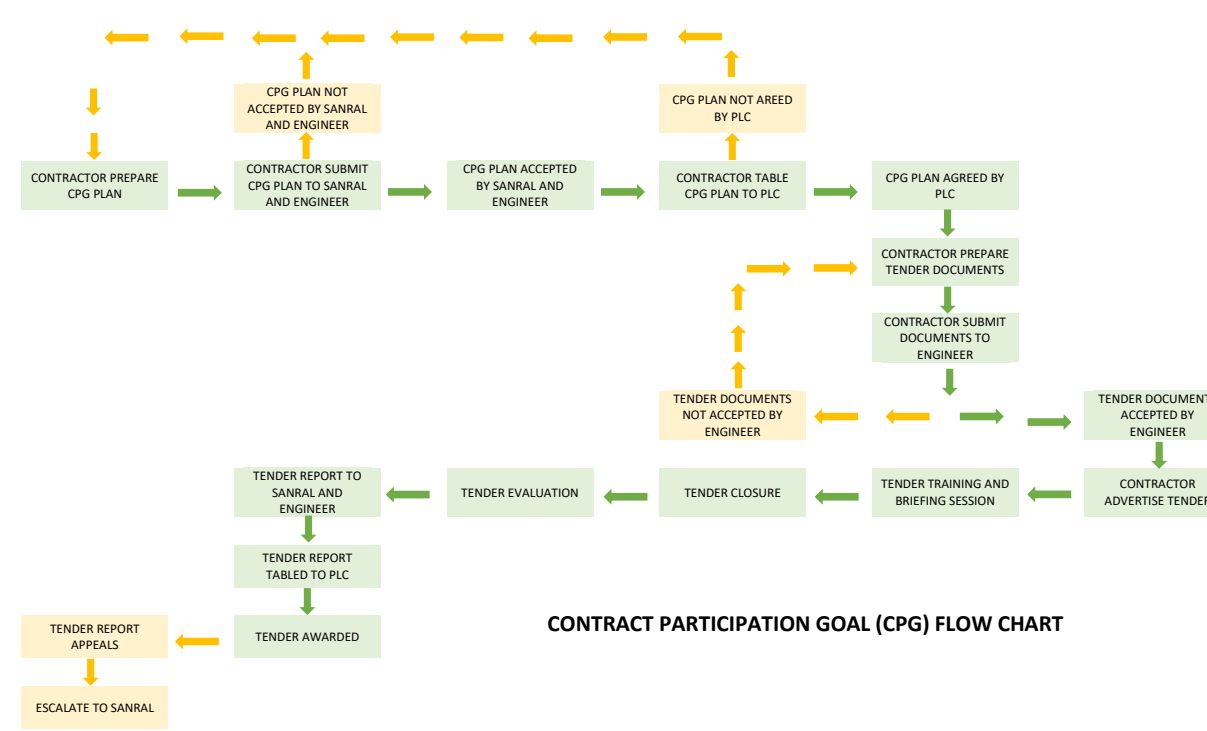
Provide the total of all the administration overheads, including marketing, insurance, financing, interest and mark-up costs.

**E13. Total local content:**

The total local content is the sum of the values of E9, E10, E11 and E12. This total must correspond with C24 of Annexure C.



APPENDIX 8 – CONTRACT PARTICIPATION GOAL (CPG) PLAN FORMAT



*Contractor Logo and details*

**Contract Participation Goal Plan**

*SANRAL Contract Number: XXXX*

*Contract Name: XXXX*

*(SANRAL Logo)*



Author:

Date:

Version

1. INTRODUCTION
2. OBJECTIVE
3. TARGETED ENTERPRISES
  - a. List of Work Packages for Targeted Enterprises
  - b. List of Work Packages for Main Contractor

**Table 1: CPG Expenditure Breakdown**

Project Number				
Project Name				
Designated Groups	Final Contract Value	R		
	Min (TE) CPG Target	%		
	Min (TE CPG Target Amount	R		
Description of CPG Category	CPG Target as per Contract		CPP Planned Achievement	
	Min. Target % as per Contract	Target Amount	Min. Allocated % as per Market Analyses	Expected Amount
Targeted Labour (TL)	Min. xx% of Final Contract Value	R	%	R
Youth				
Women				
Disabled				
Other				
Targeted Enterprise (TE)	Min. xx% of Final Contract Value	R	%	R
Youth				
Women				
Military Veterans				
Disabled				
CIDB 1 and 2				
CIDB 3 and 4				
Other				

## c. Breakdown of Work Packages

The table below describes the work package breakdown with reference to Designated Groups and Functionality:

**Table 3: Breakdown of Work Packages**

<b>Project Number</b>															
<b>Project Name</b>															
<b>Contract Price</b>															
<b>CPG Target %</b>															
<b>CPG Target Value</b>															
No.	Type of Work Package	EME or QSE	TE Amount	% of CPG Value	Proposed CIDB Grading	Tender Value Limit	Proposed No. of Work Packages	Proposed TE Target Group Amount					CIDB Expenditure		
								Black Youth	Black Woman	Black Military Veterans	Black Disabled	Other	Black 1&2CE	Black 3&4 CE	Comment
<b>TE Sub-contractors</b>															
1															
2															
3															
<b>TE Suppliers and Service Providers</b>															
4															
5															
6															
<b>TE Sub-contractor Sub-total</b>															
<b>TE Supplier/Service Provider Sub-total</b>															
<b>Provisional Total</b>															
<b>Provisional %</b>															
<b>Target Amount</b>															
<b>Target %</b>															

## d. Schedule of works and CPG Expenditure Plan

## i. Schedule of work (Insert Programme)

## ii. CPG Expenditure Plan

**Table 3: Example: CPG Expenditure Plan**

<b>Planned CPG Expenditure</b>					
<b>Final Contract Value</b>	R 100 000 000				
<b>CPG (TE) Value</b>	R 30 000 000				
<b>Timeline</b>	<b>2021/2022</b>	<b>2021/2022</b>	<b>2021/2022</b>	<b>2021/2022</b>	<b>Total</b>
<b>Project Expenditure</b>	R 20 000 000	R 30 000 000	R 30 000 000	R 20 000 000	R 100 000 000
<b>Work Packages (CPG %) Expenditure</b>	R 6 000 000	R 9 000 000	R 9 000 000	R 6 000 000	R 30 000 000
<b>Cumulative % Spend</b>	20%	50%	80%	100%	
<b>Cumulative Amount Spend</b>	R 6 000 000	R 6 000 000	R 6 000 000	R 6 000 000	R 6 000 000
<b>Package 1</b>	R 2 000 000				
<b>Package 2</b>	R 2 000 000				
<b>Package 3</b>	R 2 000 000				
<b>Total</b>	<b>R 6 000 000</b>	R	R	R	R

## e. Targeted Enterprises Procurement Program

**Table 4: Example: Targeted Enterprise Procurement program**

<b>Item</b>	<b>Activity Name</b>	<b>Duration (Days)</b>	<b>Start</b>	<b>Finish</b>

## f. Procedures for Targeted Enterprises Sub-contracting (As Per Section D1000 of the Specifications)

## I. Tender Preparation

1. Compilation of TE Work Packages
2. Establishment of a Help Desk
3. Market Analysis and Resources and Skills Audit
4. Compilation of Tender Documents

## II. Tender Process

1. Advertising of Works Packages

2. Tender Briefing Sessions
3. Minimum Tender Submission Documents
4. Tender Closure and Opening of Tenders

### III. Tender Evaluation

1. Eligibility
2. Functionality
3. Price and Preference
4. Compliance Check

### IV. Appointment of Successful Targeted Enterprise

1. Price and Rates Discussion
2. Sub-contract Agreement

## 4. TARGETED LABOUR

- a. Appointment of Targeted Labour

## 5. TRAINING DEVELOPMENT AND IMPLEMENTATION PLAN

- a. General Overview
- b. Purpose of the Training Interventions
- c. Proposed Training for Targeted Enterprises and Targeted Labour

The table below depicts the proposed training for the Targeted Enterprises.

**Table 5: Proposed Targeted Enterprise Training**

Training Summary							
No.	Course Content	Facilitator or Mentor	No. of Participants	Duration of the Course	Training Type	Start Date	Comments
1							
2							
3							
4							
5							
Etc.							

The table below depicts the proposed training for the Targeted Labour.

**Table 6: Proposed Targeted Labour Training**

<b>Training Summary</b>							
<b>No.</b>	<b>Course Content</b>	<b>Facilitator or Mentor</b>	<b>No. of Participants</b>	<b>Duration of the Course</b>	<b>Training Type</b>	<b>Start Date</b>	<b>Comments</b>
1							
2							
3							
4							
5							
Etc.							

- d. Training Methodology
- e. Selection of Participants
- f. Targeted Participants
- g. Training Materials
- h. Training Times
- i. Training Implementation Plan

Supporting Documents

## APPENDIX 9 – SANRAL PROJECT LIAISON COMMITTEE GUIDELINES

### FORM A1: PROJECT LIAISON COMMITTEE – MEMBER NOMINATION FORM

#### Notes to Nominators and Nominees:

a) General Principles of Membership:

- i) Membership is open to any person residing within the boundaries of the Project Area and that are duly nominated by their constituency.
- ii) Persons nominated as co-opted members do not necessarily have to reside within the boundaries of the Project Area (see explanation in c) below).
- iii) The nomination process will be conducted in consultation with the Local Municipalities within the Project Area.

b) Nominations for Membership

- i) Nominators will submit this prescribed nomination form and include the following information:
  - a. Name of the nominee,
  - b. Name of the proposer and five (5) seconders,
  - c. Residential address of the nominee,
  - d. Constituency whom the nominee will represent, and
  - e. Acceptance of nomination by the nominee.

c) Co-opted Members

- i) Co-opted members are members that the PLC chooses to add in addition to PLC members selected through the representative nomination process.
- ii) Co-opted members may include a PLC member from the RRM PLC within the Project Area, Councillors, and specialists such as environmental specialists, etc.
- iii) Co-opted members will have limited participation rights in PLC meetings, will not have voting rights and will not receive any seating allowance for participating in the PLC meeting.

d) Duration of Membership

- i) The duration of a nominee's membership of the PLC will depend on the duration of the project or the duration of the PLC, whichever occurs first.
- ii) A nominee's membership will end with immediate effect in terms of the Rules of Engagement for PLC members.

#### 1. Details of individual or organisation making the nomination:

I, ....., representing .....

hereby nominate .....



to be a member of the PLC for Project .....  
.....

Signature ..... Date .....

2. Details of the seconders (individuals supporting the nomination):

	Name	Surname	Organisation	Signature
1				
2				
3				
4				
5				

3. Details of the individual accepting the nomination (nominee):

Name and Surname	
Organisation	
Residential Address	
Ward Number	
Municipality	

I, ....., I.D. number .....  
hereby accept the nomination to be a member of the PLC for Project .....  
.....

I further accept to be bound by the rules, responsibilities and duties prescribed for the Project Liaison Committee Members and the Project Liaison Officers and will always act in good faith.

Signature ..... Date .....

Witnesses:

Name and Surname ..... Signature .....

Name and Surname ..... Signature .....

## **FORM A2: PROJECT LIAISON COMMITTEE – RULES, RESPONSIBILITIES AND DUTIES (Derived from D1004.03)**

The PLC is the official communication channel through which SANRAL, the Engineer, Contractor and project Stakeholders and affected Communities communicates on project matters. This platform is also used to communicate the impact that the project has or may have on project Stakeholders and the affected Communities. This part of Section D of the Specifications describes the general processes pertaining to the PLC, as well as its role and responsibilities.

### **1. Establishment of the PLC**

The PLC will be established prior to commencement of the Contract or as soon as possible by SANRAL. The PLC consists of SANRAL, the Engineer, Contractor and representatives of project Stakeholders and affected Communities. To ensure that all relevant Stakeholders are represented in the PLC, SANRAL did, or will, consult with the Executive Mayor's office, as well as with the LED Department of the Local Municipalities in the Project Area. Once the PLC has been established, the Employer's further Stakeholder engagement activities shall not prevent the Contractor from continuing with construction.

Typical Stakeholder representation on the PLC may include:

- a) A PLC member from the relevant RRM PLC.
- b) Local Municipality LED Office.
- c) Traditional leadership representation.
- d) Forums representing people with disabilities.
- e) Forums representing women.
- f) Forums representing youth.
- g) Forums representing business sector.
- h) Forums representing transport sector.
- i) Any other Stakeholder forum/organisation recognised by SANRAL and the Local Municipality's LED Office.

Every forum/organisation/constituency may have one (1) representative on the PLC, which representation will be confirmed by a duly signed nomination form.

It should be noted that the PLC is not a political platform. While Councillors may be invited to some PLC meetings, they may not be PLC members and hence, will not have voting rights when attending a PLC meeting.

### **2. Seating Allowance for PLC Members**

PLC membership is voluntary and PLC members will not be remunerated for any time spent or work done associated with representing their constituency on the PLC.

Provision has been made in the Contract for a seating allowance (stipend) to PLC members for actual costs incurred in executing their PLC duties (other than time or work related). The Contractor will determine and table to the PLC a realistic seating allowance which will be substantiated by an outline of the anticipated actual costs envisaged to be incurred by PLC members.

The seating allowance will be increased annually based on the CPI figure contained in Table B2 of Statistical Release P0141 by StatsSA.

### **3. Induction of the PLC**

SANRAL will conduct an induction meeting with the PLC to acquaint PLC members with the following information:

- a) SANRAL's Horizon 2030 Strategy.
- b) SANRAL's Fourteen Point Plan.
- c) The role and responsibilities of PLC members.
- d) SANRAL's Transformation Policy.
- e) How the Transformation Policy impacts on SMMEs.
- f) Relevant details of the Contract, e.g.
  - i) Start and end dates
  - ii) Important milestones
  - iii) CPG targets
  - iv) Envisaged Targeted Enterprise packages
  - v) Envisaged work for other SMMEs (non-CPG).

### **2. Rules of Engagement for the PLC**

In the execution of their duties, members of the PLC shall adhere to the undertakings listed below and the Contractor shall inform the Engineer of any transgression of these undertakings.

#### **a) General Matters and Membership**

- i) A PLC member may not be a politically elected representative, and political party representation will not be allowed in the PLC.
- ii) Ward Councillors may interact with the project team through the Mayor's Office.
- iii) If required, and in consultation with SANRAL, a Political Steering Committee (PSC) may be established to address political matters. A PSC will only be established where the Project Area traverse over more than one municipal area.

#### **b) Term of Office for the PLC**

- i) The duration of PLC members' participating in the PLC (term of office) shall depend on the duration of the project.
- ii) If SANRAL finds the performance of a PLC member to be below expectation or their conduct to be unacceptable, the affected member will be discharged from their obligations and a new nomination process shall commence.

#### **c) Targeted Enterprise and Targeted Labour**

PLC members shall:

- i) ensure that they, or companies in which they hold equity, will not tender on the Contract for any work or sub-contract that may be issued. Should they tender, this will be treated as a conflict of interest and the tender proposal submitted will not be evaluated.
- ii) not have private or business interests in any of the sub-contract tenders tabled to the PLC or considered in this Contract.
- iii) shall recuse themselves from discussions that deal with a sub-contract tender if any other member is of the opinion that a member's participation in deliberations, which is rightly or wrongly construed as improper or irregular, may lead to the award of a sub-contract to a tenderer known to the member or to the member itself.
- iv) recuse themselves from the operations of the PLC following a situation as described in paragraphs ii) above and shall cease to be a PLC member for this Contract.
- v) during the tender and tender evaluation processes, neither deliberately favoured nor prejudiced a person or tenderer, as intended, or contemplated in treasury Regulation 16, A8.3 (a), (b) & (c).
- vi) ensure that no conflict of interest arises from members' involvement in the PLC and potential involvement in targeted labour recruitment and/or targeted enterprises procurement and/or any other supplier/sub-contractor/service provider procurement or involvement in the contract.

d) Confidentiality

- i) PLC members shall accept that all information, documentation, and decisions regarding any matter serving before the PLC are confidential and undertake not to communicate decisions or discussions of PLC meetings to external or internal parties unless so directed and approved by the Project Manager.
- ii) Information for public dissemination shall be clearly indicated by the committee to ensure that sensitive information is only disseminated to the correct audience.

e) Removal from Office

- i) PLC members who violate the provisions of these Rules of Engagement for PLCs will be removed from their role as a PLC member at the sole discretion of SANRAL.
- ii) SANRAL reserves the right to recover any costs from PLC members whose actions can be regarded as detrimental to SANRAL or to the execution of the project.
- iii) SANRAL also reserves the right to recommend criminal prosecution if the offence warrants such action.
- iv) SANRAL reserves the right to dissolve the entire PLC should it believe that such an action is in its best interest, or that of the project. SANRAL will not be obliged to reconstitute the PLC if such a dissolution occurs.

### **3. Responsibilities and Duties of the PLC**

The PLC will execute specific duties during the design and construction phases of the project.

Some of the PLC's duties during the design and construction stages overlap and hence, for completeness, a description of the PLC's duties in both project stages is provided here.

The PLC will execute the following duties:

a) Project Design Stage

- i) Meet as often as required to discuss and resolve the project's design stage matters which are of interest or concern to the parties to the PLC.
- ii) Peruse the Project Liaison Committee rules, responsibilities and duties outlined in this Form and agree on the rules, responsibilities, and duties of, and procedures to be followed by, the PLC to fulfil its duties.

**Note:** The principles outlined in this Form shall not be amended, but duties and procedures may be altered to be project specific and to improve the functionality of the PLC.

- iii) Act in accordance with the agreed terms of reference for the PLC.
- iv) Inform SANRAL of any training that project Stakeholder and affected Community representatives of the PLC require to execute their duties.
- v) Assist the Engineer to source suitable candidates, based on SANRAL's qualifying criteria, for the position of PLO.
- vi) Observe and verify that the qualifying criteria and procedures applied by the Engineer to select and employ the PLO were executed in a fair and transparent manner and were within the prescripts of the relevant labour legislation and regulations.
- vii) Assist the Engineer to identify the project's Target and Project Area(s) from which Targeted Labour and Targeted Enterprises could be employed and sub-contracted, respectively.
- viii) Assist the Engineer to identify the project's Target Groups for inclusion in the Tender Documents and agree to and support the identified Target Groups.

b) Project Construction Stage

- i) Meet formally prior to SANRAL's monthly site meeting, or as may be required, to discuss and resolve project matters which are of interest or concern to the parties to the PLC.
- ii) Assist the Contractor to establish the selection criteria and process to employ Targeted Labour
- iii) Assist the Contractor to identify the eligibility, functionality, preference, and compliance criteria to select and sub-contract Targeted Enterprises.
- iv) Agree to and support the Databases compiled by the PLO and the Contractor from which Targeted Labour will be selected and employed and Targeted Enterprises will be sub-contracted, respectively.
- v) Verify that the criteria and methodologies applied by the Contractor to select and employ Targeted Labour and sub-contract Targeted Enterprises are executed in a fair and transparent manner and are within Government legislation and regulations and SANRAL's Policies.

- vi) Verify that the conditions of employment and the conditions of sub-contracting, in the employment of Targeted Labour and sub-contracting of Targeted Enterprises are applied in a fair and transparent manner and according to SANRAL's employment and sub-contracting requirements.
- vii) Make recommendations to the Contractor on the training needs, eligibility criteria and selection criteria for the provision of training to Targeted Labour, Targeted Enterprises, Designated Groups, project Stakeholders and the affected Communities.
- viii) Verify that training and skills development programmes, which the Contractor committed to, are implemented, and executed as approved and intended.
- ix) Inform the entities whom they represent of any project matters which the respective party to the PLC wishes to communicate with each other.
- x) Inform the entities whom they represent of any project matters that are impacting or may impact, either positively or negatively, on the respective parties to the PLC.
- xi) Inform the Contractor of Stakeholder and/or Community requests and/or needs, which could possibly be addressed within the project's Scope of Work.
- xii) Inform the SANRAL, the Engineer and Contractor of any road safety concerns within the Project Area(s) and advise them of possible mitigating measures and/or road safety programs that will be most suitable for acceptance by the affected Communities to promote road safety.
- xiii) Agree on a dispute resolution mechanism to resolve any disputes that may arise between the parties to the PLC.
- xiv) Assist parties to the PLC to liaise with their respective entities to resolve any disputes amongst the parties which may occur due to the project.

#### **4. PLC Meetings**

- a) Frequency
  - i) Meetings will be conducted monthly or as required by the Stakeholders or the project matters.
- b) Notice of meetings
  - i) The notice of the PLC meeting shall be given at least seven (7) calendar days prior to the meeting date.
  - ii) Where meetings have been diarised over a period by the PLC, it shall be the duty of each PLC member to ensure his/her attendance on the set dates.
  - iii) Where a PLC member has missed any meeting, he/she bears the onus of establishing the date and venue of the next meeting.
- c) Venue
  - i) The venue for PLC meetings shall be the project site office or any other venue agreed to by the members of the PLC and approved by SANRAL.

- ii) During the Covid 19 lockdown, or any other lockdown as announced by government, the meetings shall be held on an online platform such as WhatsApp, Teams, Zoom or similar.
- d) Agenda
  - i) An agenda shall be made available or displayed to all participants at the commencement of such meetings or the minutes of the previous meeting will serve as the agenda of such meetings.
  - ii) The agenda shall not be amended without prior approval from SANRAL.
- e) Chairperson
  - i) PLC meetings shall be chaired by SANRAL which will typically be the SANRAL's Project Manager, or a SANRAL staff member with decision--making delegation, or the Engineer.
  - ii) The Chairperson shall:
    - a. chair all meetings of the PLC,
    - b. co-ordinate all the activities of PLC,
    - c. ensure that members are fulfilling their tasks as assigned by the PLC,
    - d. see to the execution of decisions taken by the PLC,
    - e. ensure the validity of members' claim for allowance,
    - f. ensure compliance of all activities of the PLC with current rules, law and general SANRAL policy, and
    - g. be a co-signatory to all official documents of the PLC.
- f) Secretariate
  - i) The Engineer's staff shall provide a secretarial service to take minutes of PLC meetings.
  - ii) Secretarial support other than taking minutes at PLC meetings shall be provided by the PLO.
- g) Quorum
  - i) The quorum for PLC meetings shall be constituted by 50%+1 ratio excluding co-opted members.
- h) Apologies and Non-attendance
  - i) Apologies shall be in writing except in emergency where the member apologising cannot communicate the apology in writing.
  - ii) Apologies may be sent through any media agreed to prior by the PLC for example through SMS or WhatsApp messaging or similar application.
  - iii) The organization, represented by a member who fails to attend three (3) consecutive meetings without an apology, will be informed in writing and asked to nominate a replacement member.



i) Language

- i) The meetings will be conducted in English to enable all participants at the meeting to understand the discussions of the meeting.
- ii) However, care and consideration must be given to provide non-English speakers an opportunity to participate. Therefore, where desirable, any of the 11 official languages maybe be used to conduct the meeting. If another language other than English is used, the minutes of the meeting will need to be transcribed, translated, and recorded in English.

j) Other

- i) The PMT shall provide a finger lunch for PLC members at PLC meetings.

5. Amendments or Additions


The rules, responsibilities, and duties for PLC members in this Form are adopted and will be in force with effect from this ..... day of ..... 20.....

	Name and Surname	Signature	Date
Accepted for SANRAL			
Accepted for Engineer			
Accepted for Contractor			
Accepted for PLC			
Accepted by PLC			

**FORM A3: CHECKLIST – PROJECT LIAISON COMMITTEE – MEMBER APPOINTMENT****Notes:**

- a) The checklist consists of several sections. Only print the relevant sections.
- b) Indicate what has been completed and sign off at the end.
- c) While other individuals can assist in this process, the Project Manager (PM) remains accountable for all deliverables.
- d) All forms/records to be kept by the PM and availed to line management upon request.

Form No.	Item	Explanatory Note for Compliance Check		Responsibility	Complete (Yes/No or N/A)
A3.1	PLC Member Appointment:				
1	Nomination forms completed.	a)	Form must indicate the nominee and the individual or organisation making the nomination.	Stakeholder Coordinator (SC) /Contracts Engineer (CE)	
		b)	Forms circulated with the assistance of Municipality's LED office.	SC/CE	
		c)	All completed forms collected from the Municipality's LED office.	SC/CE	
2	Members selected.	a)	Confirm the membership of the PLC.	SC/Project Management Team (PMT)	
		b)	Where there are multiple entries, the team can select the member with the highest number of nominations.	SC/PMT	
		c)	Where there is an equal number of nominations, the team will request the nominating organisation to confirm the member who should join the PLC.	SC/PMT	
		d)	The last alternative is to allow for a snap election in a community meeting.	SC/PMT	
		e)	Communicate the PLC membership to the affected stakeholders.	SC/PMT	

Form No.	Item	Explanatory Note for Compliance Check		Responsibility	Complete (Yes/No or N/A)
3	Formal appointment to PLC signed.	a)	Ensure that the PLC membership is confirmed in line with Form A3.2	SC/Project Manager (PM)	
		b)	All members must be provided with a copy of the PLC Duties and Responsibilities (extract from D1004.03). The signed duties and responsibilities must be scanned and shared with all members. The PM retains a copy for future reference.	SC/PMT	
		c)	Document must be signed again when the membership changes. The PM must add the version of the document to ensure that the various versions can be tracked.	PM	
<b>Stakeholder Coordinator:</b>					
<b>Name</b>		<b>Sign</b>		<b>Date</b>	
<b>Project Manager:</b>					
<b>Name</b>		<b>Sign</b>		<b>Date</b>	

**FORM A3.2: PROJECT LIAISON COMMITTEE – MEMBER LIST**

No.	Sector/Entity/Forum	Name and Surname	Signature
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

**FORM A4: CHECKLIST – PROJECT LIAISON OFFICER – APPOINTMENT****Notes:**

- a) The checklist consists of several sections. Only print relevant sections.
- b) Indicate what has been completed and sign off at the end.
- c) While other individuals can assist in this process, the Project Manager (PM) remains accountable for all deliverables.
- d) All forms/records to be kept by the PM and availed to line management upon request.

Form No.	Item	Explanatory Note for Compliance Check		Responsibility	Complete (Yes/No or N/A)
A4	PLO Appointment:				
1	Post advertised in local media.	a)	Job profile prepared.	CE/PMT	
		b)	Post advertised in the media.	CE/PMT	
		c)	Copy of advert kept on file.	CE/PMT	
2	Shortlisting completed.	a)	All CVs received collated.	CE/PMT	
		b)	Shortlisting done by the PMT.	CE/PMT	
		c)	PLC provided with the final shortlist.	CE/PMT	
3	Interviews held.	a)	Candidates invited.	CE/PMT	
		b)	Interview grid prepared.	CE/PMT	
		c)	The PLC can nominate a member to sit on the interview panel as an observer to ensure transparency in the process.	CE/PMT	
		d)	Formal interviews carried out.	CE/PMT	
		e)	Interview scores collated.	CE/PMT	
4	Formal appointment of PLO.	a)	PLO appointment letter issued.	CE	
		b)	PLO employment contract signed.	CE	
		c)	PLO performance agreement signed.	CE	

Form No.	Item	Explanatory Note for Compliance Check		Responsibility	Complete (Yes/No or N/A)
Stakeholder Coordinator:					
Name		Sign		Date	
Project Manager:					
Name		Sign		Date	

**FORM A5: CHECKLIST – PROJECT LIAISON COMMITTEE – MEETINGS****Notes:**

- a) The checklist consists of several sections. Only print relevant sections.
- b) Indicate what has been completed and sign off at the end.
- c) While other individuals can assist in this process, the Project Manager (PM) remains accountable for all deliverables.
- d) All forms/records to be kept by the PM and availed to line management upon request.

Form No.	Item	Explanatory Note for Compliance Check	Responsibility	Complete (Yes/No or N/A)	
<b>A5</b>	<b>PLC Meeting Checklist:</b>				
<b>1</b>	<b>Attendance register completed.</b>	a)	All members of the PLC to sign the attendance register in ink.	PLO/PM	
		b)	Where meetings are on an online platform such as MS Teams, the attendance list must be downloaded from that platform.	PLO/PM	
<b>2</b>	<b>Quorum met.</b>	a)	The quorum for PLC meetings shall be constituted by 50% + 1 ratio excluding co-opted members.	PLO/PM	
<b>3</b>	<b>Agenda approved.</b>	a)		PM	
<b>4</b>	<b>Previous minutes approved.</b>	a)	Minutes must be prepared, signed off and dated by the Chairperson at the following meeting.	PLO/PM	
<b>5</b>	<b>Minutes and resolutions captured.</b>	a)		RE/PLO	
<b>6</b>	<b>Declaration of interest completed.</b>	a)	All members of the PLC to sign the DoL in ink.	PLO/PM	
<b>Stakeholder Coordinator:</b>					
<b>Name</b>		<b>Sign</b>		<b>Date</b>	
<b>Project Manager:</b>					
<b>Name</b>		<b>Sign</b>		<b>Date</b>	



FORM A6: PROJECT LIAISON COMMITTEE – DECLARATION OF INTEREST

Notes:

- a) This declaration of interest shall be signed by all attendees at every PLC meeting.

<p style="text-align: center;"><b>THE SOUTH AFRICAN NATIONAL ROADS ANGENCY LTD</b></p> <p style="text-align: center;"><b>PROJECT LIAISON COMMITTEE - DECLARATION OF INTEREST</b></p> <p>We, as members of the PLC and persons present in the meeting, hereby solemnly swear and declare that we have no private or business interest or stake in any of the Work Packages or Tender Reports tabled here today or to be discussed in this project.</p> <p>If one of us is of the opinion/view that some people may, rightly or wrongly construe as improper/irregular, his/her participation/involvement in deliberations that may lead to the award of a tender to a tenderer known to him/her, that person shall then recuse himself/herself from the proceedings/discussions that deal with that Work Package or Tender Report. Additionally, such a member shall recuse himself/herself from the operations of this PLC going forward and shall cease to be a PLC member for this project.</p> <p>We certify that we, during the process neither deliberately favoured nor prejudiced and person or tenderer, as intended or contemplated in treasury Regulation 16, A8.3 (a), (b) &amp; (c).</p> <p>We further accept that all information, documentation, and decisions regarding any matter serving before the Committee are confidential. We, therefore, undertake not to communicate decisions/discussions of the meeting to external or internal parties unless so directed and approved by the Project Manager.</p>		
<b>Members</b>	<b>Signature</b>	<b>Date</b>

**FORM B: CHECKLIST – TARGETED ENTERPRISE TENDERING PROCESS**

Form No.	Item	Explanatory Note for Compliance Check		Responsibility	Complete (Yes/No or N/A)	Source Document
<b>B1</b>	<b>Target Area:</b>					
<b>1</b>	<b>Target Area Defined by PLC.</b>	a)	Target Area for Targeted Labour and Targeted Enterprises identified and disseminated to the PLC.	PLO/PM		
		b)	Target Groups identified and disseminated to the PLC.	PLO/PM		
<b>2</b>	<b>Database of Contractors and Suppliers.</b>	a)	Database criteria setup and disseminated to the PLC.	PLO/PM		
		b)	Signed off database criteria handed over to PLC.	PLO/PM		
<b>B2</b>	<b>Tender Phase:</b>					
<b>1</b>	<b>Tender Advert.</b>	a)	Copy of advert on file.	Contractor		
		b)	Proof of publication in selected local publications.	Contractor		
		c)	Proof of publication on SANRAL website.	Contractor		
<b>2</b>	<b>Tender Document.</b>	a)	Copy of specification available on file, copy of the Tender CD, or printed.	Contractor		
<b>3</b>	<b>Clarification Meeting Attendance register.</b>	a)	Attendance register signed by all attendees of the clarification meeting	Contractor		
<b>4</b>	<b>Clarification Meeting Minutes.</b>	a)	Minutes must be prepared, signed off and dated by the Chairperson	Contractor		

Form No.	Item	Explanatory Note for Compliance Check		Responsibility	Complete (Yes/No or N/A)	Source Document
			within 14 days of the date of the meeting			
5	Clarification Meeting Presentation.	a)	Copy of the presentation on file.	Contractor		
6	Addenda	a)	All addenda issued must be recorded on the file.	Contractor		
		b)	Proof (e-mail) of those persons that the addenda was sent to (if applicable).	Contractor		
7	Register of tenders issued (if applicable).	a)	Record the names of persons / companies that collected tender documents (website/by hand).	Contractor		
B3	Tender Opening:					
1	Register of Tenders Received.	a)	Record the names of persons / companies that submitted tender offers.	Contractor		
2	Tender Opening, Declaration of Interest.	a)	Declaration by SANRAL officials at the opening.	Contractor		
3	Tender Opening, Attendance Register.	a)	Record the names of persons present at the opening of tenders.	Contractor		
4	Register for late tenders received.	a)	Record names and time of late tenders received.	Contractor		
5	Tender Opening, Opening Data.	a)	Register of the opening of the Technical Offer on the Tender Data sheet.	Contractor		
B4	Tender Evaluation:					
1	Extension of validity period.	a)	Confirmation of issue of letters of extension of validity period.	Contractor		

Form No.	Item	Explanatory Note for Compliance Check		Responsibility	Complete (Yes/No or N/A)	Source Document
		b)	Confirmation of response on extension of validity period by the bidders.	Contractor		
2	Declaration of Interest.	a)	All members of the Bid Evaluation Committee to sign the DoI in ink.	Contractor		
3	Attendance Register.	a)	All members of the BEC to sign the attendance register in ink.	Contractor		
4	Minutes	a)	Minutes must be prepared, signed off and dated by the Chairperson within 14 days of the date of the meeting.	Contractor		
5	Signed evaluation report.	a)	Report signed by the Chairperson of the BEC detailing deliberations and discussions of the BEC meeting.	Contractor		
6	PPPFA Scoring sheet	a)	Scoring sheet detailing the scores of all tenders evaluated as per the PPPFA.	Contractor		
7	CSD Compliance Report.	a)	Printout of the CSD Report for compliance verification for the successful tenderer.	Contractor		
8	CIDB grade confirmation (if applicable).	a)	Verification of active status.	Contractor		
		b)	JV calculator for Joint Ventures.	Contractor		
9	B-BBEE Certificate.	a)	B-BBEE Certificate of winning tenderer on file for verification of preference points.	Contractor		
10	SANRAL List of Restricted Bidders.	a)	Verification that the winning tenderer is not restricted from doing business with SANRAL.	Contractor		

Form No.	Item	Explanatory Note for Compliance Check		Responsibility	Complete (Yes/No or N/A)	Source Document
11	<b>Clarification correspondence after tender closing (individual tenderers or all).</b>	a)	All correspondence relating to RFT correction of arithmetic errors/balancing of rates etc.	Contractor		
12	<b>Report for the award of the contract.</b>	a)	Report detailing information from tender phase to evaluation phase, and a recommendation with motivation for the approval of the winning tenderer.	Contractor		
13	<b>Review Report.</b>	a)	Receive high level reports and ensure transparency in the appointment of Targeted Enterprises. The reports must exclude sensitive evaluation information.	PLC /PLO/PM	Report not to be supplied to PLC*.	
<b>B5</b>	<b>Award of Contract:</b>					
1	<b>BAC Declaration of Interest.</b>	a)	All members of the BAC to sign the DoI in ink.	Project Bid Adjudication Committee Secretariat (PBAC)		
2	<b>BAC Attendance Register.</b>	a)	All members of the BAC to sign the attendance register in ink.	PBAC Secretariat		
3	<b>BAC Minutes.</b>	a)	Minutes must be prepared, signed off and dated by the Chairperson within 14 days of the date of the meeting.	PBAC Secretariat		

**FORM C: CHECKLIST – TARGETED ENTERPRISE CONTRACT ADMINISTRATION**

Form No.	Item	Explanatory Note for Compliance Check	Responsibility	Complete (Yes/No or N/A)	Source Document
<b>C</b>	<b>Contract Administration Phase</b>				
<b>1</b>	<b>Letter of award / Letter of Acceptance.</b>	a)	Copy of letter issued to the successful bidder.	Contractor	
<b>2</b>	<b>Letters to unsuccessful bidder(s).</b>	a)	Standard letter informing unsuccessful bidders of the tender outcome with proof of emails.	Contractor	
<b>3</b>	<b>Publication of award, within 7 working days from date of award.</b>	a)	Proof of publication on SANRAL website.	Contractor / PLO / Project Manager	
<b>4</b>	<b>Contract document.</b>	a)	Original signed contract on file.	End-User / Contractor	
<b>5</b>	<b>Closure of contract.</b>	a)	Copy of close-out report (SIPDM).	End-User / Contractor	
<b>6</b>	<b>Performance report (for Engineering contracts).</b>	a)	Copy of contractor performance report.	End-User / Contractor	
<b>Project Manager:</b>					
<b>Name</b>		<b>Sign</b>		<b>Date</b>	

## **APPENDIX 10 – CHECKLIST FOR PLCS AND PLOS**

N/A at tender stage

**APPENDIX 11 – PROFORMA SUBCONTRACT DOCUMENT FOR TARGETED ENTERPRISES**

**N/A at tender stage**



## APPENDIX 12 – GENERAL REQUIREMENTS FOR COMMUNITY DEVELOPMENT PROJECTS

### A1001 SCOPE OF WORK

The Contractor's Scope of Work primarily entails the training and skills development of members of an identified Community, as well as Trainee Targeted Enterprises selected from this Community, who will become his Targeted Enterprise subcontractors and whom he shall manage and mentor during the construction phase.

The construction phase entails overseeing the construction of infrastructure, by Trainee Targeted Enterprises, that promotes the access, mobility and road safety of the identified Community, in relation to the National Road Network. The Contractor thus have primarily a training and construction management role.

To enhance the utilisation and development of Targeted Labour from the identified Community, care has been taken during the design of the Works to ensure that it can be constructed by means of labour enhanced construction methods (LECM) and the Contractor shall apply such labour enhanced methods.

### A1002 DEFINITIONS

Unless inconsistent with the context, in these specifications, the following terms, words or expressions shall have the meanings hereby assigned to them:

#### a) Accreditation

The certification, for a set period, of a person, a body or an institution to have the capacity to fulfil a particular function within the quality assurance system set up by the SAQA.

#### b) Construction Education and Training Authority (CETA)

The Construction Education and Training Authority (CETA) was established in terms of the Skills Development Act, Act 97 of 1998. It provides skills development services to the construction sector, to implement the objectives of the National Skills Development Strategy and to ensure that people obtain the critical or scarce skills that are needed to build the capacity of the construction sector to become economically sustainable and globally competitive.

#### c) Contractor's Construction Management Staff

##### i) Construction Manager

The Contractor's full-time staff member who manages the practical training and construction of the Works. He also develops and supports Trainees through mentoring, providing guidance and coaching Trainee Targeted Enterprises and other Targeted Enterprises.

##### ii) Construction Mentor

The person who mentors and oversees Trainees during practical training and construction of the Works.

##### iii) Construction Supervisor

The person who directly supervises Trainees and who is the coordinator between the Construction Manager and the Trainees during the construction of the Works.

#### d) Contractor's Training Staff

##### i) Assessor

A person registered with the relevant ETQA body to measure the achievement of specified NQF standards or qualifications.

- ii) Moderator  
A member of a body registered with the CETA to ensure that assessment of the outcomes described in the NQF standards and qualifications are fair, reliable and valid
- iii) Practitioner  
A person registered with the CETA to practice as a trainer or instructor of specific NQF Unit Standards.
- iv) Training Provider  
The person who coordinates and manages the training and skills development programme developed, or to be developed, for the project.

**e) Education and Training Quality Assurance (ETQA) Body**

The Education and Training Quality Assurance (ETQA) Body is the quality assurance body within the CETA whose purpose is to monitor and audit achievements in terms of standards or qualifications registered on the NQF.

**f) Labour Enhanced Construction Methods (LECM)**

Labour Enhanced Construction Methods (LECM) involve the use of an appropriate mix of labour and machines, with a preference for labour where technically and economically feasible, without compromising the quality of the product.

**g) Mentoring**

Mentoring is a professional relationship in which an experienced businessperson assists another by giving advice and imparting their knowledge and wisdom in developing special skills and knowledge that will enhance the less experienced person's professional and personal growth. The objective is to equip the business owner and his team to improve their decision-making skills, being focussed and make positive progress quickly.

**h) National Qualifications Framework (NQF)**

The National Qualifications Framework (NQF) is a comprehensive system for the classification, registration, publication and articulation of quality-assured national qualifications. It is the set of principles and guidelines by which records of learner achievement are registered to enable national recognition of acquired skills and knowledge, thereby ensuring an integrated system that encourages life-long learning.

**i) Notional (or Learning) Hours of Training**

The learning time that it is conceived it would take an average Trainee to meet the defined outcomes and includes concepts such as contact time, time spent in structured learning in the workplace and individual learning.

**j) Portfolio of Evidence**

A collection of written confirmation contained in a book or file that provides proof of a Trainee's progress towards achieving competency in a Traineeship or skills programme or part thereof, to be kept safe by the Training Provider for a period of at least 5 (five) years after completion of the Traineeship or skills programme or part thereof.

**k) Recognition of Prior Learning (RPL)**

The comparison of the previous learning and experience of a Trainee, howsoever obtained, against the learning outcomes required for a specific qualification, and the acceptance for purposes of qualification of that which meets the requirements.

**l) South African Qualifications Authority (SAQA)**

The South African Qualifications Authority (SAQA) is a juristic person that is an entity given a legal personality by the law and that was established in terms of the South African Qualifications Authority Act, Act No. 58 of 1995. The SAQA must develop and implement policy and criteria for the development, registration and publication of qualifications and part-qualifications.

**m) Specific Outcomes**

The knowledge, skills and values (demonstrated in context) which support one or more critical outcomes of a Unit Standard.

**n) Trainee Targeted Enterprise**

A Targeted Enterprise as defined in t) above, but who participates in the project, and who is subcontracted to the Contractor, as a Trainee in the Contractor's Training and Skills Development Programme.

**o) Traineeship (also Learnership)**

A work-based training and learning programme which leads to a qualification registered on the NQF. Where reference is made to Traineeship it shall also mean Learnership.

**p) Unit Standard**

The registered statement of desired education and training outcomes and its associated assessment criteria, together with administrative and other information as specified in the regulations.

**i) Unit Standard – Core**

The compulsory learning required in a situation contextually relevant to a qualification.

**ii) Unit Standard – Elective**

A selection of additional credits at the level of the NQF specified from which a choice may be made to ensure that the purpose of the qualification and the minimum required number of credits for the qualification is achieved.

**iii) Unit Standard – Fundamental**

The learning which forms the foundation or basis needed to undertake the education, training or further learning required to obtain a qualification.

**A1003 GENERAL REQUIREMENTS**

**A1003.01 Description of the Project**

Training and skills development forms an integral part of the Employer's Transformation Policy and Community Development Strategy and hence, it is important to the Employer that Communities and small, medium and micro enterprise (SMME) Contractors within local Communities are trained and equipped with skills that can be used to gain meaningful employment and secure contracting or subcontracting opportunities.

The Training and Skills Development Programme shall comprise of, amongst others, structured theoretical (classroom) training with an extensive practical (workplace) and developmental construction component.

The services required from the Contractor comprise the following components and phases, of which some will overlap in its execution.

**a) Conduct Resources and Skills Audits, and Market Analysis**

the Contractor shall conduct Resources and Skills Audits to determine the Targeted Enterprise capacity in the Project Area and the Community's levels of education, existing qualifications, and skills sets. It shall be followed by a Market Analysis of the area in which these Targeted Enterprises typically, or potentially could, operate.

**b) Develop a Training and Skills Development Programme**

Based on the Contractor's Resources and Skills Audits and Market Analysis, the Contractor shall develop a Training and Skills Development Programme as a basis for the project.

**c) Select Beneficiaries of the Project**

Beneficiaries of the project shall comprise Designated Groups and/or Targeted Enterprises from the Community, as identified via the Employer's Stakeholder and Community Liaison processes described in Part C3, Section D and shall include:

- i) Trainee Targeted Enterprise Subcontractors (CIDB grades 1 to 4);
- ii) Targeted Enterprise Suppliers, Service Providers and Subcontractors;
- iii) Targeted Labour; and
- iv) Community members or groups.

**d) Conduct Theoretical (Classroom) Training**

The theoretical training shall be SAQA accredited programmes that include multiple, but related, Unit Standards which are relevant to the practical implementation component, i.e. the Works to be constructed. The theoretical, together with the practical, component of the project is aimed at achieving the training and skills development objectives of the Employer to lead towards Trainees obtaining a formal qualification in the Construction Industry and for Targeted Enterprises to improve their CIDB grading levels.

**e) Conduct Practical (Workplace) Training**

During the practical training phase of the project, the Construction Manager shall expose Trainees to the practical aspects of construction work under his direction. The Construction Manager shall supervise and closely monitor Trainees and shall train, coach, guide, mentor and assist Trainees in all aspects of the execution and management of a typical construction project. Amongst others, Trainees shall be developed in the planning of the Works, sourcing and ordering of materials, labour relations, monthly measurements and invoicing procedures.

**f) Construction of the Works**

An infrastructure construction component has been identified for the Community Development Project to facilitate the Training and Skills Development Programme.

The Works shall be constructed using the COTO Standard Specifications.

Care has been taken during the design of the Works to ensure that it can be constructed by means of labour enhanced construction methods and the Contractor shall apply such labour enhanced methods within the perimeters of the Specifications.

**A1003.02 Time for Completion and Project Programme**

The Contractor shall programme his duties in such a manner to complete the various phases of the project within the indicative milestone dates specified below. The Employer's indicative programme for this project is depicted in **Table A1003.02(a)** below:

**Table A1003.02(a): Indicative Programme**

	Project Stage	Completion Date
A	Submission of Tenders	X <i>(insert date)</i>
B	Appointment of Training and Construction Manager	X + 24 weeks
C	Project Hand-over meeting	X + 26 weeks <i>(14 days from award.)</i>
	Mobilisation Period commences	X + 26 weeks
D	First Progress Meeting	X + 30 weeks
E	Resources and Skills Audit and Market Analysis Report	X + 30 weeks
F	Training and Skills Development Programme Approval	X + 30 weeks
G	Selection of Beneficiaries of the Project Complete	X + 38 weeks
	Mobilisation Period ends	X + 38 weeks
H	Theoretical (Classroom) Training Complete	X + 52 weeks
I	Practical (Workplace) Training Complete	X + 66 weeks
J	Simulation Construction Complete	X + 80 weeks
K	Construction of the Works Complete	X + 98 weeks
L	Project Close-out	X + 106 weeks

The Contractor shall submit his draft programme, based on the indicative programme, for the Engineer's perusal at the project hand-over meeting.

#### **A1003.03 Drawings**

The drawings issued in electronic format on a Compact Disc as part of the tender documents, shall be used for tender purposes only.

The Contractor will be issued with the contract drawings in electronic format on a Compact Disc. Any prints which the Contractor may require shall be at his own cost.

Any information in the possession of the Contractor, which the Engineer requires to record as-built information, shall be supplied to the Engineer before the Taking-Over Certificate will be issued.

Only figured dimensions shall be used and drawings shall not be scaled unless so instructed by the Engineer. The Engineer will supply all figured dimensions omitted from the drawings.

#### **A1003.04 Contractor's Staff**

The Contractor's two leading Key Persons are the Training Provider and the Construction Manager. The roles of both these persons are described below.

##### **a) Contractor's Training Staff**

###### **i) The Training Provider**

The Contractor's Training Provider shall predominantly coordinate and manage the Training and Skills Development Programme of the project. If the Contractor is not an accredited Training Service Provider, he shall subcontract an accredited Training Service Provider by applying the Employer's Supply Chain Management Policy for second tier procurement.

ii) Practitioners, Assessors and Moderators

The Training Provider shall have under his management, or in his employ, Practitioners, Assessors and Moderators who are registered with the CETA. Proof of accreditation and registration shall be current, valid and list the NQF levels and Unit Standards for which the Training Provider and his staff are accredited.

The training and competency levels required of the Training Provider and his staff are provided in **Table A1003.04(a)** below:

**Table A1003.04(a): Qualifications and Experience Requirements for Training Staff**

Designation	Qualification or Unit Standard No.	NQF Level	Credit	Minimum Relevant Experience (years)
Training Provider	Civil Engineering Qualification	5	N/A	10
Practitioner	Train the trainer; No 7384	4	16	None Specified
Assessor	Conduct outcome base assessment; No 115753	5	15	5
Moderator	Conduct moderation of outcome-based assessment; No 115759	6	10	5

In addition to the above qualifications, and in keeping with current CETA practical experience requirements for registration as a Practitioner, NQF Level 4 Unit Standards shall only be presented by Practitioners with NQF Level 5 (one level up) credentials.

Elective Unit Standards are typically more vocational orientated and may require specialist input. It is thus not a requirement that individual Practitioners and Assessors shall have all the necessary skills for all the different categories of Unit Standards. The Training Provider may and shall therefore, when necessary, appoint Practitioners and Assessors on an ad hoc basis with the levels of experience which are required for the Unit Standards to be presented.

The Employer further requires that Assessors and Moderators shall have at least 5 (five) years' experience as a Site Agent, managing construction processes in the fields of roads maintenance, new roads construction, roads rehabilitation, structures, etc.

**b) Contractor's Construction Management Staff**

i) The Construction Manager

The Construction Manager and his staff shall predominantly manage the practical training, construction of the Works and mentoring, development and support of the Trainees and Targeted Enterprises.

The Construction Manager is also the Contractor's Representative and shall maintain a full-time presence on site during the practical training and construction of the Works phases of the project.

ii) The Construction Mentor

The Construction Mentor is not listed as a Key Person for eligibility and functionality purposes but is an extension of the Construction Manager and it is recommended that 1 (one) Construction Mentor be provided for every 4 (four) Targeted Enterprises. The Construction Mentor shall maintain a full-time presence on site during the practical training and construction of the Works phases of the project.

iii) The Construction Supervisor

The Construction Supervisor is not listed as a Key Person for eligibility and functionality purposes but is an extension of the Construction Manager and Mentors. The Construction Supervisor does not only directly supervise Targeted Enterprises but is also the coordinator between the Targeted Enterprises and the Construction Manager. It is recommended that 1 (one) Construction Supervisor be provided for every 3 (three) Targeted Enterprises. The Construction Supervisor shall maintain a full-time presence on site during the construction of the Works phases of the project.

The Clerk of Works is not listed as a Key Person for eligibility and functionality purposes, but the Contractor shall have in his employ the number of Clerks of Works that is required to assist the Construction Manager with the Project Management and Administration of the Works. It is recommended that 1 (one) Clerk of Works be provided for every 12 (twelve) Targeted Enterprises. The Clerk of Works shall maintain a full-time presence on site during the practical training and construction of the Works phases of the project.

The minimum requirements with regards to qualification, registration and experience in the civil engineering or road construction field, for the Contractor's Construction Management staff shall be as stated in **Table A1003.04(b)** below, according to the CIDB contractor grading designation determined for the contract.

**Table A1003.04(b): Qualifications and Experience Requirements for Construction Management Staff**

Key Person	Contracts up to 6CE		Contracts 7CE or Higher	
	Minimum Technical Qualification or Registration	Minimum Relevant Experience (years) <sup>1</sup>	Minimum Technical Qualification or Registration	Minimum Relevant Experience (years) <sup>1</sup>
Professional Registered Person	None specified	None specified	Pr.Eng or Pr.Tech with ECSA <sup>2</sup> or Pr.CM with SACPCMP <sup>3</sup>	None specified
Contract Manager	None specified	10	None specified	10
Construction Manager	None specified	10	None specified	10
	National Diploma Civil Engineering	5	National Diploma Civil Engineering	7
	NQF 6 in Civil Engineering	5	NQF 6 in Civil Engineering	7
Construction Health and Safety Officer	CHSO with SACPCMP	As required by SACPCMP	CHSO with SACPCMP	As required by SACPCMP
Construction Mentor	None specified	8	None specified	8
	National Diploma Civil Engineering	3	National Diploma Civil Engineering	5
	NQF 5 in Civil Engineering	3	NQF 5 in Civil Engineering	5
Construction Supervisor	None specified	5	None specified	5
	National Diploma Civil Engineering	2	National Diploma Civil Engineering	3
	NQF 4 in Civil Engineering	2	NQF 4 in Civil Engineering	3
Clerk of Works	National Diploma Civil Engineering	2	National Diploma Civil Engineering	3

<sup>1</sup> Relevant experience is the actual number of years, measured from the date of acquiring the base qualification, working in the civil engineering or road construction field.

- <sup>2</sup> Registered with the Engineering Council of South Africa (ECSA) or any other international body recognised by the Employer. Foreigners with permanent South African residence longer than 5 (five) years shall be ECSA registered.
- <sup>3</sup> South African Council for Project and Construction Management Professions.

For any proposed change in Key Personnel during the contract, the Contractor shall submit to the Engineer for consent the name and details of the Key Person the Contractor proposes to appoint. The Contractor shall not, without the prior consent of the Engineer, revoke the appointment of the Contractor's Key Personnel or appoint a replacement.

#### **A1003.05 Meetings with the Engineer and the Employer**

The Contractor shall conduct monthly project progress meetings with the Employer and the Engineer. These meetings shall take place on site, at the Contractor's Training Facility and later at his Camp Site. The progress of all aspects of the project shall be discussed, as well as any contractual and technical issues that may have arisen since the previous project progress meeting.

Any matter that may impact on the project's budget and/or may lead to a Contractor's Claim shall be dealt with immediately and ad hoc meetings shall be arranged to resolve such matters.

#### **A1003.06 Contractor's Training Facility and Camp Site**

When selecting and/or establishing his Training Facility and Camp Site, the Contractor shall consider the advantages that will remain with the Community for permanent structures to be left standing.

The Contractor's Training Facilities and Camp Site may be the same building(s) and/or on the same site, or it may be separate buildings and/or on different sites, which-ever is most suitable to project circumstances.

##### **a) Training Facility**

The Contractor shall be responsible for providing everything necessary to offer the various theoretical and practical training, including:

- i) a suitable venue with sufficient furniture, lighting and power for lectures,
- ii) suitable ablution facilities with separate cubicles for both genders; and
- iii) all necessary stationery, consumables and learning aids and material.

##### **b) Camp Site**

For both the practical training and construction of the Works phases of the project, the Contractor shall provide a suitable Camp Site to accommodate the Engineer and his staff, the Contractor's staff and the Contractor's subcontractors and labourers.

##### **c) Electricity Supply and other Utility Services**

The Contractor shall make his own arrangements for the supply of electricity and all other utility services. No direct payment will be made for the provision of these services. The cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which these services are required.

#### **A1003.07 Allowance for Other Contractors and Contracts**

In addition to the requirements of Clause 4.6 of the FIDIC Conditions of Contract for Construction, 1999, the Contractor must take note of the presence of other Contractors on the site and make allowances for them on the site. This may involve adapting the Contractor's Programme to accommodate the work of other Contractors and ensuring access to their sites.



Although details of such contracts may not be known at the time of tender of this contract, it may include, *inter alia*, periodic maintenance, special maintenance, rehabilitation and upgrade contracts.

#### **A1003.08 Targeted Procurement**

The Employer is committed to the implementation of Government's policies and in turn expects the same from its Contractors. Thus, in addition to the Trainee Targeted Enterprises benefitting from this Community Development Project, to comply with the Employer's objectives of its preferential procurement policy, the Contractor shall utilise the Employer's targeted procurement procedure, which is the process used to create a demand for the services and supplies of, or to secure the participation of, Targeted Enterprises in contracts.

Accordingly, it is a requirement of this project that the Contractor is familiar with the specifications that relate to the transformation of the construction industry through the following:

- a) adherence to the policies and initiatives of the Government;
- b) employment of Targeted Enterprises as per the Contract Participation Goals stated in the Contract Data;
- c) provision of mentoring, guidance and assistance to subcontracted Targeted Enterprises;
- d) arrangement of engineering skills, entrepreneurial skills and generic skills training programmes for subcontracted Targeted Enterprises; and
- e) liaison with government institutions and community-based structures.

Part C3, Section D, describes the Employer's requirements for the subcontracting of Targeted Enterprises in detail and provision is made in Pricing Schedule D for the subcontracting of Targeted Enterprises other than the Trainee Targeted Enterprises.

#### **A1003.09 Changes to Scope of Work**

It is a condition of this contract that the Employer reserves the right to limit the total expenditure on the Works due to possible budget constraints. Should the tender sum exceed the budgeted amount, the scope of the works may be reduced at any time before or during the contract period to ensure that the final contract amount does not exceed the budgeted amount.

#### **A1003.10 Environmental Management**

The Contractor shall be responsible for construction according to an Environmental Management Plan. The Contractor must take the utmost care to minimise the impact of his establishment and other construction activities on the environment and must adhere to the requirements of the Environmental Management Plan.

#### **A1003.11 Occupational Health and Safety**

In terms of the Construction Regulation 2014, 5(1)(b) of the Occupational Health and Safety Act (Act No 85 of 1993), the South African National Roads Agency SOC Limited, as the Employer, is required to compile a specification on health and safety for the project.

#### **A1003.12 Contractor Performance and Project Reporting**

##### **a) Contractor Performance Reports**

The Engineer is responsible for the completion of the contractor performance reports on behalf of the Employer. These reports will be completed monthly and on issuing the Taking-Over Certificate.

The standard for contractor performance reports provides for a uniform and consistent method of assessment of the performance of the Contractor with respect to the following project parameters regarding the Contractor meeting his contractual obligations and achievement of targets:

- i) time management;

- ii) cost management;
- iii) quality management;
- iv) health and safety management;
- v) management of site conditions; and
- vi) management of subcontractors (including payment).

Each performance report will be discussed with the Contractor, who will be given an opportunity to comment on the assessment. The Engineer must respond to any issues raised by the Contractor in writing, and the Contractor's comments and the written response by the Engineer must form part of the contractor performance report. The contractor performance report will be signed off by the Employer.

The monthly contractor performance reports and other inputs from the Engineer will be used to monitor and evaluate the Contractor's performance throughout the contract.

**b) Integrated Transportation Information System**

The Employer has developed a comprehensive information management tool called ITIS (Integrated Transportation Information System) to address all facets of its strategic and tactical planning, design, construction and maintenance of the entire road network. This provides support for the management tasks of the Employer and to allow its personnel to make technical decisions more quickly and efficiently.

**A1003.13 Local Production and Content**

The Department of Trade and Industry in consultation with National Treasury has designated the construction sector and determined the stipulated minimum threshold for steel products and component for construction for the state procurement for local production and content.

**A1004 TRAINING AND SKILLS DEVELOPMENT PROGRAMME**

The Contractor shall, in collaboration with the Employer, the Engineer and the Project Liaison Committee (PLC), develop the Training and Skills Development Programme and submit it for the Engineer's approval.

Developing and executing the Training and Skills Development Programme shall consist of the following phases:

1. Conduct Resources and Skills Audits and a Market Analysis.
2. Identify Project Area and Designated Groups who shall benefit from the Programme.
3. Finalise and approve the Training and Skills Development Programme.
4. Select Trainees and Trainee Targeted Enterprises to participate in the Programme.
5. Conduct theoretical (classroom) training.
6. Conduct practical (workplace) Training.
7. Construction Simulation phase.
8. Construction of the Works phase.

**A1004.01 Resources and Skills Audits, and Market Analysis**

Prior to developing the Training and Skills Development Programme, the Contractor shall conduct Resources and Skills Audits of the identified Community and the Targeted Enterprises residing within the Project Area.

The Resources and Skills Audits shall be followed by a Market Analysis of the construction industry within the geographical area where the Targeted Enterprises could potentially operate.

**a) Resources Audit**

To determine the Targeted Enterprise subcontractor capacity in the Project Area, the Contractor shall conduct a Resources Audit within the greater project area. The Contractor shall consult, as a minimum, the National Treasury's CSD (to be obtained

from the Employer) and the CIDB contractor database. Other databases, e.g. the Local Municipality's Economic Development department's database, may also be considered.

This Resources Audit shall inform the Contractor what CIDB contractor grading Targeted Enterprises are available within the greater project area, which in turn will guide the Contractor, in consultation with the PLC, to establish the boundaries of the Project Area and to identify the criteria for the different beneficiary groups of the project, i.e. Trainee Targeted Enterprises, other Targeted Enterprises and Community groups and/or members.

In addition, the Contractor shall conduct a Resource Audit of Targeted Enterprise Suppliers and Service Providers available within the Project Area. Knowledge of the availability of plant, equipment, material and service providers will enable the Contractor to ensure that as much as possible of the total economic spend on the project remains within the community.

The Resources Audit shall be presented to the Employer, the Engineer and the PLC as an Interim Report and shall become a chapter of the Training and Skills Development Programme.

**b) Skills Audit**

Following the Resources Audit, the Contractor shall conduct a Skills Audit of these resources, as well as of the Community in general. The purpose of the audit is to determine the Targeted Enterprises' and the Community's levels of education, existing qualifications, Recognised Prior Learning and skills sets and competencies, which in turn will inform the details of the Training and Skills Development Programme.

The Skills Audit shall be presented to the Employer, the Engineer and the PLC as an Interim Report and shall become a chapter of the Training and Skills Development Programme.

**c) Market Analysis**

The Contractor shall conduct a Market Analysis of the construction industry within the geographical area where the identified resources typically would, or potentially could, operate.

The Market Analysis shall entail a quantitative and qualitative assessment of the market, establishing its size both in volume and in value. Amongst others, factors to consider includes:

- i) the various client and/or customer segments;
- ii) client and/or customer assignment and/or buying patterns;
- iii) supplier power and services availability;
- iv) identification of competitors;
- v) analysis of the economic environment;
- vi) economic feasibility or profitability; and
- vii) regulations and barriers to entry.

The Market Analysis will assist the Contractor to identify the Targeted Enterprises that will benefit most from the Training and Skills Development Programme from a market feasibility point of view, and it will inform the content of the Training and Skills Development Programme.

The Market Analysis shall be presented to the Employer, the Engineer and the PLC as an Interim Report and shall become a chapter of the Training and Skills Development Programme.

**A1004.02 Developing the Training and Skills Development Programme**

The Employer shall be involved in the decision making and quality control pertaining to the development and implementation of the Training and Skills Development Programme.

The Employer has no service agreement or memorandum of understanding with any education and training quality assurance body and, therefore, does not function as the "Employer" as defined under any three-party-agreement between the Trainee, the Training Provider and the Employer.

However, the Employer requires similar outcomes to that of formal Traineeship programmes and the Contractor shall structure a Training and Skills Development Programme in a manner that permits continued access to further learning and qualifications within a defined programme.

The complete Training and Skills Development Programme shall be approved by the Employer and the Engineer and agreed by the PLC before any training commence.

Provision for the Training and Skills Development Programme has been made in Pricing Schedule A, under pay item A1000.03(d).

#### **A1004.03 General Requirements of the Training and Skills Development Programme**

##### **a. Training Variety**

The Training and Skills Development Programme shall make provision for a variety of training options and all theoretical training provided, and its practical components, shall be SAQA accredited and shall be a combination of:

- i) technical,
- ii) entrepreneurial and
- iii) generic training

as informed by the resources and skills audits and market analysis.

##### **b) Training for Trainee Targeted Enterprises**

One of the primary objectives of Community Development Projects is to offer a full Traineeship experience to Trainee Targeted Enterprises, which requires a minimum period of 18 to 24 months of theoretical and practical training combined.

The Training and Skills Development Programme shall thus consist of Traineeships that include multiple, but related Unit Standards which:

- i) are relevant to the Works to be constructed,
- ii) are aimed at achieving the skills development objectives of the Employer, and
- iii) leads towards a formal qualification in the Construction Industry.

Traineeships shall include both the theoretical and practical components of each Unit Standard taught and shall be in accordance with the various laws and regulations contained in the SAQA statutes.

In smaller Community Development Projects with a shorter duration, it is recognised that the Training and Skills Development Programme may consist of several Unit Standards but totalling insufficient credits for a full Traineeship qualification. Nevertheless, the Training Provider shall ensure that the competencies and credits achieved in the Programme, contribute to a full Traineeship by a later acquisition of the outstanding Unit Standards required for the full Traineeship.

The details of the training to be provided to Trainee Targeted Enterprises are further described in the relevant paragraphs of Part C, Section A of the Scope of Work.

##### **c) Training for Targeted Labour**

It is anticipated that the Trainee Targeted Enterprises will have Targeted Labourers in their employ. These Labourers shall also be provided with training based on the Resources and Skills Audit and Market Analysis.

Similar to that of Trainee Targeted Enterprises, the training to be provided shall be one, or a combination of, the following learning methods:

- i) Work related theoretical and practical training from selected Unit Standards;

- ii) Structured workplace learning towards the attainment of a part or a full occupational qualification;
- iii) Structured workplace learning for apprentices or other artisan Trainees towards the attainment of a trade qualification leading to a listed trade (Government Gazette No. 35625 of 31 August 2012) subject to at least 60 percent (%) of the artisan Trainees being holders of public FET college qualifications.

The selected Unit Standard training to be provided to Targeted Labour shall equip them with the technical skills that is relevant to the tasks assigned to them. These Unit Standards are typically road construction methods on NQF level 2.

Targeted Labour shall also receive generic skills training as identified during the Contractor's Resources and Skills Audits and may, amongst others, include:

- a. First aid training;
- b. Road safety training;
- c. Environmental management training; etc.

**d) Selection of Unit Standards**

The Training and Skills Development Programme shall be structured in a manner to prioritise those Unit Standards that will equip Trainees with the minimum skills required to become economically involved in the execution of the Works as soon as possible.

The Contractor's Training Provider shall apply the SAQA Traineeship criteria of which the basic elements are listed below to demonstrate the Employer's requirements:

- i) Minimum number of credits for a qualification;
- ii) Fundamental Unit Standards and credit values;
- iii) Core Unit Standards and credit values;
- iv) Elective Units Standards and credit values;
- v) Assumption that NQF Level 3 literacy, numeracy, and computer competencies exist;
- vi) Recognised Prior Learning processes; and
- vii) Exit level outcomes.

The above criteria are not exhaustive, and the Training Provider shall apply the processes and procedures required by the relevant SAQA and other related legislation pertinent to training. The Training Provider shall regularly consult the SAQA website ([www.saqa.org.za](http://www.saqa.org.za)) to ensure that the most current Unit Standards are presented. If a conflict arises, the legislated requirements shall apply.

While structuring the Traineeship offerings, the Training Provider shall distinguish between the levels of learning required. The bulk of the training shall focus on NQF Levels 3 and 4. NQF Levels 2 and 5 training is not anticipated but may be suitable in some instances. Typical qualification titles for the respective NQF Levels that may be considered for inclusion into the Training and Skills Development Programme are listed in **Table A1004.03(a)** below:

**Table 1004.03(a): Typical Qualification Titles\***

NQF Level	Qualification	Name	Approximate Credits
2	National Certificate	Road Construction	120
2	National Certificate	Construction: Roadworks	120
2	National Certificate	Construction Contracting	120
3	National Certificate	Building and Civil construction	150
4	National Certificate	Supervision of Construction Processes	180

5	National Diploma	Management of Civil Engineering Construction Processes	210
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\* The Training Provider shall regularly consult the SAQA website (www.saqa.org.za) to ensure that the most current Qualifications and Unit Standards are presented with the adequate number of minimum credits to obtain the Qualification.

It shall be necessary to include additional Core Unit Standards, e.g. "Tendering" or "Entrepreneurship" as an additional Unit Standard for NQF Level 4, to achieve the Contract's development objectives. The identification of any additional Unit Standards shall be discussed with the Employer and the Engineer and shall not be implemented without prior approval.

#### e) Learning Material

Learning material is required for each Unit Standard. This learning material is the equivalent of prescribed textbooks for other qualifications. Each Trainee shall receive a copy of the learning material to learn the contents and to use it as reference source after obtaining the qualification.

The SAQA Unit Standard curriculums define the contents of the learning material. The learning material shall not only comply with the SAQA and CETA guidelines but shall be technically and practically aligned to road construction and road maintenance. Any input from a subject matter expert required to ensure the appropriateness of the learning material's contents shall be included in the Contractor's costs for compiling the learning material.

The Unit Standard requirements to be addressed in learning material, as outlined by the SAQA Unit Standard curriculums, are amongst others, the following:

- i) The purpose of the Unit Standard;
- ii) The specific outcomes (typically 4 per Unit Standard);
- iii) The assessment criteria (typically 4 per specific outcome);
- iv) The range as is defined for each specific outcome;
- v) The critical cross-field outcomes for the Unit Standard;
- vi) The Unit Standard essential embedded knowledge.

### A1005 METHOD STATEMENTS FOR TRAINING STAGES

The Contractor shall, before commencing with the Training and Skills Development Programme, demonstrate to the Employer and the Engineer how he intends to execute each of the respective training offerings.

#### A1005.01 Contents and Submission of Method Statements

The Contractor shall provide the Engineer with a method statement, describing the detail of, amongst others, the following components of the training:

- a) A time schedule of the different training offerings;
- b) A time schedule of the phases of the different training offerings;
- c) Details of the training logistics, e.g. venue, transport, etc.
- d) Identification and selection of Trainees;
- e) Registration of Trainees;
- f) Induction of Trainees;
- g) Details of the theoretical training execution;
- h) Details of the practical training execution;
- i) Trainee workbooks and logbooks;
- j) Assessment and moderating stages and arrangements, etc.

It is anticipated that the time schedule and training methodologies of individual training offerings may vary depending on the progress made by Trainees and the identification of subsequent training needs based on continuous Trainee assessments. It is thus not expected of the Contractor to submit a complete set of method statements prior to commencement of the Training and Skills Development Programme, but method statements for individual training stages shall be submitted for the Engineer's approval at least 10 (ten) calendar days prior to its commencement.

The Employer's minimum requirements for the most critical components to be outlined in the Method Statements are elaborated on in the sections below.

#### **A1005.02 Selection of Trainees**

To complete a Traineeship successfully requires minimum literacy and numeracy competencies as defined by SAQA. Once the Designated Groups to participate in the project has been identified by the Stakeholder and Community engagement processes described in Part C3, Section D of the Scope of the Work, the Contractor's Training Provider shall utilise the Skills Audit and conduct additional skills analysis to benchmark the literacy and numeracy levels of the potential Trainees. The Training Provider shall thus make provision for baseline assessments such as conducting Recognised Prior Learning enquiries and tests.

This information shall guide the Training Provider in finalising the Trainee selection methodology(ies) and process(ess), which shall be approved by the Employer and the Engineer and agreed by the PLC.

Trainees identified as having already acquired some tertiary training, particularly in the field of Civil Engineering, may be suitable for a specialised trainee programme or a higher NQF level programme. The Training and Skills Development Programme shall, therefore, make provision for Trainees with a variety of competency levels and shall make provision for different levels of training.

##### **Note:**

Where this section refers to the selection and training of Trainees, any person, employed by any national, provincial or local authority, being it full time or part time, is expressly excluded from being considered for this training.

#### **A1005.03 Registration of Trainees**

The first day of any level of training, be it a full Traineeship or a single Unit Standard, shall be allocated to registering, inducting and providing information to Trainees. The registration process shall, amongst others, include the following:

- a) Capture Trainees' personal details for populating the national database on Traineeship training.
- b) Capture Trainees' banking details for the electronic transfer of stipends and later payments for work undertaken.
  - i) All payments to Trainees shall be by electronic transfers or direct deposits into Trainees' bank accounts.
  - ii) The Contractor shall assist Trainees that do not have bank accounts, to open bank accounts.
- c) Formalise the parties' commitment to the Training Programme by signing an agreement between the Contractor and the Trainee.

#### **A1005.04 Induction of Trainees**

Induction means explaining to Trainees the purpose of the Training Programme, what is expected of them during the theoretical (classroom) training, as well as during the practical (workplace) training. It includes agreeing codes of ethics, behaviour etc. The following items for inclusion in the induction are pointers and not the only aspects to be imparted:

- a) Stipend payments (amount per day, per full training day attended in classroom, and only if found competent).
- b) Working and training days and hours as a contractor would be working or not working.
- c) Number and duration of comfort and lunch breaks (lunch will be provided during classroom training only).
- d) Types of absenteeism and treatment thereof as a contractor would treat such absenteeism.
- e) Disciplinary code and grievance procedure (explained and a copy handed to each Trainee with a signed copy retained by Training Provider).

- f) Trainees found not competent after the first training offering shall be allowed one repeat training offering. Thereafter, Trainees that are still found not competent shall be disqualified from the Training Program.
- g) The Contractor's insurances that are in place during the theoretical and practical training phases.
- h) UIF is not applicable to any stage or phase of the Training Programme.
- i) A detailed explanation of SAQA and CETA functions and responsibilities, as well as training processes and procedures.
- j) Roles and responsibilities of Trainees and the Contractor and his Training Provider, Practitioners, Assessors and Moderators.
- k) An explanation of Unit Standards and its division into fundamental, core and elective units.
- l) An explanation and breakdown of Unit Standard credits and how it builds toward an accredited qualification.
- m) The approximate ratio between theoretical and practical training and how it overlaps.
- n) An explanation of the Unit Standard exit outcomes.

## **A1006 THEORETICAL TRAINING**

### **A1006.01 Number of Trainees per Contact Session**

Experience has shown that the optimal number of Trainees per contact session is 12 (twelve) Trainees per Practitioner or Assessor.

Smaller Trainee numbers tend to be not feasible to the Contractor from an economical point of view, whereas larger groups of up to a maximum of 20 (twenty) Trainees can be accommodated if during the second learning session of the day, i.e. the afternoon learning application session, the Practitioner is assisted by an Assessor. For groups of more than 20 (twenty) Trainees per Unit Standard, the group shall be divided and taught in two separate groups.

For this project, a minimum number of 8 Trainee Targeted Enterprises between CIDB grades 1 to 4 shall benefit from the project and at least 2 (two) persons shall be trained from each Trainee Targeted Enterprise. The minimum number of Trainees to be trained in the respective categories are listed in Table A1006.01(a) below:

**Table A1006.01(a): Minimum Number of Trainees to be Trained**

<b>Trainee Category</b>	<b>Level of Training</b>	<b>No of Persons</b>
Full Traineeships for Trainee Targeted Enterprises.	NQF level 3.	8 (one person per Trainee Targeted Enterprise).
Full Traineeships for Trainee Targeted Enterprises	NQF level 4.	8 (one person per Trainee Targeted Enterprise).

A minimum number of Trainee Targeted Enterprises to be provided with NQF level 2 training is not stipulated, but provision has been made to provide NQF level 2 training on an ad hoc basis in Pricing Schedule D.

A minimum number of Trainee Targeted Enterprises to be provided with NQF level 5 training is not stipulated, but provision has been made to provide NQF level 5 training on an ad hoc basis in Pricing Schedule D.

### **A1006.02 Trainees' Learning Aids, Training Material and Workplace Documentation**

#### **a) Stationery and Learning Aids**

Trainees shall be issued with a stationary or learning aids pack, which shall be replenished as required during both the theoretical and practical training components, to participate actively in the training experience. For up to NQF 3 training, a basic pocket calculator shall be included in the stationary pack, while NQF 4 Trainees shall receive a basic scientific calculator.



In addition to the stationary pack, Trainees shall also be provided with other learning and workplace aids as required by the Unit Standard. Examples of such learning and workplace aids are scale rulers, GPS devices, computing equipment, etc.

**b) Learning Material, Workbooks and Logbooks**

Before the training of a Unit Standard commence, the following learning material needs to be available and/or issued to Trainees:

- i) Unit Standard learning material;
- ii) Unit Standard Trainees' Workbook;
- iii) Unit Standard Trainees' Logbook;
- iv) Unit Standard Practitioner's visual training aids and/or demonstration tools; and
- v) Unit Standard Assessor's guide.

The requirements for and/or utilisation of the listed learning material are discussed in detail in the relevant sections of the Scope of Work.

**c) Contract and Specification Documents**

During theoretical (classroom) training and practical (workplace) training, Trainees will be referred to contract documentation and quality specifications. Trainees enrolled in the NQF 4, full Traineeships shall be issued with one set of this documentation, which as a minimum, shall include the following:

- i) FIDIC Short Form of Contract (green book); and
- ii) COTO Standard Specifications for;

**A1006.03 Theoretical Training Programme**

Theoretical (classroom) training shall be conducted according to the programme explained to Trainees during the induction. This programme shall be displayed on a notice board in the training room and shall be tracked weekly and updated if necessary.

The training programme shall be in a bar chart format (MS Projects or similar) taking cognisance of the construction industry's typical non-working days. The basis of the programme shall be to conduct training in the classroom at an average of 3 (three) credits per workday.

**A1006.04 Scheduling of Training Sessions**

Each Unit Standard training has a theory content (lecturing) and a learning application element (examples and exercises). Experience has shown that Trainees perform best if the theory content is lectured during the morning contact session, while the practical element is conducted during the afternoon contact session.

During the afternoon practical sessions, the Trainee will display his competence in the Trainee's Workbook by recording actions, methods, calculations, etc. for compiling his Portfolio of Evidence.

The Contractor is advised to complete the training of a Unit Standard uninterrupted. Training is proved to be less effective if a part of the training is done and then interrupted to only continue a week or weeks later.

**A1006.05 Trainees' Portfolio of Evidence and Workbooks**

Each Trainee must compile a Portfolio of Evidence. The Portfolio of Evidence serves as proof of the Trainees' competence and will be assessed and moderated by an Assessor and/or Moderator. The Contractor shall keep record of the Portfolio of Evidence for a period of at least 5 (five) years after the training has been completed or partially completed.

The Trainees' Workbook is a tool to record that the work has been done and that the Trainee is competent in doing the work. The Workbook forms an integral part of the

Trainees' Portfolio of Evidence. For each Unit Standard, Trainees will keep a Workbook for the theoretical (classroom) component and the practical (workplace) component.

Over and above the Trainees' Workbook, any other documentary proof relevant to the Unit Standard and assisting in illustrating the competence of the Trainee, must be filed in the Portfolio of Evidence.

#### **A1006.06 Assessing Trainees' Progress**

The Assessor, whether permanently on the training project or not, shall assess Trainees' competence in a Unit Standard within 3 (three) working days after completion of the Unit Standard's training. The Assessor shall advise the Training Provider and the affected Trainees of the need for repeat training as soon as possible and the Training Provider shall schedule repeat training as soon as possible.

The Assessor shall maintain his portfolio of assessment of Trainees and keep it updated and available for Moderating.

No additional pay item has been provided for repeat training and it must be included in the Contractor's tenderer training rates.

#### **A1007 PRACTICAL TRAINING**

Once a Trainee has been found competent for the theoretical component, he must be declared competent for the practical component before he can be declared competent for the Unit Standard.

Hence, Trainees will be expected to demonstrate their competence in a practical situation that integrates the assessment of all specific outcomes, for all Unit Standards in the Traineeship Programme.

Amongst others, the Contractor's responsibilities include ensuring that Trainees keep a Logbook and update their Portfolio of Evidence continuously, training Trainees in the use of construction tools and practical construction techniques, ensure adequate plant, material and labour for the practical training experience and conduct assessments of the Trainees' learning progress. Provision shall be made for repeat training when necessary.

#### **A1007.01 Workplace Experience Requirements**

Trainees shall spend at least 10 (ten) times the Unit Standard credit value in notional hours in a workplace environment, e.g. if a Unit Standard consists of 3 (three) credits, the Trainee shall spend 3 x 10 (30) notional hours in a workplace environment to qualify for an assessment of his competence in the Unit Standard.

#### **A1007.02 Keeping a Logbook and Assessment**

Trainees shall be issued with a Logbook and the necessary stationery to capture his workplace experience during the practical training. Trainees shall keep a diary of their workplace experience and file any proof of their experience in their Portfolio of Evidence.

During or on completion of the practical training, the Portfolio of Evidence shall be assessed by and assessor to rate the Trainee's competency acquired in the workplace environment.

#### **A1007.03 Training Test Sections**

Trainees shall be trained in practical construction techniques by constructing Training Test Sections for each construction activity. The Construction Manager shall ensure that Trainees are knowledgeable and adequately trained in the detail of constructing the Training Test Sections.

The list below contains recommended good practice techniques that should be applied to every Training Test Section.

**a) Trainees' Responsibilities**

Trainees shall:

- i) execute the work during the Training Test Section phase.
- ii) rotate tasks to ensure that every Trainee gain experience in every activity.
- iii) study and interpret the requirements, specification, drawings and instructions prior to attempting the Training Test Section.
- iv) list pertinent points, i.e. tolerances and discuss their interpretation of the work with the Construction Manager.

**b) Construction Manager's Responsibilities**

The Construction Manager shall:

- i) issue Trainees with personal protective equipment (PPE) prior to them commencing their practical training.
- ii) timeously order or obtain plant, human resources and material for the Training Test Section.
- iii) set a date and the place for constructing the Training Test Section and invite all Trainees and relevant personnel to attend.
- iv) explain the lines of communication during the Training Test Section. Only the Construction Manager shall relay any instruction or proposal to amend the construction method during the Training Test Section.
- v) explain the purpose of the Training Test Section and the construction method to achieve the specified product in a cost-effective manner.
- vi) explain the method statement to Trainees, taking care to ensure that they fully understand what is being explained to them. If necessary, the Construction Manager shall repeat the process to be undertaken and arrange for translation into the Trainees' home language.
- vii) demonstrate to Trainees, the actual practical process and repeat it as often as is necessary until the desired result is achieved.

**A1007.04 Workplace Experience Outcomes**

Outcomes from the Training Test Sections shall provide Trainees with the following experiences:

- a) Familiarity with the use of all tools and small plant;
- b) Exposure to the daily servicing needed of small plant;
- c) Understanding that tasks are achievable and reasonable;
- d) Understanding the importance of materials handling and batching techniques;
- e) Knowledge of the end-product specifications and how it is checked and recorded;
- f) The impact that a change in the method has on output, including failure to achieve a task.
- g) Obtaining and understanding of the requirements needed to tender for construction activities to be used during the construction period.

**A1007.05 Integrated Summative Assessment and Moderation**

The last and final phase of assessment for total competence per Unit Standard and/or the full Traineeship is the integrated summative assessment and the moderation and verification by CETA.

Integrated summative assessment means the combination of results of the theoretical assessment from the classroom training plus the practical assessment from the workplace training.

This NQF training is an outcome-based qualification which means that Trainees can perform as required by the Unit Standard and are, to all intents and purposes, prospective contractors.

**A1008 CONTRACTOR'S RESPONSIBILITIES TOWARDS TRAINEES**

In addition to the specifications for training above, the Contractor shall also undertake the duties described under this section relating to Trainees' welfare during training.

#### **A1008.01 Trainee Welfare**

##### **a) Travel and Accommodation**

During the training phases of the project, Trainees shall be responsible for their travel and accommodation arrangements to and from the training facility and the camp site at their own cost.

During the practical training phase of the project, the Contractor shall, however, provide transportation to and from the training facility or the camp site to the place where the practical training shall take place.

The cost to transport Trainees during the practical training phase shall be included in the Contractor's rates for the relevant elements of the Works to be constructed during the practical training phase as if the Trainees are his own employees.

In choosing the training facility and camp site's location, the Contractor shall take cognisance of Trainees' travel and accommodation challenges.

##### **b) Sustenance**

Trainees shall receive the following sustenance during the theoretical training phase of the project:

- i) A choice of tea, coffee or fruit juice and a nutritious snack during the morning comfort break.
- ii) A choice of tea, coffee or fruit juice and a nutritious lunch pack during the lunch break.
- iii) A choice of tea, coffee or fruit juice only during the afternoon comfort break.
- iv) Potable or bottled water shall always be at Trainees' disposal.

All sustenance shall be procured from local Targeted Enterprise Suppliers and Service Providers.

#### **A1008.02 Trainee Stipends**

The Contractor shall pay Trainees the legislated daily stipend in accordance with the Basic Conditions of Employment Act (Act No. 75 of 1997), as amended and as per its most recent learnership allowances table. Payment of stipends shall be applicable:

- a) during both the theoretical (classroom) and practical (workplace) training phases;
- b) only if the Trainee was present for the full duration of the training on the day; and
- c) only if the Trainee was found competent on completion of the Unit Standard.

Stipends shall be payable monthly and into the Trainees' bank accounts.

It shall be clearly explained to Trainees that when Training Test Sections are carried out, they will continue to be paid a stipend, because even though permanent work may be the result, it is the practical component of the Unit Standard and it is a training experience.

Just as for the theoretical training component, Trainees will only be paid the stipend if they can demonstrate that they are competent in the practical execution of the Unit Standard.

#### **A1009 CONSTRUCTION SIMULATION**

Amongst others, the Contractor's responsibilities include mentoring, coaching and guidance of Trainees, providing each Trainee Targeted Enterprise with a Bill of Quantities for their respective work packages and assist Trainees to price the Bill of Quantities, assist the Trainee Targeted Enterprises to establish and train their construction teams, to schedule and execute the work, to procure material, plant and labour, and to measure the work and compile payment certificates.

**A1009.01 Purpose and Outcomes of the Construction Simulation Phase**

The purpose of the Construction Simulation phase is for the Trainee Targeted Enterprises to conduct actual construction work in a controlled setting, which simulates a real contracting environment. The following outcomes are expected:

- a) Establish a degree of independence to perform as an emerging contractor.
- b) Develop the capabilities of tendering for and completing specified construction work.
- c) Develop confidence with weekly and monthly planning.
- d) Develop confidence with the setting of group and individual tasks.
- e) Develop confidence with usage of construction material.
- f) Develop confidence in the operation and maintenance of plant.
- g) Improve capability to measure the tasks and work completed.
- h) Improve capability to incorporate measured work into a payment certificate.
- i) Improve capability to calculate daily work costing and profitability.
- j) Develop an understanding of the discipline required for maximum productivity.
- k) Develop confidence in reporting of progress in typical construction formats.

Continuing mentorship, coaching and guidance during this project phase is critical to embed the prior learning received and to develop Trainee Targeted Enterprises beyond the learning experience.

**A1009.02 Execution of the Construction Simulation Phase****a) Responsibilities of the Trainee Targeted Enterprises**

The Trainee Target Enterprise Owner or his Supervisor shall:

- i) price a bill of quantities for a section of construction work and/or tasks as if he is tendering competitively for the work;
- ii) establish a construction team based on his experience from the Training Test Sections on what is practical achievable and profitable.
- iii) train his construction team, consisting of Target Labour, to perform the construction tasks to the required standards.
- iv) Supervise his construction team and take responsibility for the quality and standard of the work that they produce.

**b) Responsibilities of the Construction Manager**

Prior to, and during the commencement of the Construction Simulation, the Construction Manager shall:

- i) discuss the priced bills of quantities with the Trainee Targeted Enterprises in a classroom setting and agree on the rates to be paid for work done during this phase. All Trainee Targeted Enterprises shall be paid the same rates for the same pay items.
- ii) assist Trainee Targeted Enterprises to schedule work activities for the sections of work assigned to them and agree on the construction methods to apply.
- iii) plan with each Trainee Targeted Enterprise what plant, material and labour he would require for constructing the work in accordance to the agreed construction methods.
- iv) plan with each Trainee Targeted Enterprise how and from where to arrange and procure his plant, material and labour.

To ensure that Trainee Targeted Enterprises receive the maximum benefit skills development experience during the Construction Simulation phase, the Construction Manager shall provide extensive administration and financial management support. Every workday shall commence with a site meeting to discuss, amongst others, the following:

- a. Progress made the previous workday;
- b. Productivity outputs obtained during the previous workday.
- c. How productivity outputs impact on cost and profitability.
- d. Planning of resources and construction for the day ahead.
- e. The most feasible construction method for the work planned for the day.

**c) Payment for Work Completed**

During the Construction Simulation phase, the Trainee Targeted Enterprises are expected to operate as if they are proper contractors.

Stipends will no longer be paid, and Trainee Targeted Enterprises shall be paid for the work according to tasks or quantities completed and as per the agreed rates.

With the assistance of the Construction Manager and Construction Mentors, Trainee Targeted Enterprises shall compile a Simulation Payment Certificate as if he sourced and paid plant, material and labour himself.

However, the Contractor shall procure plant, material and labour on behalf of the Trainee Targeted Enterprises and shall pay Suppliers, Service Providers and Labour directly. The Construction Manager shall pay the balance of the Simulation Payment Certificate into the bank accounts of the Trainee Targeted Enterprises on receipt of their invoices.

**A1010 CONSTRUCTION MANAGEMENT AND CONSTRUCTION OF THE WORKS**

Amongst others, the Contractor's responsibilities include Trainee Target Enterprises' competency review, Construction mentoring, coaching and guidance, assistance to Trainee Targeted Enterprises on any aspect of the planning and administration of the Works, ensuring that Trainee Targeted Enterprises comply with all relevant statutory requirements monthly and overall management of the construction of the Works.

**A1010.01 Subcontracting Work to Trainee Targeted Enterprises**

Once the Construction Simulation phase has been completed, Trainee Targeted Enterprises shall have the opportunity to tender for construction work packages and enter into formal subcontract agreements with the Construction Manager as detailed in Part C, Section D of the Scope of the Work.

The Trainee Targeted Enterprises shall, however, remain Trainees in the sense that they still must complete the notional hours required by the NQF level 3, 4 and 5 Unit Standards to be found competent in these Unit Standards. Thus, although the principles of subcontracting to Targeted Enterprises, as detailed in Part C, Section D of the Scope of Work, shall apply, every Trainee Targeted Enterprise shall be awarded at least 1 (one) subcontract package to ensure that they receive the practical exposure to complete a Full Traineeship.

**a) Trainee Target Enterprises' Competency Review**

During the Construction Simulation period, Trainee Targeted Enterprises demonstrated their competency to operate as contractors and taking responsibility for all aspects of planning, procuring and managing plant, material and labour.

In awarding subcontract packages to Trainee Targeted Enterprises, the Construction Manager shall review Trainees' ability to combine all learning experiences into that of a competent contractor. Following this review, the Construction Manager, in consultation with the Engineer, shall award construction packages to Trainee Targeted Enterprises to ensure that they receive the full benefit of the practical training experience.

**b) Form of Subcontract Agreement**

The subcontract shall be the FIDIC Short Form of Contract (green book) as prescribed in Part C, Section D of the Scope of Work.

The Works shall be constructed in accordance with the COTO Standard Specifications.

**c) Payment for Work Completed**

Trainee Targeted Enterprises shall be paid for tasks or quantities completed at the agreed rates and in terms of the subcontract agreement.

The Contractor shall no longer procure plant, material or labour on behalf of the Trainee Targeted Enterprises and shall not pay Suppliers, Service Providers or Labour directly and on behalf of the Trainee Targeted Enterprises.

Trainee Targeted Enterprises shall compile their Payment Certificates, which shall include for plant, material and labour and which shall, after checking and agreeing the quantities between the parties, be paid by the Contractor on receipt of the Trainee Targeted Enterprises' invoices.

If the Contractor did procure any plant, material or labour on behalf of a Trainee Targeted Enterprise, the cost of such procurement shall not be offset against the Payment Certificate. The Contractor shall pay the full value of the Payment Certificate and then issue the Trainee Targeted Enterprise with an invoice for the Contractor's cost incurred.

**A1010.02 Construction Mentoring**

During the construction of the Works the Contractor shall continue his training duties, but in a mentoring capacity. Amongst others, the Construction Manager shall continue with the following activities:

- a) Coach, guide and mentor Trainee Targeted Enterprises continuously;
- b) Supervise construction activities and be responsible for the standard and quality of the Works constructed.
- c) Ensure that Trainee Targeted Enterprises are registered and comply with all relevant statutory requirements, e.g.
  - i) South African Revenue Service
  - ii) National Treasury's Central Supplier Database
  - iii) Compensation for Occupational Injuries and Deceases Act
  - iv) Rates for wages and conditions of labour agreed by the Bargaining Council for the Civil Engineering Industry.
  - v) Construction Industry Development Board
  - vi) Occupational Health and Safety Regulations
  - vii) Environmental Management Regulations
- d) If requested or required, assist Trainee Targeted Enterprises to schedule work activities and decide on construction methods to apply.
- e) If requested or required, assist Trainee Targeted Enterprises to plan and procure their plant, material and labour.
- d) Assist Trainee Targeted Enterprises to determine production rates required and obtained to optimise profitability.
- e) Assist Trainee Targeted Enterprises to measure the works and quantify it in a payment certificate for invoicing.
- f) Any other support to Trainee Targeted Enterprises to enhance the success of their business.

The Construction Manager shall conduct bi-weekly technical meetings with the Trainee Targeted Enterprises to introduce them to the industry norm of monthly cost and management meetings at which allowable versus cost issues are thoroughly explored.

**A1010.03 Construction Management**

The Construction Manager shall be responsible for day to day management of Trainee Targeted Enterprises and construction of the Works in a manner that is expected from a competent Contractor. He shall keep a daily site diary, receive and execute instructions from the Engineer and give and monitor instructions to the Trainee Targeted Enterprises.

Regular audits, but not less than quarterly, shall be conducted by the Employer to ensure compliance with financial and progress accounting, as well as compliance with Occupational Health and Safety and Environmental Management legislation.

## APPENDIX 12 – INSITU RECYCLING CHECKLIST

	Yes	No
1. Recycler		
Is recycler model appropriate for depth to be worked? (Manufacturers limits)	<input type="checkbox"/>	<input type="checkbox"/>
Is recycler in good condition?	<input type="checkbox"/>	<input type="checkbox"/>
Is the drum fitted appropriate for recycling?	<input type="checkbox"/>	<input type="checkbox"/>
Are all picks in good condition and present?	<input type="checkbox"/>	<input type="checkbox"/>
Is recycler fitted with a breaker bar?	<input type="checkbox"/>	<input type="checkbox"/>
Are all supply pipes in good condition?	<input type="checkbox"/>	<input type="checkbox"/>
The computer input data correct and <del>spraybar</del> <u>spraybar</u> settings are correct (for each cut).	<input type="checkbox"/>	<input type="checkbox"/>
The speed of advance is within the prescribed range ( $\pm 8$ m/min)	<input type="checkbox"/>	<input type="checkbox"/>
Equipped with Self-cleaning nozzles	<input type="checkbox"/>	<input type="checkbox"/>
Equipped with a micro-computer, able to adjust the application of the water and stabilising agent according to the speed of the recycler – the proper working of this equipment is essential to ensure that the stabiliser is applied to specification.	<input type="checkbox"/>	<input type="checkbox"/>
Operators receive the necessary training to operate the <u>equipment</u> to enable the required specifications to be met.	<input type="checkbox"/>	<input type="checkbox"/>
2. Tankers		
Does tanker have the correct stabilising agent?	<input type="checkbox"/>	<input type="checkbox"/>
Are there sufficient water tankers for production rate?	<input type="checkbox"/>	<input type="checkbox"/>
Do bitumen tankers contain the correct grade of bitumen/emulsion	<input type="checkbox"/>	<input type="checkbox"/>
Are they fitted with dipsticks?	<input type="checkbox"/>	<input type="checkbox"/>
Is binder at correct temperature?	<input type="checkbox"/>	<input type="checkbox"/>
Are supply pipes properly lagged?	<input type="checkbox"/>	<input type="checkbox"/>
Are all pipes fully "bled"?	<input type="checkbox"/>	<input type="checkbox"/>
3. Rollers		
Steel Wheel Rollers		
Are edges of rollers in good condition?	<input type="checkbox"/>	<input type="checkbox"/>
Is change of direction smooth (no backlash)?	<input type="checkbox"/>	<input type="checkbox"/>
Are rollers properly ballasted? (Record mass and position)	<input type="checkbox"/>	<input type="checkbox"/>
Do rollers have variable amplitude/frequency settings?	<input type="checkbox"/>	<input type="checkbox"/>
Settings used for trial: Passes No. (____) Amplitude (____) Passes No. (____) <u>Frequency</u> (____)		
Are wheel cleaning mats in good condition?	<input type="checkbox"/>	<input type="checkbox"/>
Are scrapers in good condition and set?	<input type="checkbox"/>	<input type="checkbox"/>
Check for oil, fuel and hydraulic leaks. Is roller free of leaks?	<input type="checkbox"/>	<input type="checkbox"/>
Do brakes work?	<input type="checkbox"/>	<input type="checkbox"/>
Is reversing smooth?	<input type="checkbox"/>	<input type="checkbox"/>



## Pneumatic Rollers

a)	Are tyres in good condition?	<input type="checkbox"/>	<input type="checkbox"/>
b)	i) Is there a variable pressure system for tyre pressure.	<input type="checkbox"/>	<input type="checkbox"/>
	If <u>so</u> is it working and is pressure gauge working and visible to driver?	<input type="checkbox"/>	<input type="checkbox"/>
	ii) Are all tyre pressures uniform?	<input type="checkbox"/>	<input type="checkbox"/>
	Note tyre pressures .....Kpa		
c)	Is roller properly ballasted (record mass and position)	<input type="checkbox"/>	<input type="checkbox"/>
	Mass.....t		
	Position.....		
4.	Process		
	Have the number of cuts for the total width been defined?	<input type="checkbox"/>	<input type="checkbox"/>
	Has the width of overlap for each longitudinal joint been defined?	<input type="checkbox"/>	<input type="checkbox"/>
	Has the length of cut ( <u>i.e.</u> when train should return for adjacent cut been defined?	<input type="checkbox"/>	<input type="checkbox"/>
	Is there sufficient volume of imported material for <u>planned</u> production?	<input type="checkbox"/>	<input type="checkbox"/>
	Is there sufficient bitumen/emulsion for planned production?	<input type="checkbox"/>	<input type="checkbox"/>
	Is there sufficient water for planned production?	<input type="checkbox"/>	<input type="checkbox"/>
	Is outer edge of 1 <sup>st</sup> cut clearly demarcated?	<input type="checkbox"/>	<input type="checkbox"/>
	To ensure correct grading has rotation speed of drum <u>been</u> defined?	<input type="checkbox"/>	<input type="checkbox"/>
	RPM _____		
	To ensure correct grading has forward speed of recycler <u>been</u> defined?	<input type="checkbox"/>	<input type="checkbox"/>
	m per minute _____		
	Is application of cement in front of train as per spec?	<input type="checkbox"/>	<input type="checkbox"/>
	kg/m <sup>2</sup> _____		
	Is moisture content of recycled material as per spec?	<input type="checkbox"/>	<input type="checkbox"/>
	mc _____%		
	Is gradation of milled material <u>similar to "design material"</u> ?	<input type="checkbox"/>	<input type="checkbox"/>
	Is depth of cut on both sides of drum uniform as per spec?	<input type="checkbox"/>	<input type="checkbox"/>
	Is final product completed within the allowable <u>time period</u> ?	<input type="checkbox"/>	<input type="checkbox"/>

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## **PART C5: ANNEXURES**

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**ANNEXURES**

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<b>ANNEXURE B: SANRAL STANDARD ELECTRICAL SPECIFICATIONS .....</b>	<b>C3(B)-392</b>

**ANNEXURE A: THE GENERAL AUTHORISATION AND GENERAL AUTHORISATION IN TERMS  
OF THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)**



## forestry, fisheries & the environment

Department:  
Forestry, Fisheries and the Environment  
REPUBLIC OF SOUTH AFRICA

Private Bag X 447 · PRETORIA · 0001 · Environment House · 473 Steve Biko Road, Arcadia · PRETORIA

DFFE Reference: 14/12/16/3/3/1/2637

Enquiries: Dr Danie Smit

Telephone: (012) 399 9394 E-mail: [dsmit@dff.gov.za](mailto:dsmit@dff.gov.za)

Mr Progress Hlahla  
South African National Roads Agency SOC Ltd  
Private Bag X17  
**LYNNWOOD RIDGE**  
0040

Telephone Number: 012 426 6204  
Email Address: [Hlahlap@nra.co.za](mailto:Hlahlap@nra.co.za)

### PER E-MAIL

Dear Mr Hlahla

**APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, ACT NO. 107 OF 1998, AS AMENDED FOR THE PROPOSED IMPROVEMENTS OF R33 NATIONAL ROAD SECTION 12 FROM N1 (KM 77.0) TO SECTION 13 MODIMOLLE (KM 0.6), LOCATED IN MODIMOLLE, MOOKGOPONG LOCAL MUNICIPALITY WITHIN THE WATERBERG DISTRICT IN THE LIMPOPO PROVINCE**

With reference to the above application, please be advised that the Competent Authority has decided to grant the application for Environmental Authorisation. The Environmental Authorisation and reasons for decision are attached herewith.

In terms of Regulation 4(2) of the Environmental Impact Assessment Regulations, 2014, as amended (the EIA Regulations), you are instructed to notify all registered interested and affected parties, in writing and within fourteen (14) days of the date of the Record of Refusal, of the Competent Authority's decision as well as the provisions regarding the submission of appeals that are contained in the EIA Regulations.

In terms of the Promotion of Administrative Justice Act, 2000 (Act No 3 of 2000), you are entitled to the right to fair, lawful and reasonable administrative action; and to written reasons for administrative action that affects you negatively. Further your attention is drawn to the provisions of the Protection of Personal Information Act, 2013 (Act no. 4 of 2013) which stipulate that the Competent Authority should conduct itself in a responsible manner when collecting, processing, storing and sharing an individual or another entity's personal information by holding the Competent Authority accountable should the Competent Authority abuse or compromise your personal information in any way.

Your attention is drawn to Chapter 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) National Appeal Regulations published under Government Notice R993 in Government Gazette No. 38303 dated 08 December 2014 (National Appeal Regulations, 2014), which prescribes the appeal procedure to be followed. Kindly include a copy of this document (National Appeal Regulations, 2014) with the letter of notification to interested and affected parties in this matter.

MS

Should any person wish to lodge an appeal against this decision, he/she must submit the appeal to the appeal administrator, and a copy of the appeal to the applicant, any registered interested and affected party, and any organ of state with interest in the matter within 20 days from the date that the notification of the decision was sent to the registered interested and affected parties by the applicant; or the date that the notification of the decision was sent to the applicant by the Competent Authority, whichever is applicable.

**Appeals must be submitted in writing in the prescribed form to:**

The Director: Appeals and Legal Review of this Department at the below mentioned addresses.

By email: [appealsdirector@dfre.gov.za](mailto:appealsdirector@dfre.gov.za)

By hand: Environment House  
473 Steve Biko  
Arcadia  
Pretoria  
0083

or

By post: Private Bag X447  
Pretoria  
0001

To obtain the prescribed appeal form and for guidance on the submission of appeals, please visit the Department's website at [https://www.dfre.gov.za/documents/forms#legal\\_authorisations](https://www.dfre.gov.za/documents/forms#legal_authorisations) or request a copy of the documents at [appealsdirector@dfre.gov.za](mailto:appealsdirector@dfre.gov.za)

Yours faithfully



**Mr Sabelo Malaza**  
**Chief Director: Integrated Environmental Authorisations**  
**Department of Forestry, Fisheries and the Environment**  
**Date: 25/04/2023**

cc: Mr Sindiso Lubisi	Environmental Edge (Pty) Ltd	Email: <a href="mailto:sindiso@environmentaedge.co.za">sindiso@environmentaedge.co.za</a>
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## forestry, fisheries & the environment

Department:  
Forestry, Fisheries and the Environment  
REPUBLIC OF SOUTH AFRICA

# Environmental Authorisation

In terms of Regulation 25 of the Environmental Impact Assessment Regulations, 2014, as amended

The improvements of R33 National Road Section 12 from N1 (km 77.0) to Section 13 Modimolle (km 0.6), located in Modimolle Mookgopong Local Municipality, Limpopo Province

### Waterberg District Municipality

<b>Authorisation register number:</b>	14/12/16/3/3/1/2637
<b>Last amended:</b>	First issue
<b>Holder of authorisation:</b>	South African National Roads Agency SOC Ltd
<b>Location of activity:</b>	Portion 16 of Erf No.457 in Cyferfontein; Portion 0 of Erf No.429 in Groenfontein; Portion 0 of Erf No.417 in Grootvlei; Portion 0 of Erf No.425 in T – Plaas; Portion 0 of Erf No.419 in Nylstroom Town and Townlands Within Ward 4, 7 and 8 of Modimolle-Mookgopong Local Municipality, Waterberg District Municipality, Limpopo Province.

This authorisation does not negate the holder of the authorisation's responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the activity.

M.S

## Decision

The Department is satisfied, on the basis of information available to it and subject to compliance with the conditions of this Environmental Authorisation, that the applicant should be authorised to undertake the activities specified below.

Non-compliance with a condition of this Environmental Authorisation may result in criminal prosecution or other actions provided for in the National Environmental Management Act, Act No. 107 of 1998, as amended and the EIA Regulations, 2014, as amended.

Details regarding the basis on which the Department reached this decision are set out in Annexure 1.

## Activities authorised

By virtue of the powers conferred on it by the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment Regulations, 2014, as amended, the Department hereby authorises –

### **SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD (SANRAL)**

(hereafter referred to as the **holder of the authorisation**)

with the following contact details –

Mr Progress Hlahla

South African National Roads Agency SOC Ltd

Private Bag X17

**LYNNWOOD RIDGE**

0040

Telephone Number: 012 426 6204

Cellphone Number: 061 372 4148

Email Address: [Hlahlap@nra.co.za](mailto:Hlahlap@nra.co.za)



to undertake the following activities (hereafter referred to as "the activity") indicated in Listing Notice 1 and Listing Notice 3 of the EIA Regulations, 2014 as amended:

Activity number	Activity description
<p><u>Listing Notice 1, Item 12:</u></p> <p><i>"The development of-</i></p> <p><i>(i) Infrastructure or structures with a physical footprint of 100 square metres or more;</i></p> <p><i>where such development occurs -</i></p> <p><i>(a) within a watercourse;"</i></p>	<p>The construction activities for the upgrade of the road will require the development of infrastructure with a combined footprint of more than 100m<sup>2</sup> within watercourses, including possible widening of existing bridges and culverts.</p>
<p><u>Listing Notice 1, Item 19:</u></p> <p><i>"The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse."</i></p>	<p>Infilling of soil and/or concrete of more than 10m<sup>3</sup> in capacity may be required for the possible widening of the existing bridges and culverts.</p>
<p><u>Listing Notice 1, Item 48:</u></p> <p><i>The expansion of</i></p> <p><i>(i) Infrastructure or structures with a physical footprint is expanded by 100 square metres or more;</i></p> <p><i>where such expansion occurs -</i></p> <p><i>(a) within a watercourse.</i></p>	<p>The existing bridges and culverts may need to be widened to accommodate the wider road design.</p> <p>The resulting combined footprint may be more than 100m<sup>2</sup> of the entire development of the road upgrade.</p>
<p><u>Listing Notice 1, Item 56:</u></p> <p><i>"The widening of a road by more than 6 metre, or the lengthening of a road by more than 1 kilometre.</i></p> <p><i>(i) where the existing reserve is more than 13,5 meters.</i></p>	<p>The proposed project could entail the construction of access roads of unknown sizes at this stage, for use during the construction phase and operational phase (for maintenance purposes). In the absence of existing roads, new access roads may need to be constructed, which could traverse areas declared as critical biodiversity areas or watercourses (The existing road reserve is approximately 38m wide).</p>

<p><u>Listing Notice 3, Item 12:</u></p> <p><i>"The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> <p><u>e. Limpopo</u></p> <p><i>(ii) Within critical biodiversity areas identified in bioregional plans;"</i></p>	<p>Road construction activities will require clearance of 300m2 of indigenous vegetation in areas identified as critical biodiversity areas in terms of the Limpopo conservation plan.</p>
<p><u>Listing Notice 3, Item 18:</u></p> <p><i>"The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</i></p> <p><u>e. Limpopo</u></p> <p><i>i. Outside urban areas</i></p> <p><i>(ee) Critical biodiversity areas identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i></p> <p><i>(hh) Areas within a watercourse; or within 100 metres from the edge of a watercourse."</i></p>	<p>The proposed project will require road widening within areas identified as critical biodiversity areas as per the Limpopo conservation plan.</p> <p>Widening activities may occur within 100 metres from the edge of a watercourse.</p>
<p><u>Listing Notice 3, Item 23:</u></p> <p><i>"The expansion of-</i></p> <p><i>(i) Infrastructure or structure where the physical footprint is expanded by 10 square metres or more:</i></p> <p><i>Where such expansions occur-</i></p> <p><i>(a) Within watercourse</i></p> <p><u>e. Limpopo</u></p> <p><i>i. Outside urban areas:</i></p>	<p>The project may require the expansion of bridges and culverts within a watercourse, where the expansion footprint is 10 square metres or more, outside an urban area.</p>

<p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or bioregional plans;</p> <p>ii. Inside urban areas:</p> <p>(aa) Areas zoned for use as public open space;</p>	
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as described in the Basic Assessment Report (BAR) dated January 2023 at:

#### Farm Names:

- Portion 16 of Erf No.457 in Cyferfontein
- Portion 0 of Erf No.429 in Groenfontein
- Portion 0 of Erf No.417 in Grootvlei
- Portion 0 of Erf No.425 in T – Plaas
- Portion 0 of Erf No.419 in Nylstroom Town and Townlands

#### SG 21 Code

T	0	K	R	0	0	0	0	0	0	0	0	0	4	5	7	0	0	0	0	0
T	0	K	R	0	0	0	0	0	0	0	0	0	4	2	9	0	0	0	0	0
T	0	K	R	0	0	0	0	0	0	0	0	0	4	1	7	0	0	0	0	0
T	0	K	R	0	0	0	0	0	0	0	0	0	4	2	5	0	0	0	0	0
T	0	K	R	0	0	0	0	0	0	0	0	0	4	1	9	0	0	0	0	0

#### Coordinates

Proposed road for upgrades	Latitude	Longitude
Start	24° 46' 57.48" S	28° 28'36.51" E
Middle	24° 44' 35.39" S	28° 28'36.51" E
End	24° 41' 49.93" S	28° 24'4.43" E

- for the Proposed Improvements of R33 National Road Section 12 from N1 (km 77.0) to Section 13 Modimolle (km 0.6), Located in Modimolle, Mookgopong Local Municipality within the Waterberg District in the Limpopo Province, hereafter referred to as "the property".

The facility will comprise the following:

The proposed road improvements will mainly include the upgrade of the road from a single lane road into a dual carriageway which will also reclassify the road from an 80 km/h zone to a 100 km/h zone. The improvements will also include the:

- Upgrades at signalized intersections (timing only).
- Upgrades at other intersections safety and mobility
- Construction of auxiliary lanes along the R33.
- Widening of the current lanes.
- Construction of adequate shoulders.
- Increasing the speed limit.
- Formalisation of hawker facilities.

Other improvements that may be undertaken include:

- Upgrading of pedestrian walkways along the R33, with emphasis on the urban section (R101)
- Pedestrian accommodation at every intersection
- Universal access
- Upgrading and/or restoration of the 2 river bridges and 1 railway bridge along the R33 National Road.

## **Conditions of this Environmental Authorisation**

### **Scope of authorisation**

1. The proposed improvements of R33 National Road Section 12 from N1 (km 77.0) to Section 13 Modimolle (km 0.6), Located in Modimolle Mookgopong Local Municipality Within the Waterberg District in the Limpopo Province is approved as per the geographic coordinates.
2. Authorisation of the activity is subject to the conditions contained in this Environmental Authorisation, which form part of the Environmental Authorisation and are binding on the holder of the authorisation.
3. The holder of the authorisation is responsible for ensuring compliance with the conditions contained in this Environmental Authorisation. This includes any person acting on the holder's behalf, including but not limited to, an agent, servant, contractor, sub-contractor, employee, consultant or person rendering a service to the holder of the authorisation.

4. The activities authorised may only be carried out at the property as described above.
5. Any changes to, or deviations from, the project description set out in this Environmental Authorisation must be approved, in writing, by the Department before such changes or deviations may be effected. In assessing whether to grant such approval or not, the Department may request such information as it deems necessary to evaluate the significance and impacts of such changes or deviations and it may be necessary for the holder of the authorisation to apply for further Environmental Authorisation in terms of the regulations.
6. The holder of an Environmental Authorisation must apply for an amendment of the Environmental Authorisation with the Competent Authority for any alienation, transfer or change of ownership rights in the property on which the activity is to take place.
7. This activity must commence within a period of ten (10) years from the date of issue of this Environmental Authorisation. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for Environmental Authorisation must be made in order for the activity to be undertaken.
8. Construction must be completed within five (05) years of the commencement of the activity on site.

#### **Notification of authorisation and right to appeal**

9. The holder of the authorisation must notify every registered interested and affected party, in writing and within 14 (fourteen) calendar days of the date of this Environmental Authorisation, of the decision to authorise the activity.
10. The notification referred to must –
  - 10.1. specify the date on which the authorisation was issued;
  - 10.2. inform the interested and affected party of the appeal procedure provided for in the National Appeal Regulations, 2014;
  - 10.3. advise the interested and affected party that a copy of the authorisation will be furnished on request; and
  - 10.4. give the reasons of the Competent Authority for the decision.

#### **Commencement of the activity**

11. The authorised activity shall not commence until the period for the submission of appeals has lapsed as per the National Appeal Regulations, 2014, and no appeal has been lodged against the decision. In terms of Section 43(7), an appeal under Section 43 of the National Environmental Management Act, Act No. 107 of 1998, as amended will suspend the Environmental Authorisation or any provision or condition

attached thereto. In the instance where an appeal is lodged you may not commence with the activity until such time that the appeal has been finalised.

### **Management of the activity**

12. A layout map submitted as part of the BAR is not approved. A copy of the final site layout map must be made available for comments by registered Interested and Affected Parties and the holder of this environmental authorisation must consider such comments. Once amended, the final development layout map must be submitted to the Department for written approval prior to commencement of the activity. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The layout map must be overlaid into a sensitivity map and must indicate the following:
  - 12.1. All existing infrastructure on the site, especially roads.
  - 12.2. Internal roads indicating width.
  - 12.3. Any sensitive environmental features that will be affected by the road.
  - 12.4. All "no-go" and buffer areas.
13. The Environmental Management Programme (EMPr) submitted as part of the BAR is **not approved** and must be amended to include measures as dictated by the final site lay-out map, and the provisions of this environmental authorisation. The EMPr must be made available for comments by registered Interested and Affected Parties and the holder of this environmental authorisation must consider such comments. Once amended, the final EMPr must be submitted to the Department for written approval prior to commencement of the activity. Once approved the EMPr must be implemented and adhered to.
14. Once approved, the EMPr must be implemented and strictly enforced during all phases of the project. It shall be seen as a dynamic document and shall be included in all contract documentation for all phases of the development when approved.
15. Changes to the approved EMPr must be submitted in accordance to the EIA Regulations applicable at the time.
16. The Department reserves the right to amend the approved EMPr should any impacts that were not anticipated or covered in the BAR be discovered.

## **Frequency and process of updating the EMPr**

17. The EMPr must be updated where the findings of the environmental audit reports, contemplated in Condition 24 below, indicate insufficient mitigation of environmental impacts associated with the undertaking of the activity, or insufficient levels of compliance with the environmental authorisation or EMPr.
18. The updated EMPr must contain recommendations to rectify the shortcomings identified in the environmental audit report.
19. The updated EMPr must be submitted to the Department for approval together with the environmental audit report, as per Regulation 34 of the EIA Regulations, 2014 as amended. The updated EMPr must have been subjected to a public participation process, which process has been agreed to by the Department, prior to submission of the updated EMPr to the Department for approval.
20. In assessing whether to grant approval of an EMPr which has been updated as a result of an audit, the Department will consider the processes prescribed in Regulation 35 of the EIA Regulations, 2014 as amended. Prior to approving an amended EMPr, the Department may request such amendments to the EMPr as it deems appropriate to ensure that the EMPr sufficiently provides for avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity.
21. The holder of the authorisation must apply for an amendment of an EMPr, if such amendment is required before an audit is required. The amendment process is prescribed in Regulation 37 of the EIA Regulations, 2014, as amended. The holder of the authorisation must request comments on the proposed amendments to the impact management outcomes of the EMPr or amendments to the closure objectives of the closure plan from potentially interested and affected parties, including the competent authority, by using any of the methods provided for in the Act for a period of at least 30 days.

## **Monitoring**

22. The holder of the authorisation must appoint an experienced Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation/rehabilitation measures and recommendations referred to in this environmental authorisation are implemented and to ensure compliance with the provisions of the approved EMPr.
  - 22.1. The ECO must be appointed before commencement of any authorised activities.
  - 22.2. Once appointed, the name and contact details of the ECO must be submitted to the *Director: Compliance Monitoring* of the Department.

- 22.3. The ECO must keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- 22.4. The ECO must remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.

### **Recording and reporting to the Department**

- 23. All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the Department in terms of this environmental authorisation, must be submitted to the *Director: Compliance Monitoring* of the Department.
- 24. The holder of the environmental authorisation must, for the period during which the environmental authorisation and EMPr remain valid, ensure that project compliance with the conditions of the environmental authorisation and the EMPr are audited, and that the audit reports are submitted to the *Director: Compliance Monitoring* of the Department.
- 25. The frequency of auditing and of submission of the environmental audit reports must be as per the frequency indicated in the EMPr, taking into account the processes for such auditing as prescribed in Regulation 34 of the EIA Regulations, 2014 as amended.
- 26. The holder of the authorisation must, in addition, submit environmental audit reports to the Department within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and a final environmental audit report within 30 days of completion of rehabilitation activities.
- 27. The environmental audit reports must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014 as amended and must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions as well as the requirements of the approved EMPr.
- 28. Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

### **Notification to authorities**

- 29. A written notification of commencement must be given to the Department no later than fourteen (14) days prior to the commencement of the activity. Commencement for the purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence, as well as a reference number.



### **Operation of the activity**

30. A written notification of operation must be given to the Department no later than fourteen (14) days prior to the commencement of the activity operational phase.

### **Site closure and decommissioning**

31. Should the activity ever cease or become redundant, the holder of the authorisation must undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and Competent Authority at that time.

### **Specific conditions**

32. No activities will be allowed to encroach into a water resource without a water use authorisation being in place from the Department of Water and Sanitation.
33. A qualified Agricultural Specialist must be commissioned to undertake a final walk through of the road to be upgraded to identify potential agricultural impacts. The findings of the specialist must inform the development of the final layout plan and the EMP to be submitted to the Department for approval as per conditions 12 and 13 above.
34. Should archaeological materials or human burial remains be exposed during construction work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made.
35. Signs must be placed along the construction roads to identify speed limits, travel restrictions, and other standard traffic control information.
36. No temporary storage areas, laydown areas or site offices are allowed within a 100m of the edge of any river, stream or distinctive drainage line a 100m buffer zone (no-go zone) for these sites is required along all watercourses.
37. An Erosion Management Plan must be developed and implemented during the construction phase of the project, especially around watercourses and steep gradients along escarpment edges.
38. All hazardous materials must be stored appropriately to prevent these contaminants from entering the water environment.
39. All excess materials brought onto site for construction must be removed after construction and their removal seen as part of the construction phase.

40. Rehabilitation plan for disturbed areas must be compiled and implemented as part of the construction phase.
41. An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Any solid waste must be disposed of at a landfill licensed in terms of Section 20 (b) of the National Environment Management Waste Act, 2008 (Act No.59 of 2008).
42. The holder of the authorisation must provide sanitation facilities within the construction camps and along the road so that workers do not pollute the surrounding environment. These facilities must be removed from the site when the construction phase is completed as well as associated waste to be disposed at a registered waste disposal site.
43. Construction must include design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.

#### **General**

44. A copy of this Environmental Authorisation, the audit and compliance monitoring reports, and the approved EMPr, must be made available for inspection and copying-
  - 44.1. at the site of the authorised activity;
  - 44.2. to anyone on request; and
  - 44.3. where the holder of the Environmental Authorisation has a website, on such publicly accessible website.
45. National government, provincial government, local authorities or committees appointed in terms of the conditions of this authorisation or any other public authority shall not be held responsible for any damages or losses suffered by the holder of the authorisation or his/her successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the holder of the authorisation with the conditions of authorisation as set out in this document or any other subsequent document emanating from these conditions of authorisation.

**Date of Environmental Authorisation:** 25/04/2023

  
**Mr Sabelo Malaza**

**Chief Director: Integrated Environmental Authorisations**  
**Department of Forestry, Fisheries and the Environment**

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## **Annexure 1: Reasons for Decision**

### **1. Information considered in making the decision**

In reaching its decision, the Department took, *inter alia*, the following into consideration -

- a) The listed activities as applied for in the application form received on 13 October 2022.
- b) The information contained in the BAR dated January 2023.
- c) The comments received from SAHRA.
- d) Mitigation measures as proposed in the BAR and the EMPr.
- e) The information contained in the specialist studies contained within the appendices of the BAR dated January 2023 and as appears below:

### **2. Key factors considered in making the decision**

All information presented to the Department was taken into account in the Department's consideration of the application. A summary of the issues which, in the Department's view, were of the most significance is set out below.

- a) The findings of all the specialist studies conducted and their recommended mitigation measures.
- b) The BAR dated January 2023 identified all legislation and guidelines that have been considered in the preparation of the BAR.
- c) The location of the proposed improvements of the national road.
- d) The methodology used in assessing the potential impacts identified in the BAR dated January 2023 and the specialist studies have been adequately indicated.
- e) A sufficient public participation process was undertaken and the applicant has satisfied the minimum requirements as prescribed in the EIA Regulations, 2014 as amended for public involvement.

### **3. Findings**

After consideration of the information and factors listed above, the Department made the following findings -

- a) The identification and assessment of impacts are detailed in the BAR dated January 2023 and sufficient assessment of the key identified issues and impacts have been completed.
- b) The procedure followed for impact assessment is adequate for the decision-making process.
- c) The information contained in the BAR dated January 2023 is deemed to be accurate and credible.

- d) The findings of the site inspection held on 24 April 2023.
- e) The proposed mitigation of impacts identified and assessed adequately curtails the identified impacts.
- f) EMPr measures for the pre-construction, construction and rehabilitation phases of the development were proposed and included in the BAR and will be implemented to manage the identified environmental impacts during the construction phase.

In view of the above, the Department is satisfied that, subject to compliance with the conditions contained in the environmental authorisation, the authorised activities will not conflict with the general objectives of integrated environmental management laid down in Chapter 5 of the National Environmental Management Act, 1998 and that any potentially detrimental environmental impacts resulting from the authorised activities can be mitigated to acceptable levels. The environmental authorisation is accordingly granted.