

# PROPOSED GREENGATE EXT 98

## OUTLINE SERVICES SCHEME REPORT FOR THE PROPOSED TOWNSHIP OF GREENGATE EXT 98 SITUATED ON PORTION 260 (A PORTION OF PORTION 114) OF THE FARM RIETFONTEIN 189 IQ

**28 September 2020**

**Prepared By:**




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TITLE :		OUTLINE SERVICES SCHEME REPORT FOR THE PROPOSED TOWNSHIP OF GREENGATE EXT 98 SITUATED ON PORTION 260 (A PORTION OF PORTION 114) OF THE FARM RIETFONTEIN 189 IQ		
OUTLINE SCHEME REPORT				
ILIFA PROJECT NO :	DATE :	REPORT STATUS :		
K19-040-02	18 November 2020	Revision 5		
CARRIED OUT BY :		COMMISSIONED BY :		
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SYNOPSIS :				
OUTLINE SERVICES SCHEME REPORT FOR THE PROPOSED TOWNSHIP OF GREENGATE EXT 98 SITUATED ON PORTION 260 (A PORTION OF PORTION 114) OF THE FARM RIETFONTEIN 189 IQ				
KEY WORDS :				
Proposed development. Water, sewer, roads and stormwater Services				
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QUALITY VERIFICATION				<b>SACAS</b> ISO 9001:2015
This report has been prepared under the controls established by a certified ISO 9001:2008 quality management system developed by Ecosphere (Pty) Ltd.				
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Authorized by	Executive Office Manager.	A.B. Kriel (Pr Eng)		18/19/2020
No. of Copies Made:	Print Date:	No of Reprints:	Date:	
1	18/11/2020	Nil		
Copies sent to:			Deliver Method:	
Charl Fitzgerald			Transmitted	
Robert Victor			Transmitted	

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## 1. INTRODUCTION

This Outline Services Scheme Report addresses the installation of the civil engineering services required for the proposed township of Greengate Ext 98 situated on Portion 260 (a portion of Portion 114) of ohe Farm Rietfontein 189 IQ.

The report is submitted to the Mogale City Local Municipality (MCLM) to assist with the compilation of the necessary service agreement between MCLM and the Applicant in terms of the relevant section of the MCLM Spatial Planning and Land Use Management Act (SPLUMA) bylaw of 2018.

## 2. BACKGROUND

### 2.1 PROPERTY DESCRIPTION

The proposed township is situated in the jurisdiction area of the MCLM. The site is situated adjacent to Beyers Naude Drive (Road K31) between Tuohyvale and Valley Road. Please refer to Figure 1.

The total area of the township is 8.8893 ha. The topography of the area forms part of a rural area with a moderate relief sloping downwards in a Westerly direction with an approximately slope of 1.4%.

### 2.2 EXISTING ZONING

The property is currently zoned "Agricultural".

### 2.3 PROPOSED ZONING

The particulars of the proposed township are as follows:

- a) Erf 1 to 4 and 6 to 7 "Business 1"
  - Coverage 70%
  - FAR 0.4
  - Height 4 storeys

## b) Erf 5 "Commercial"

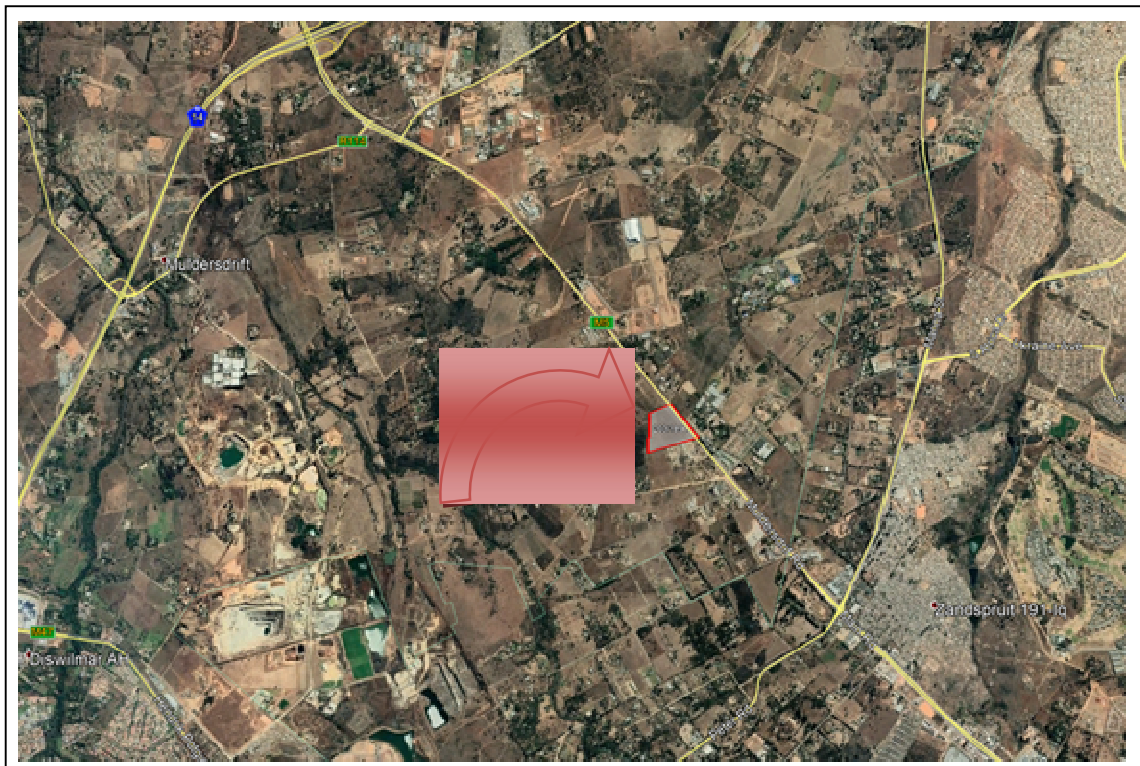
- Coverage 70%
- FAR 0.4
- Height 4 storeys

The anticipated land use is summarised in Table 1.

**Table 1 : Proposed land use**

<i>DESCRIPTION</i>	<i>ZONING</i>	<i>AREA (ha)</i>	<i>FAR</i>	<i>FLOOR AREA (m<sup>2</sup>)</i>
Erf 1 to 4 and 6 to 7	Business 1	5.1428	0.4	20,571
Erf 5	Commercial	1.1408	0.4	4,563
Roads		2.6057		
<b>TOTAL</b>		<b>8.8893</b>		<b>25,134</b>

**Figure 1 : Locality Plan**



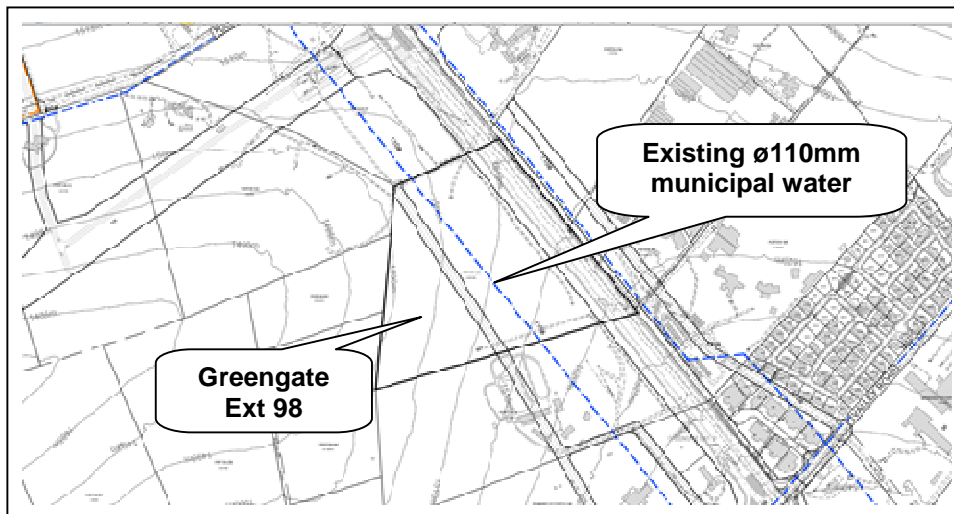
### 3. EXISTING SERVICES

#### 3.1 WATER RETICULATION

The area is currently supplied from the Honeydew Reservoirs (Johannesburg Water), through a bulk meter connection on the municipal boundary in Jubilee Street.

An existing 110mm dia. municipal water pipeline is traversing the proposed development parallel to Beyers Naude Drive. The capacity of the existing water network needs to be confirmed by the municipality.

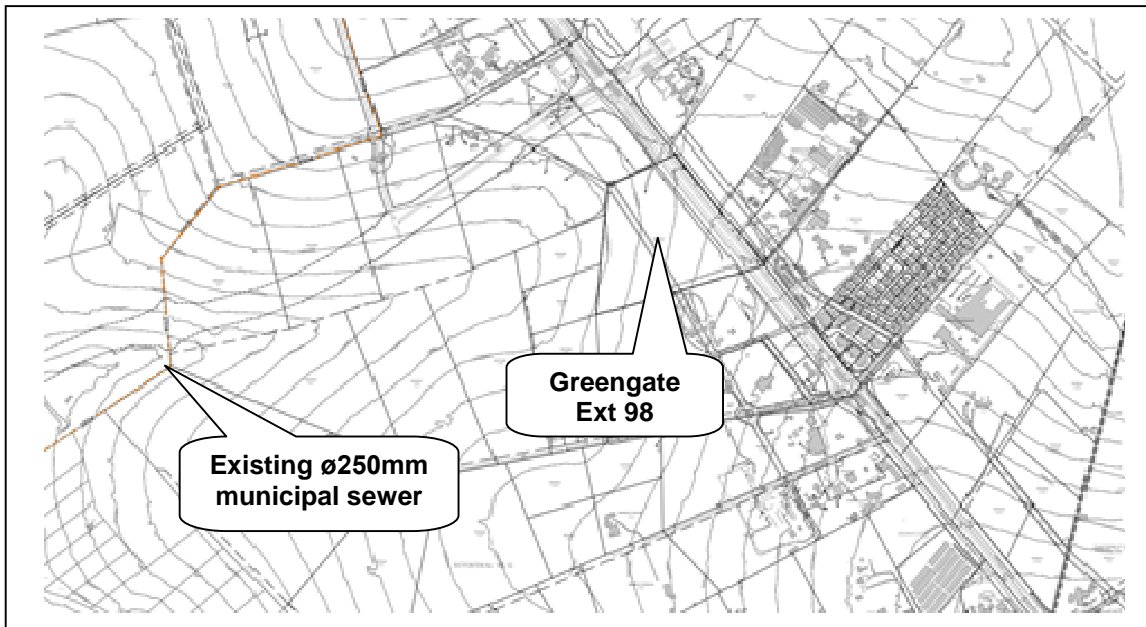
**Figure 2 : Existing municipal water infrastructure**



#### 3.2 SANITATION

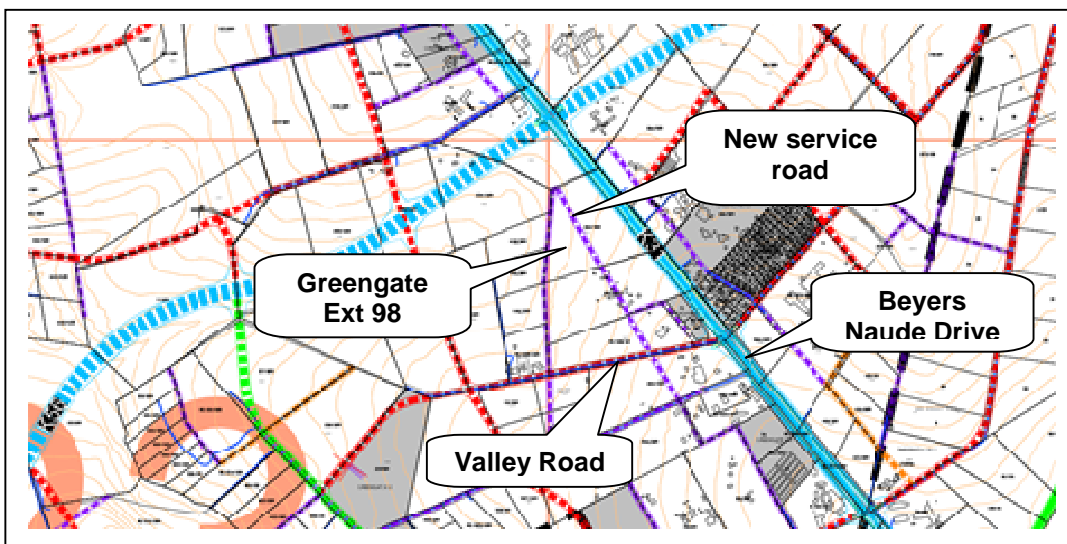
No existing municipal sewer infrastructure is located adjacent to the proposed development. The nearest connection point is situated approximately 1.1 km west from the proposed township.

In accordance with the information from an investigation conducted by Ilifa Africa Engineers in March 2017, this particular sewer infrastructure has sufficient capacity to accommodate the proposed township. However, this needs to be confirmed by the municipality.

**Figure 3 : Existing municipal sewer infrastructure**

### 3.3 ROADS

Access to the property is currently directly from Beyers Naude Drive, but in accordance with the latest Mogale City Local Municipality (MCLM) roads masterplan, access to the proposed township will be from a new service road parallel to Beyers Naude Drive. An application was also submitted to Gautrans for a marginal access (Left-in-left-out) from Beyers Naude Drive (K31).

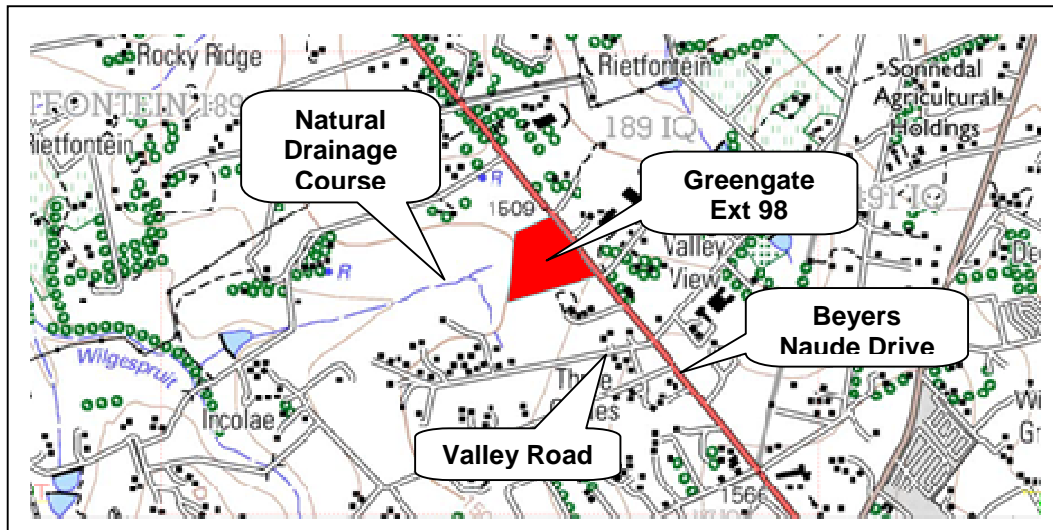
**Figure 4 : Access to the proposed development**



### 3.4 STORMWATER

No existing municipal stormwater infrastructure is located within the vicinity of the proposed township. However, a tributary of the Wilgespruit, is located west of the proposed development.

**Figure 5 : Natural Drainage Course**



## 4. PROPOSED SERVICES

### 4.1 WATER RETICULATION

#### 4.1.1 WATER DEMAND

The average daily demand for the proposed township is 163.4 kl/day. The water consumption for the proposed township is summarized in Table 2.

**Table 2 : Water Consumption**

DESCRIPTION	ZONING	QNT		UNIT DEMAND		DAILY DEMAND (kl/day)	FLOW RATE (l/s)
Erf 1 to 4 and 6 to 7	Business 1	20,571	m <sup>2</sup>	0.650	kl/100m <sup>2</sup> /day	133.7	1.55
Erf 5	Commercial	4,563	m <sup>2</sup>	0.650	kl/100m <sup>2</sup> /day	29.7	0.34
<b>TOTAL AVERAGE DEMAND</b>		<b>25,134</b>	<b>m<sup>2</sup></b>			<b>163.4</b>	<b>1.89</b>

#### 4.1.2 FIRE FLOW CRITERIA

The risk category assumed for the proposed development for the purpose of fire protection according to the Red Book is “*Moderate-risk 1: Industrial, business, high-rise flats ≥ four storeys*”. The applicable hydraulic requirements under fire flow are summarized in Table 3.

**Table 3 : Fire Flow Criteria (Red Book)**

<i>DESCRIPTION</i>	<i>CRITERIA</i>
Duration of design fire flow	4 hours
Design fire flow rate	50 l/s
Number of Hydrants in use	2
Minimum residual head in network	15m

#### 4.1.3 PROPOSED WATER NETWORK

A new 160mm dia. municipal water pipeline will be installed in the new service road connecting to the existing 160mm dia. municipal water pipeline located in Valley Road. The Mogale City Local Municipality (MCLM) needs to confirm if the existing water network has sufficient capacity to accommodate the proposed development. Please refer to the drawings attached as Annexure B.

## 4.2 SANITATION

#### 4.2.1 SEWAGE OUTFLOW

The total Dry Weather Flow (DWF) for the proposed township is 130.7 kl/day. The sewage outflow for the proposed township is summarized in Table 4.

**Table 4 : Sewage Outflow**

<i>DESCRIPTION</i>	<i>ZONING</i>	<i>QNT</i>		<i>OUTFLOW</i>		<i>DWF (kl/day)</i>	<i>FLOW RATE (l/s)</i>
Erf 1 to 4 and 6 to 7	Business 1	20,571	m <sup>2</sup>	0.520	kl/100m <sup>2</sup> /day	107.0	1.24
Erf 5	Commercial	4,563	m <sup>2</sup>	0.520	kl/100m <sup>2</sup> /day	23.7	0.27
<b>TOTAL DRY WEATHER FLOW</b>		25,134	m <sup>2</sup>			<b>130.7</b>	1.51

#### **4.2.2 PROPOSED SEWAGE NETWORK**

A new 160mm dia. external sewer network will be constructed along the natural drainage course flowing in a westerly direction towards the existing municipal sewer network. The new sewer line will be installed 1.0m outside the 1:100 year flood line of the natural drainage course. Please refer to the drawings attached as Annexure B.

#### **4.3 ROADS**

Marginal access to the proposed development will be from Beyers Naude Drive (K31), as well as from the new service road in accordance with the latest MCLM roads master plan. Please refer to the proposed road layout attached as Annexure C.

#### **4.4 STORMWATER**

Stormwater attenuation will be provided for the 1:5 as well as the 1:25 year storm event such that the pre-development runoff is not exceeded. An industry guideline of 350 m<sup>3</sup>/ha for the 1:25 year storm, typically imposed by the Johannesburg Roads Agency (JRA), will be used for the sizing of the attenuation ponds. This requires a total volume for attenuation for the 1:25 year storm of approximately 2,491 m<sup>3</sup>.

The stormwater network is designed in order to safely channel the runoff from a 1:10 year storm event, to the nearby Wilgespruit river tributary located adjacent to the Western boundary. The internal roads are provided with kerb inlets at strategic positions to catch stormwater runoff from the development.

The underground system will consist of "Interlocking Joint" concrete pipes with a minimum diameter of 450mm with various slopes discharging into a new attenuation pond. The maximum velocities in the network are 5.6 m/s, and the manholes are provided with a maximum spacing of less than 100m between manholes. Adequate energy dissipation will be provided in order to prevent scouring at the stormwater outlets. Please refer to the drawings attached as Annexure B.

## 5 FLOOD LINES

The proposed development is not affected by a 1:100 year flood line, as per the provisions of Section 144 of the Natural Water Act, 1998 (Act 36 of 1998).

## 6. FINANCIAL IMPLICATIONS

### 6.1 CONSTRUCTION COST

The estimated construction cost of the civil engineering services is **R8,913,253.00 (Incl. VAT)**, based on previous projects of a similar nature. A detailed cost estimate needs to be conducted during the final design stage. The estimated construction cost is summarised in Table 5.

**Table 5 : Estimated Construction Cost**

<i>Description</i>	<i>Qty</i>	<i>Unit</i>	<i>Rate</i>	<i>Amount</i>	<i>Add P&amp;G's, Cont. Fees</i>	<i>Total</i>
<b>Sewer Reticulation</b>						
160mm dia. sewer line	1,545	m	800	1,236,000	483,894	1,719,894.00
<b>Water Reticulation</b>						
160mm dia. water pipeline	790	m	650	513,500	201,035	714,535.25
Sub-Total				<b>1,749,500</b>	<b>684,929</b>	<b>2,434,429.25</b>
<b>Roads</b>						
External roads as per TIA	3,219	m <sup>2</sup>	900	2,897,100	1,134,215	4,031,314.65
Upgrading of service road	4,440	m <sup>2</sup>	700	3,108,000	1,216,782	4,324,782.00
<b>Stormwater</b>						
450mm dia. Interlocking Joint	76	m	1,300	98,800	38,680	137,480
525mm dia. Interlocking Joint	71	m	1,500	106,500	41,695	148,195
600mm dia. Interlocking Joint	90	m	1,700	153,000	59,900	212,900
675mm dia. Interlocking Joint	47	m	2,100	98,700	38,641	137,341
Bio retention pond / swale	1	Sum	700,000	700,000	274,050	974,050
Sub-Total				<b>7,162,100</b>	<b>2,803,962</b>	<b>9,966,062</b>
TOTAL (Excl. VAT)				8,911,600	3,488,891	12,400,491
Add VAT @ 15%				1,336,740	523,334	1,860,074
<b>TOTAL (Incl. VAT)</b>				<b>10,248,340</b>	<b>4,012,225</b>	<b>14,260,565</b>

## **6.2 BULK CONTRIBUTIONS**

The Bulk Contribution calculation for the proposed Greengate Ext 98 does not form part of this report.

## **7. LEGAL IMPLICATIONS**

### **7.1 OWNERSHIP AND MAINTENANCE**

#### **7.1.1 WATER**

The new water pipeline will be handed over to the Mogale City Local Municipality (MCLM) on completion of the construction works. The responsibility of the operations and maintenance will be for the MCLM.

#### **7.1.2 SEWER**

The new sewer pipeline will be handed over to the Mogale City Local Municipality (MCLM) on completion of the construction works. The responsibility of the operations and maintenance will be for the MCLM.

#### **7.1.3 ROADS AND STORMWATER**

All new road and stormwater infrastructure will be handed over to the Mogale City Local Municipality (MCLM) on completion of the construction works. The responsibility of the operations and maintenance will be for the MCLM.

### **7.2 SERVITUDE**

A new 2.0m wide servitude must be registered in favour of the Mogale City Local Municipality, where the new external sewer traverse private property.

## **8. ENVIRONMENTAL IMPLICATIONS**

A Water Use Licence Application (WULA) needs to be submitted to the Department of Water and Sanitation (DWA) for the installation of the sewer line parallel to the natural water course.

## 9. CONCLUSION

From the report it is evident that the proposed township can be supplied with all civil engineering services for the functioning thereof, based on the following:

a) Water Reticulation:

- 1) A new 160mm dia. municipal water pipeline will be installed in the new service road connecting to the existing 160mm dia. municipal water pipeline located in Valley Road.

b) Sewer Reticulation:

- 1) A new 160mm dia. external sewer network will be constructed along the natural drainage course flowing in a westerly direction towards the existing municipal sewer network

c) Roads:

- 1) Marginal access to the proposed development will be from Beyers Naude Drive (K31), as well as from the new service road in accordance with the latest MCLM roads master plan.

d) Stormwater:

- 1) A new 450 to 675mm dia. stormwater pipes will be constructed.
- 2) A detail analysis and design of the internal stormwater runoff and attenuation will be conducted during the finalization of the Site Development Plan (SDP) and building plans.
- 3) Stormwater attenuation will be provided at a rate of approximately 350 m<sup>3</sup>/ha in order to ensure that the pre-development runoff is not exceeded for the 1:5 and 1:25 year storm events.

e) Bulk Contributions

- 1) The bulk contributions must be calculated in accordance with the 2005 Policy.
- 2) The methodology followed to calculate the rates for the 2005 Policy must be confirmed by the Mogale City Local Municipality.

## 10. RECOMMENDATIONS

It is recommended that:

- a) That the proposed development is supported from a civil engineering point of view.
- b) The construction cost of the new civil engineering services is offset against the bulk contributions for roads. This needs to be confirmed by the Mogale City Local Municipality (MCLM).
- c) Detailed design drawings must be prepared and submitted for approval to the Mogale City Local Municipality (MCLM) before construction.

## 11. REFERENCES

1. Red Book, The guidelines for human settlement planning and design volume. : *CSIR, 2019.*
2. Drainage Manual. : *The South African National Roads Agency Limited, 2006.*
3. Guidelines and Standards for the design and maintenance of water and sanitation services. : *City of Johannesburg Metropolitan Municipality (CJMM), July 2016*
4. Guidelines for the design and construction of water and sanitation systems. : *City of Tshwane Metropolitan Municipality (CTMM), June 2007*

**ANNEXURE A**  
(Proposed Township Layout)



**ANNEXURE B**  
(Drawings)

## **ANNEXURE C**

(Proposed Left-in-left-out layout as per TIA)