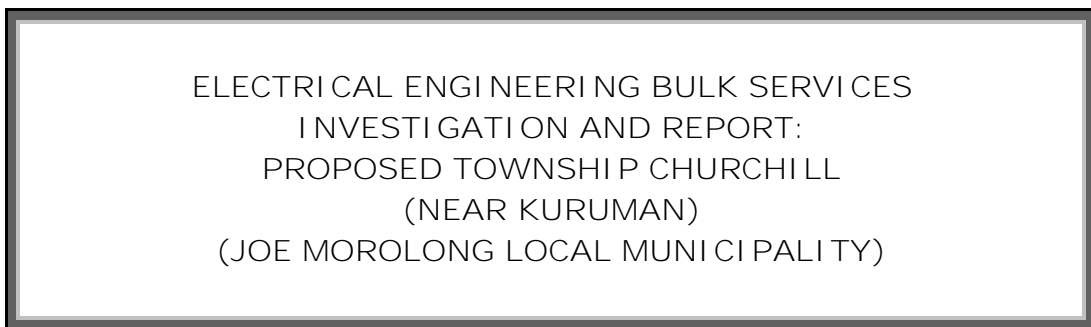


CLIENT:



PROJECT:



SERVICES PROVIDERS:



BARZANI HOLDINGS
ELECTRICAL ENGINEERING BULK SERVICES
INVESTIGATION AND REPORT:
PROPOSED TOWNSHIP CHURCHILL
(NEAR KURUMAN)
(JOE MOROLONG LOCAL MUNICIPALITY)

MAY 2020

Technical Report Prepared by : H Jonck
Date : May 2020
On behalf of : G3T Consult
For : Maxim Planning Solutions
Attention : Mr K Raubenheimer

ELECTRICAL ENGINEERING BULK SERVICES
INVESTIGATION AND REPORT: PROPOSED TOWNSHIP
CHURCHILL (NEAR KURUMAN) (JOE MOROLONG LOCAL
MUNICIPALITY)

CONTENTS

1.	DEVELOPER AND SERVICE PROVIDERS DETAILS	1
1.1	DEVELOPERS DETAILS:	1
1.2	SERVICE PROVIDERS DETAILS:	1
2.	BACKGROUND	2
3.	SITE DESCRIPTION	3
3.1	LOCATION	3
3.2	TOPOGRAPHY	4
3.3	CLIMATE	5
3.3.1	Rainfall	5
3.3.2	Temperature	5
3.4	VEGETATION	6
3.5	GEOLOGY	6
3.6	DEMOGRAPHIC OVERVIEW	7
3.6.1	Employment	9
3.6.2	Key Economic Drivers in The Municipality	9
3.6.3	Household income	10
3.6.4	Education	10
3.6.5	Municipal services	11
3.6.6	Population Figures	11
4.	TERMS OF REFERENCE	16
5.	INFORMATION	17
5.1	INFORMATION OBTAINED:	17
5.1.1	Town planning Zoning	17
5.1.2	Flood line information	17
5.1.3	Geological Investigation	17
5.1.4	Geohydrological Investigation	17
5.1.5	Cadastral and Topographic survey	17
6.	ELECTRICAL	18
6.1	TECHNICAL DESIGN PARAMETERS AND STANDARDS	18
6.2	DEMAND ESTIMATION	19
6.3	BULK SUPPLY	20
6.3.1	General	20
6.3.2	Existing Network	20
6.3.3	New Network	20
6.3.4	Eskom/Municipal Electrification Programme	20
6.4	COST ESTIMATE OF BULK SUPPLY	21
6.5	REQUIREMENTS FOR THE IMPLEMENTATION OF THE BULK SUPPLY	21
6.5.1	List proposed development on Municipal IDP	21
6.5.2	Confirmation of Supply Authority	22
6.5.3	Application to DOE	22
7.	REFERENCES	22
8.	CONCLUSION	22

LIST OF FIGURES

Figure 1: Town Location	2
Figure 2: Proposed Development of 3500 Residential Erven	4
Figure 3: Site Elevation	4
Figure 4: Precipitation	5
Figure 5: Rain Days	5
Figure 6: Temperatures.....	6
Figure 7: Employment Statistics	9

LIST OF TABLES

Table 3-1: Overview of key demographic indicators for the JTGDM and GLM	8
Table 3-2: Employment: Industry (Municipal Demarcation Board)	9
Table 3-3: Education Level (Census 2011)	10
Table 3-4: Overview of access to basic services in the JTGDM and JMM	11
Table 3-5: Beneficiaries 2011	12
Table 3-6: Anticipated Population by 2020	16
Table 6-1: Proposed ADMD to be used at secondary transformer level	18
Table 6-2: Maximum Demand Estimation	19
Table 6-3: CHURCHILL: 22kv BULK SUPPLY LINE – Cost Estimate	21

LIST OF ANNEXURES

- Annexure A: Eskom Classification of Domestic Consumers
- Annexure B: Location of Mothibistat Substation

1. DEVELOPER AND SERVICE PROVIDERS DETAILS

1.1 Developers Details:



THE MANAGING DIRECTOR
 BARZANI HOLDINGS
 BUILDING 9, CAMBRIDGE OFFICE PARK
 5 BAUHEMIA STREET
 HIGHVELD TECHNO PARK
 CENTURION
 0169

Mr I van der Westhuizen
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1.2 Service Providers Details:



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 MR K RAUBENHEIMER
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P.O. BOX 3095
 KIMBERLEY
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2. BACKGROUND

Churchill is a rural settlement in South Africa, and the home for the Joe Morolong Local Municipality (formerly Moshaweng Local Municipality), the largest municipality in the John Taolo Gaetsewe District of Northern Cape province. Its previous name (Moshaweng) **means** "place of sand". Two other rural settlements namely Esperanza and Lotlhakane is also located in the Joe Morolong Muncipal are and together they form the greater Churchill.



Figure 1: Town Location

Churchill lies in the Kalahari Desert region (see Fig 1 above). **It's a rural/informal settlement area that lies strategically to the east of the R31 between Kuruman and Hotazel, and thirty-four minutes' drive away from Kuruman, to which it is connected by road. In between Kuruman and Churchill you can also find the well know Mothibistad. Kuruman is the closest town to Churchill that can provide income and economical enhancement for the rural settlement surrounding area.**

Kuruman is a town with just over 13,000 inhabitants in the Northern Cape province of South Africa. It is known for its scenic beauty and the Eye of Kuruman, a geological feature that brings water from deep underground. It was at first a mission station of the London Missionary Society founded by Robert Moffat in 1821. The Kuruman River, which is dry except for flash floods after heavy rain, is named after the town. **Kuruman is regarded as the "Oasis of the Kalahari". It is set out on the Ghaap Plateau and receives its water source from a spring called "The Eye" which rises in a cave in the semi desert "thornveld" area in the Kalahari region. Kuruman is the main town in the area and the spring gives about 20 to 30 million litres of water daily to approximately 10 000 inhabitants. It is also known as "Die Oog" or "Gasegonyane" in the Kalahari region.**

Kuruman is situated on the main route between Gauteng and Namibia/Cape Town via Upington. The route is growing in popularity because of its beautiful nature and various tourist attractions. Mining and agriculture (cattle and game) support Kuruman's thriving economy. Minerals mined in Kuruman include Manganese, Iron Ore, Tiger's eye and Crocidolite. The richest deposits of Crocidolite in the world are found in the Kuruman district.

Mothibistad is a town situated 9 kilometres northeast of Kuruman in the Northern Cape province of South Africa. Before 1994 it was in the Bophuthatswana bantustan, and from 1994 until a border change in 2006 it was in North West province. It falls within the Ga-Segonyana Local Municipality and the John Taolo Gaetsewe District Municipality.

3. SITE DESCRIPTION

3.1 LOCATION

The proposed development site is on a portion of the remaining extent of the farm Churchill 211-HM and portion of the remaining extent of portion 2 of the farm Nyra 213-HM, surrounding the existing rural settlements namely Esperanza and Lotlhakane, northeast of the town of Kururman, approximately 250.2453 hectares in size.



Figure 2: Proposed Development of 3500 Residential Erven

The site is accessible from the MR948 provincial road, towards the North West and Northern Cape border line (See Fig 2 above).

3.2 TOPOGRAPHY



Figure 3: Site Elevation

The site is located towards the north eastern side of Kuruman.

The proposed site has a gradual slope from the west towards the north east of approximately 24.3m over a distance of 4.85kms, 1275 to 1286 meters s above sea level. The site indicates an average slope of 0.7% to 0.8% across the entire site.

Figure 3 above depicts the gradient of the proposed site.

3.3 CLIMATE

3.3.1 Rainfall

The region is characterized by summer rainfall with thunderstorms, with annual rainfall figures of 550 mm (Vryburg) recorded at the closest weather station to the site. Winters are dry with frost common.

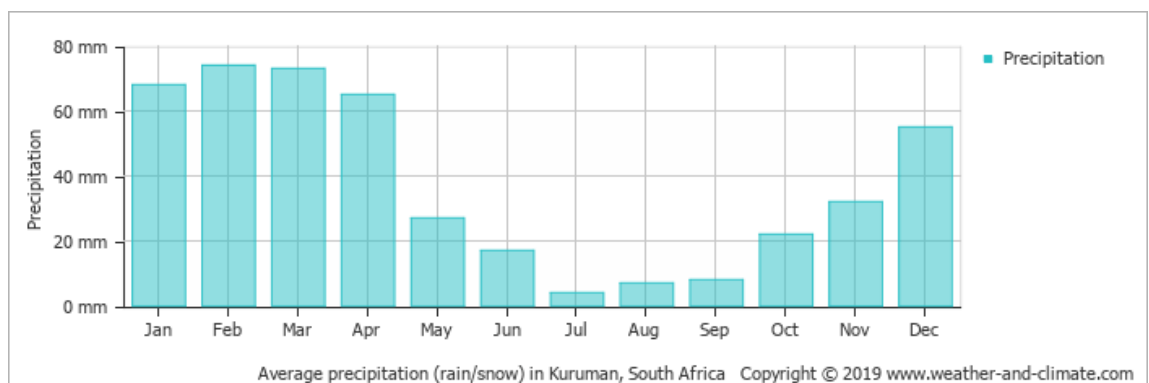


Figure 4: Precipitation

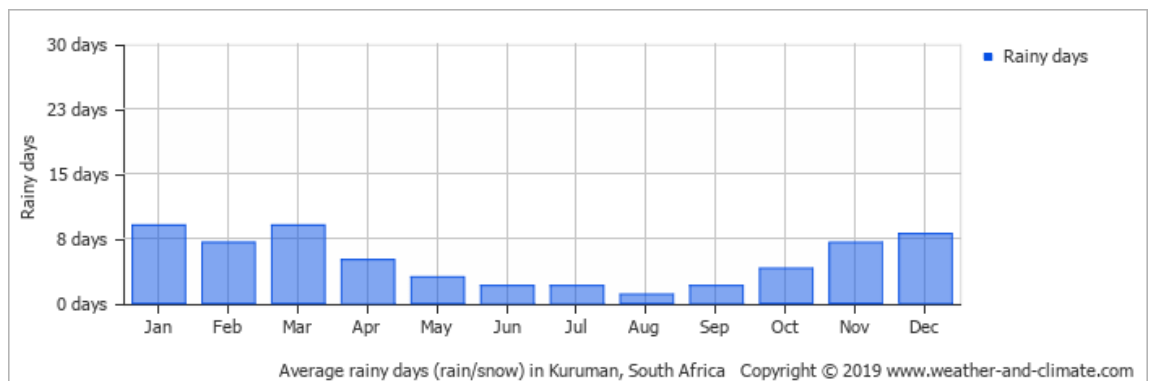


Figure 5: Rain Days

3.3.2 Temperature

The warmest months are normally December and January and the coldest months are June and July.

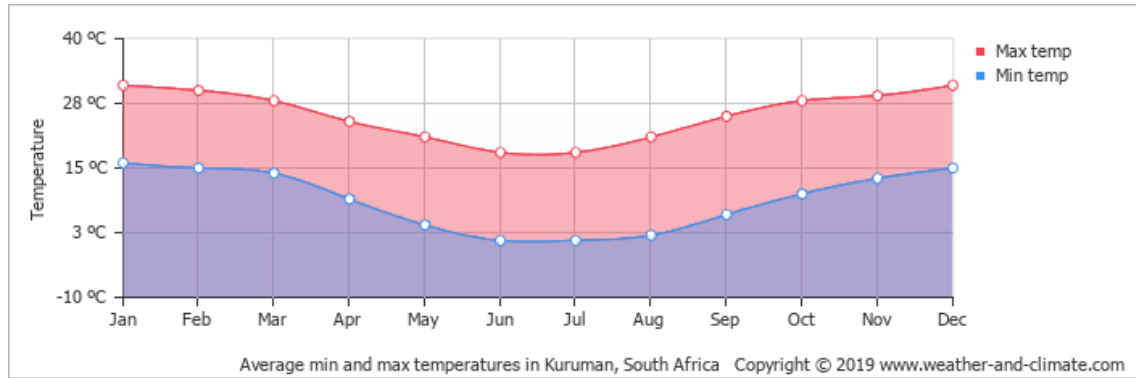


Figure 6: Temperatures

3.4 VEGETATION

The indigenous vegetation of the area is mainly classified as the Kuruman thornvelds which consists of closed shrub layer and well-developed open tree stratum mainly made of *Acacia erioloba* (Mucina and Rutherford, 2006).

The site is extensively covered by tall grass, shrubs and trees in places. Vegetation cover comprises grass, formal gardens, shrubs and trees in places. The area is also **known as the "Oasis of the Kalahari"**, typically characterized by semi desert thornveld veld type.

3.5 GEOLOGY

A detailed feasibility level dolomite stability investigation report for Churchill, in the jurisdiction of Joe Morolong local municipality, northern cape, was done by the Council of Geosciences & Geohazards.

According to the geological map, and investigations the profile of the site generally consists of aeolian deposits, calcrete or calcified (pedogenic) deposits, weathered dolomite and hard rock dolomite. Other rocks types and most noticeably dolerite was intersected in some boreholes and calcified pan dunes of Gordonia Formation. The area also hosts surface limestone of tertiary age.

This zone is largely characterised by a medium inherent hazard of a medium (2-5m diameter) sinkhole and subsidence (with sub areas of medium inherent hazard of large [5-15m diameter] sinkhole and subsidence) in a non-dewatering scenario. The inherent hazard for any size sinkhole and subsidence is low with respect to a dewatering scenario. The overburden which is non-dolomitic consists of aeolian deposits and pedogenic calcrete which is in a form of hardpan and calcified nodules in places. This zone occupies all gravity zones i.e. highs, lows and gradients. Neither wad nor low density material was recorded in the boreholes drilled. The groundwater level rests within the solid dolomite bedrock.

The geohydrological report classifies the area as a D3 Designation. Restrictions are placed on the types of residential development that may be considered on IHC: 3/4 land. Full title residential development (RN2-3) on stands of 300m² or greater is recommended or 10 – 25 dwelling houses per hectare and a population of ≤ 60 people per hectare is recommended.

Any form of commercial, retail and/or light industrial development is permissible with appropriate stringent precautionary measures. Footprint investigations are required for each commercial development.

The municipality exclusively relies on groundwater resources for domestic, agricultural and business water supply. According to the Department of Water Affairs' (DWA) National Groundwater Archive (NGA), there are 4 groundwater monitoring boreholes in close proximity of the site. They fall under Lower Vaal Water Management Areas and D41L drainage region. Recorded water rest levels ranged between 2.5m and 58.7m with a general average of 10m.

In general, alternating lows and highs are present in the study area, indicating possible features (bedrock) that are shallower at 0.163mGal and those that are deeper than the surrounding area at 0.404mGal. Gravity low patches are found in the south eastern and south western of the site, while gravity gradients and highs area are predominant and occur in different places across the site. Percussion drilling results confirmed the anticipated variation in the depth to bedrock and weathering profiles with relatively deep bedrock and thicker overburden profile being prevalent in gravity lows and much shallower or surface outcrops in gravity highs.

Development Recommendations can be outlined as follows:

- It is recommended that the municipality sets up at least two groundwater monitoring boreholes distributed across the current study area to establish trends. Any future developments must be investigated in accordance with SANS 1936-2 (2012).
- A high density development, i.e. 150m² stands or developed as group housing such as a block of flats, has a greater probability of inducing a sinkhole than a commercial development on the same property because of the higher density of wet services and greater chance of an undetected leak. Therefore, new development should take into cognizance the allowable land use densities as per SANS 1936-1 (2012) permissible land use Tables.
- Based on the feasibility study, the entire site is suitable for most planned low-cost housing development.
- Any signs of ground instabilities or subsidence should be reported immediately to the municipality and remediated in accordance with SANS 1936-4 (2012).

Source: Compiled from a feasibility level dolomite stability investigation report for Churchill, in the jurisdiction of Joe Morolong local municipality, northern cape.

3.6 DEMOGRAPHIC OVERVIEW

As indicated in Table 1, the population of the John Taolo Gaetsewe District Municipality (JTGDM) increased by from 191 539 in 2001 to 224 799 in 2011, which represents an increase of ~ 17.4%. The population of the Joe Morolong Local Municipality (JMM) decreased from 97 945 in 2001 to 89 530 in 2011 (~ -0.9%) over the same period. The decrease in the population in the JMM was linked to a stabilisation in the 15-64 age group.

This is linked to the non-growth in the mining sector and the influx of workers to the area over this ten-year period. The size of the JTGDGM decreased from 4 to 3.5, while the household size in the JMM decreased from 4.3 to 3.7.

ASPECT	JTGDGM		JMM	
	2001	2011	2001	2011
Population	191 539	224 799	97 945	89 461
% Population <15 years	38.1	34.0	41.9	39.4
% Population 15-64	57.1	61.2	54.2	54.2
% Population 65+	4.8	4.8	5.6	6.4
Households	44 218	61 331	21 749	23 707
Household size (average)	4.0	3.5	4.3	3.7
Formal Dwellings %	70.2%	76.6%	64.8%	72.5%
Dependency ratio per 100 (15-64)	75.1	63.3	90.4	84.6
Unemployment rate (official) - % of economically active population	42.5%	29.7%	49%	38.6%
Youth unemployment rate (official) - % of economically active population 15-34	53.3%	37.2%	59.8%	49.5%
No schooling - % of population 20+	25.7%	14.6%	31.6%	22.8%
Higher Education - % of population 20+	3.3%	4.1%	3.3%	4.1%
Matric - % of population 20+	14.2%	20.5%	8.3%	13.4%

Source: Compiled from StatsSA Census 2011 Municipal Fact Sheet

The majority of the population in the JMM in 2011 was Black African (96.4%), followed by Coloureds (2%), Whites (1.2%), Indian/Asian (0.3%) and Other (0.2%) (Census 2011).

The dominant language spoken is Setswana (90.1%), followed by Afrikaans (3.6%), English (1.9%), IsiNdebele (1%) and IsiZulu (0.9%).

The dependency ratio in both the JTGDGM and JMM decreased from 75.1 to 63.3 and 90.4 to 84.6 respectively. The decrease represents a positive socio-economic improvement by indicating that there are a decreasing number of people dependent the economically active 15-64 age group. The age dependency ratio is the ratio of dependents, people younger than 15 or older than 64, to the working, age population, those ages 15-64. However, the dependency ratio for the JTGDGM remains higher than the ratio for the Northern Cape as whole, which was 55.7 in 2011.

In terms of percentage of formal dwellings, the number of formal dwellings in the JTGDM increased from 70.2% in 2001 to 76.6% in 2011. The number of formal houses in the JMM increased from 64.8% to 72.5% for the same period. This represents a positive socio- economic movement for the JMM but however still reflects the challenges faced by the JMM associated with the influx of workers and job seekers to the area. This figure also indicates that there is likely to be a housing backlog in JMM.

3.6.1 Employment

The official unemployment rate in both the JTGDM and JMM decreased for the ten-year period between 2001 and 2011. In the JTGDM the rate fell from 42.5% to 29.7%, a decrease of 12.8%. In the JMM the unemployment rate decreased from 49% to 38.6%, a decrease of 10.4%. Youth unemployment in both the JTGDM and JMM also dropped over the same period. Youth unemployment in the JMM area decreased from 59.8% to 49.5%. There are 12 740 people that are economically active (employed or unemployed but looking for work), and of these 38.6% are unemployed in JMM. Of the 6 323 economically active youth (15 – 34 years) in the JMM area, 49.5% are unemployed.

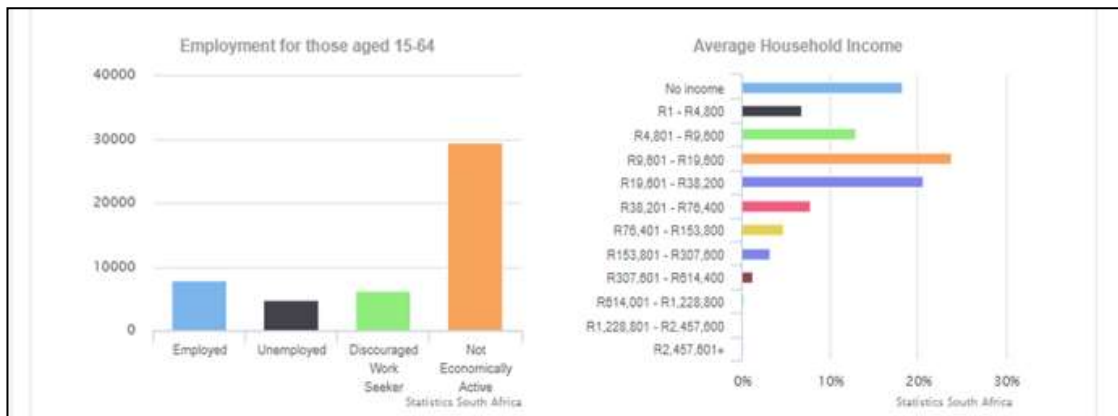


Figure 7: Employment Statistics

3.6.2 Key Economic Drivers in The Municipality

Mining and Agriculture are the largest contributing factors in terms of the economy in the Municipality.

Sector	Number of jobs created
Agriculture related work	720
Manufacturing	144
Mining, Quarrying	471
Electricity, gas, water	116
Construction	283

Wholesale, Retail	432
Transport	122
Business services	100
Community services	1 693
Undetermined	87 171

3.6.3 Household income

Based on the data from the 2011 Census, 18.3 % of the population of the JMM have no formal income, 6.8% earn between 1 and R 4 800, 13% earn between R 4 801 and R 9 600 per annum, 23.9% between R 9 601 and R 19 600 per annum, 20.6% between R 19 601 and R 38 200 per annum, 7.8% between R 38 201 and R 76 400 per annum and 4.8% between R 76 401 and R 153 800 per annum (Census 2011). The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household. This figure is likely to be linked to the influx of job seekers to the area and the inability of all of them to secure work. This is also likely to result in an increasing number of individuals and households who are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the district and local municipality.

3.6.4 Education

The education levels at both the district and local municipal level also improved, with the percentage of the population over 20 years of age with no schooling in the JTGDM decreasing from 25.7% to 14.6%.

Table 3-3: Education Level (Census 2011)	
Education Level	Number
No schooling	10 204
Some primary school	11 887
Completed primary school	2 324
Some Secondary school	12 384
Grade 12	5 986
Higher education	1 823

3.6.5 **Municipal services**

As indicated in Table 2, the municipal service levels in the JTGDM and JMM all improved over the period 2001 to 2011. This represents a socio-economic improvement. However, the service levels in the JTGDM are significantly lower than both the national and provincial averages. The national averages for each of the relevant indicators are 57% (access to flush toilet), 62% (weekly waste removal), 46.3% (piped water inside dwelling) and 84.7% for electricity. The figures for the JMM are all lower than the national and provincial averages.

Municipal Services	JTGDM		JM	
	2001	2011	2001	2011
% households with access to flush toilet	21.5	26.2	7.2	6
% households with weekly municipal refuse removal	23.1	26.0	5.8	6.1
% households with piped water inside dwelling	16.8	22.7	6.1	9.1
% households which uses electricity for lighting	39.0	81.8	39	81.8

Source: Compiled from StatsSA Census 2011 Municipal Fact Sheet

3.6.6 **Population Figures**

The Joe Morolong Local Municipality was established in 2000 and serves 15 wards, most of which are rural. Although unemployment is high, the municipality has great potential for developers, especially those interested in ecotourism and conservation. The municipal area is approximately 5 813 km² in size. The municipality strives to deliver basic services to its community by ensuring that there is water, sanitation and electricity.

Among the 15 wards in the Joe Morolong Municipal area rural settlements like Churchill, Esperanza, Lotlhakane, to name a few, and a large farming area forms part of the municipality. Churchill is a small rural settlement within the municipality and is also the administrative centre of the Joe Morolong Local Municipality.

Kuruman and Mothibistad are the largest established towns in the near vicinity of the rural settlements and situated in the Ga-Segonyana Municipal area.

Table 3-5: Beneficiaries 2011		
Joe Morolong Local Municipality		
Places	Population	Households
Avon	263	89
Baily Brith	110	25
Bareki	150	32
Battlemound	353	90
Bendell	1820	511
Blackrock	403	151
Bojalapotsane	108	52
Bosra	462	139
Bothetheletsa	1064	260
Bothithong	3172	869
Cassel	3895	1033
Clyde	392	98
Cottenend	147	45
Deorham	964	249
Dewar	550	164
Dikolobeng	67	25
Dinopeng	3115	767
Dithakong	1691	389
Ditshilabeleng	553	148
Ditshipeng	1057	260
Elston	157	60
Esperanza	383	103
Everton	21	12
Ga-Diboye	574	156
Ga-Lotlhare	795	186
Ga-Mabe	968	204
Ga-Madudu	3598	874

Table 3-5: Beneficiaries 2011		
Joe Morolong Local Municipality		
Places	Population	Households
Ga-Makgatle	476	105
Ga-Masepa	840	209
Ga-Moheele	139	37
Ga-Mokomela	79	28
Ga-Morona	612	161
Ga-Moseki	756	158
Ga-Mothibi	291	84
Ga-Pitiela	941	206
Ga-sehunelo	116	46
Ga-Sese	1148	259
Gadisane	560	130
Gahuhuwe	609	106
Ganap	569	143
Ganghae	120	38
Gapopo	66	18
Garamatale	54	22
Garaphoane	137	50
Gatshekedi	183	46
Good Hope	247	48
Heiso	1182	247
Hertzog	601	157
Heuningvlei	2656	698
Hotazel	1756	598
Kakoje	135	50
Kamden	1616	423
Kangkuru	264	76
Kelokilwe	329	79

Table 3-5: Beneficiaries 2011		
Joe Morolong Local Municipality		
Places	Population	Households
Kganong	265	61
Kganwane	2297	517
Kgomohute	231	73
Kikahela	323	87
Klaarkom	476	127
Klein Tsamaros	205	44
Laxey	1590	413
Lebonkeng	310	64
Letlhakajaneng	1065	204
Logaganeng	520	132
Logobate	547	106
Longhirst	216	62
Lotlhakane	881	203
Madibeng	1531	381
Madingwane	831	197
Magobing	493	121
Magojaneng	742	182
Magwagwe	740	159
Mahukubung	393	92
Maipeng	1061	252
Majankeng	244	65
Makadibeng	155	52
Makalaneng	5358	1267
Maketlele	217	65
Manyeding	1583	415
Maphiniki	657	176
March	321	65

Table 3-5: Beneficiaries 2011		
Joe Morolong Local Municipality		
Places	Population	Households
Masankong	299	71
Masilebatsena	707	147
Maswehatshe	265	70
Mathanthanyaneng	149	41
Matshaneng	478	102
Mecwatsaneng	339	104
Metsemantsi	381	140
Minto	157	51
Mmatoro	105	33
Moalogane	162	62
Mogobing	132	34
Molomo-wa-Petsana	279	76
Moshaweng NU	8228	2971
Mothong	86	22
Nchwaning	4	3
Ncwaneng	224	57
Neira	341	80
Niks	139	30
Nkajaneng	172	67
Ntswelengwe	1598	355
Padstow	908	242
Pennyn	435	129
Perth	832	244
Phomolong	592	204
Ramatele	21	13
Rowel	58	15
Segwaneng	554	127

Table 3-5: Beneficiaries 2011		
Joe Morolong Local Municipality		
Places	Population	Households
Smauswane	461	142
Tlapeng	162	41
Tsaelengwe	450	83
Tsamaros	405	100
Tsilwana	198	53
Tsineng	2042	628
Tsineng-Kop	33	13
Tsoe	777	194
Washington	722	168
Total	89461	23707

Source: Compiled from StatsSA Census 2011

Joe Morolong Municipality has decreased from 97945 people in 2001 to 89461 people in 2011 (Census 2011) at an average growth rate of -0.9% per annum.

However, Churchill village also serve as one of the nodal points with potential for human settlement, and as a result of this, the Municipality has proposed a Mixed Land Use Development for 3500 (houses Low Income, Middle Income and High Income). This development will have a positive impact towards the economy of Churchill village and Joe Morolong Municipality as a whole.

Table 3-6: Anticipated Population by 2020		
Suburb Benefiting	Total Benefiting Population	Total No. Of Households Benefiting
Churchill	24500	3500
Total	24500	3500

4. TERMS OF REFERENCE

G3T Consult CC was appointed by Maxim Planning Solutions on the 02 December 2019 for the compilation of Bulk Civil and Electrical Services investigations and Reports for the development of 3500 residential erven in Churchill village in the Joe Morolong Local Municipality.

The proposed development will consist of the following:

- Residential (Minimum 300m²) 2500 Erven

• Residential (Minimum 400m ²)	500 Erven
• Residential (Minimum 450m ²)	500 Erven
• Business	5 Erven
• Institutional Zone I (Crèche)	5 Erven
• Institutional Zone II (Church)	5 Erven
• Institutional Zone I (Primary School)	1 Stand
• Institutional Zone I (Secondary School)	1 Stand
• Open Space Zone I (Parks)	12 Stands
• Open Space Zone II (Sports field)	1 Stand
• Community Facilities	2 Stands

5. INFORMATION

5.1 INFORMATION OBTAINED:

5.1.1 Town planning Zoning

The detailed layout plan was received from Maxim Planning Solutions (Accredited Town and Regional Planners) (Annexure A)

5.1.2 Flood line information

The 1:100 flood line has been determined and is depicted on the Layout received from Maxim Planning Solutions.

5.1.3 Geological Investigation

An extensive Geological investigation was received from Maxim for the towns of Hotazel and Blackrock in close proximity to the proposed development.

The Geology and Rock Mass Quality of the Cenozoic Kalahari Group,

Nchwaning Mine Northern Cape was compiled by R.A. Puchner in December 2002.

5.1.4 Geohydrological Investigation

We also received a feasibility level dolomite stability investigation report for Churchill, in the jurisdiction of Joe Morolong Local Municipality, Northern Cape conducted by the Council of Geoscience in October 2017.

5.1.5 Cadastral and Topographic survey

A Cadastral and Topographical survey was obtained from Azur Aerial Photography.

6. ELECTRICAL

6.1 TECHNICAL DESIGN PARAMETERS AND STANDARDS

The current Supply Authority in Churchill is Eskom. The NERSA Electricity Distribution Licence for the proposed development area at Churchill is not yet allocated to a Supply Authority.

It is assumed that Eskom will be responsible for the electricity distribution in the proposed development area considering that Eskom is the Supply Authority of the existing electrical services in this area; thus, having a network presence. Hence, the design parameters are based on the Eskom Standards.

However, it is imperative to confirm with the Joe Morolong Municipality who will be the Supply Authority for the proposed development.

The design criteria and specifications as contained in this report are based on the following:

- All electrical services must be designed in accordance to the standards, specifications and equipment types/brands of Eskom.
- NRS 034-1: 1999, Electricity Distribution-Guidelines for the provision of electrical distribution networks in residential areas.
- SANS10142-1, The Wiring of Premises – Low Voltage Installations.
- SANS10142-1, The Wiring of Premises – Medium Voltage Installations above 1kV not exceeding 22kV.
- SANS 204 – Energy Efficiency in Buildings & SANS 10400 Part X and XA – Application of the National Building Act – Energy Usage.
- **Eskom’s classification for domestic consumers: “Table 2-Classification of domestic consumers-Typical design load parameters for domestic consumers”**
- **The maximum demand per household is based on Eskom’s “Table 2- Classification of domestic consumers (Error! Reference source not found.) – Typical design load parameters for domestic consumers” and are summarised as follows:**

Table 6-1: Proposed ADMD to be used at secondary transformer level		
PROPOSED LAND USE	kVA	NOTE
Res House (Min 300m ²)	2,4	
Res House (Min 400m ²)	3,6	
Res House (Min 450m ²)	3,6	
Business		70W/m ² for 50% of erf size

Table 6-1: Proposed ADMD to be used at secondary transformer level		
PROPOSED LAND USE	kVA	NOTE
Church	5	60A, single phase
Crèche	15	60A, three phase
Primary School	100	
Secondary School	150	
Sports field	15	60A, three phase
Community facility		70W/m ² for 50% of erf size

6.2 DEMAND ESTIMATION

The maximum demand for the proposed development is based on the draft layout plan as received from Maxim Planning Solutions and calculated in accordance with the requirements of Table 6-1 above.

Table 6-2: Maximum Demand Estimation				
PROPOSED LAND USE	QTY	kVA	TOTAL (kVA)	NOTE
Res House (Min 300m ²)	2500	2,4	6000	
Res House (Min 400m ²)	500	3,6	1800	
Res House (Min 450m ²)	500	3,6	1800	
Business	5		447	70W/m ² for 50% of erf size
Church	5	5	25	60A, single phase
Crèche	5	15	75	60A, three phase
Primary School	1	100	100	
Secondary School	1	150	150	
Sports field	1	15	15	60A, three phase
Community facility	2		192	70W/m ² for 50% of erf size
Parks	12			
Public street	0	0	15,0	
Sewer Pumpstation	1	15	15	Running load
Water Reservoir	1	60	60	Running load
Total maximum demand (kVA)			10694	

Table 6-2: Maximum Demand Estimation				
PROPOSED LAND USE	QTY	kVA	TOTAL (kVA)	NOTE
Total maximum demand (MVA)			10,69	

6.3 BULK SUPPLY

6.3.1 General

We had preliminary negotiations with the Electrification Planning Division of Eskom Kimberley, and we are reasonably certain that the contents of this document will meet with their formal requirements. However, a formal application must be submitted to Eskom if the project is viable and proceeds.

6.3.2 Existing Network

Churchill is currently supplied from the existing 132kV/22kV, "Eldoret" Substation via a 22kV overhead-line known as the "Eldoret-Bendel" feeder which has a spare capacity of 1.6MVA. Thus, the existing network can accommodate only 667 low-income stands.

6.3.3 New Network

In order to accommodate the remaining 2833 households, a new 22kV overhead feeder line consisting of "Hare" conductor must be constructed from the proposed Mothibistat Substation (132kV/22kV).

The proposed Mothibistat Substation is currently under construction and is expected to be in operation by December 2020. Refer to Error! Reference source not found. for a graphical representation of the location of the new substation.

6.3.4 Eskom/Municipal Electrification Programme

Both Eskom and Municipalities implement their electrification projects for low-income households via the Integrated National Electrification Programme (INEP) of South Africa of which the Department of Energy (DOE) is the funder based on conditional grant allocations.

Briefly, the following criteria must be met before the proposed area qualify as an electrification project:

- a) Either Eskom or the Municipality or both may apply to NERSA for the Electricity Distribution License of the relevant area. An Integrated Development Planning (IDP) letter from the local Municipality must accompany the said application.
- b) The relevant License Holder must apply to the DOE for funding and the DOE INEP applications must be submitted by 30 June of each year.

- c) The Eskom Notified Maximum Demand (NMD) or Main Intake capacity must be confirmed. The INEP also cater for the required bulk supply infrastructure.

In accordance with the Eskom debt policy an NMD increase application will **not be approved if the relevant Municipality's Eskom account is in arrears**; however, this matter is still a point of discussion not resolved between Eskom and the DOE because this action will prohibits the DOE with the required Government service delivery via the INEP.

- d) The relevant area could be a formal or informal settlement.
- e) The number of house/dwellings must physically exist on the site at the time of application.
- f) The "as built" layout drawings in .dwg or. dgn format must be made available to the Supply Authority.

6.4 COST ESTIMATE OF BULK SUPPLY

Based on information currently available as well as present material and labour rates, the cost for the Electrical Bulk Supply installation is estimated as follows:

As noted in item 6.3.4, the abovementioned cost could be covered by DOE funding via the INEP programme.

Table 6-3: CHURCHILL: 22kV BULK SUPPLY LINE – Cost Estimate		
SUMMARY OF COST ESTIMATE: 23 MARCH 2020		
ITEM	DESCRIPTION	AMOUNT
1	Preliminaries & General	R1 605 000,00
2	Medium Voltage Cable Overhead Line	R7 200 000,00
3	22kV Feeder Bay at Substation	R3 500 000,00
5	Professional Fees	R984 400,00
Estimated Construction Cost (Excl. 15% VAT)		R13 289 400,00

6.5 REQUIREMENTS FOR THE IMPLEMENTATION OF THE BULK SUPPLY

In order to proceed with the bulk supply, the following items will have to be **implemented should the proposed development enjoy the council's approval.**

6.5.1 List proposed development on Municipal IDP

The proposed project must be recorded on the Integrated Development Plan (IDP) of Joe Morolong Municipality.

6.5.2 **Confirmation of Supply Authority**

Eskom or Joe Morolong Municipality must obtain the Electricity Distribution License from NERSA for the applicable area.

6.5.3 **Application to DOE**

The License Holder must apply to the DOE to fund the bulk supply services.

7. **REFERENCES**

- *Government Gazette, 5 July 2006: Electricity Regulation Act, 2006: Chapter III – Electricity Licenses and Registration*
- *Department of Energy: Bulk Infrastructure Policy Guidelines for Integrated National Electrification Programme (INEP)*
- *Department of Energy: Mixed Developer Projects Policy Guidelines for Integrated National Electrification Programme (INEP)*
- *Department of Energy: Suit of Supply Policy Guidelines for Integrated National Electrification Programme (INEP)*
- *SABS 1963-3:2012: Development of dolomite land – Part 3: Design and Construction of Buildings, Structures and Infrastructure.*

8. **CONCLUSION**

We trust this will enable you to make the necessary decisions. MVD Kalahari will gladly assist with additional information should the need arise.



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 MVD Kalahari
 Consulting Engineers and Town Planners
 Level 2 B-BBEE Contributor
 /bb/2985-002-QR-Bulk Electrical Services Report



 G. VAN TONDER (*Pr Tech Eng*)
 G3T CONSULT CC

Annexures

Annexure A:
Eskom Classification of
Domestic Consumers

Table 2 — Classification of domestic consumers — Typical design load parameters for domestic consumers¹⁾

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Consumer class	Current type AMPS ^a and LSM ^a class	Income range ^b (gross R/month)	Load parameters – 7 years ^{cdef}					Load parameters – 15 years ^{cdef}						
			a	b	c	ADMD kVA	μ A	δ A	a	b	c	ADMD kVA	μ A	δ A
Rural settlement	LSM 1 (low end)	0 to 600	0,30	2,98	20	0,42	1,83	2,78	0,35	2,88	20	0,50	2,17	3,03
Rural village	LSM 1 and 2	400 to 900	0,43	2,52	20	0,67	2,91	3,55	0,48	2,13	20	0,84	3,65	4,07
Informal settlement	LSM 3 and 4	800 to 1 500	0,77	9,88	60	1,00	4,35	4,56	0,91	8,80	60	1,30	5,56	5,36
Township area	LSM 5 and 6	1 500 to 3 000	1,05	7,81	60	1,64	7,13	6,18	1,22	5,86	60	2,37	10,30	7,96
Urban residential I	LSM 7	3 000 to 5 500	1,23	5,56	60	2,50	10,87	8,28	1,25	3,55	60	3,59	15,61	10,93
Urban residential II	LSM 7 and 8	5 500 to 8 500	1,45	6,07	80	3,54	15,39	10,81	1,42	4,10	80	4,72	20,52	13,68
Urban township complex	LSM 8	8 500 to 12 000	1,45	5,75	80	3,70	16,09	11,20	1,42	4,13	80	4,70	20,43	13,63
Urban multi-storey/estate ^f	LSM 8 (high end)	12 000 to 24 000	1,43	4,41	80	4,50	19,57	13,15	1,37	3,39	80	5,30	23,04	15,09

^a Living standards measure (LSM) as quoted in the All Media and Product Survey (AMPS) conducted annually by the South African Advertising Research Foundation.

^b Average household income ranges shown for comparative purposes are in 2005 Rands. Any income data collected at a later date should be deflated by the CPI to allow a direct comparison.

^c If the target community matches the description, but the chosen value of c is different, new a and b values can be calculated for the chosen value of c, using the formula given in B.4.3.

^d Parameters have been normalized to the climate in the interior of South Africa where the winters are generally cold and with low rainfall. In regions where the winter is cold and wet (e.g. Cape Peninsula), the ADMD is about 12 % higher than that given. In climates similar to that of the Durban coastal region, the ADMD is about 12 % lower than that given.

^e Except as indicated in f below, the parameters have been derived from carefully monitored case studies around the country, and reflect best knowledge at the time of publication of actual consumer demand over time. The actual load parameters used depend upon the strategy of the planner with regard to phasing of capital expenditure.

^f Parameters for this consumer class have been extrapolated from existing data, since no sample load data have yet been collected from such consumers. Loads significantly higher than the ADMD shown in LSM 8 (high end) can be expected in the case of specific high-consumption developments. In such cases, estimated load data should be obtained from the relevant local authority or licensee.

¹⁾ Table 2 is administered by the NRS Project Management Agency (PMA) on behalf of the Electricity Supply Industry. The table is updated from time to time, based on the analysis of the latest available load research data without this part of the specification being revised. The current table can be viewed on the NRS website: <www.nrs.eskom.co.za> or obtained from the NRS Projects Manager.

NOTE Contact details for the NRS Projects Manager are:

Telephone +27 11 651 6846; Fax +27 11 651 6827; Postal address: Industry Association Resource Centre, Technology Standardization, Eskom Convention Centre, PO Box 1091, Johannesburg 2000

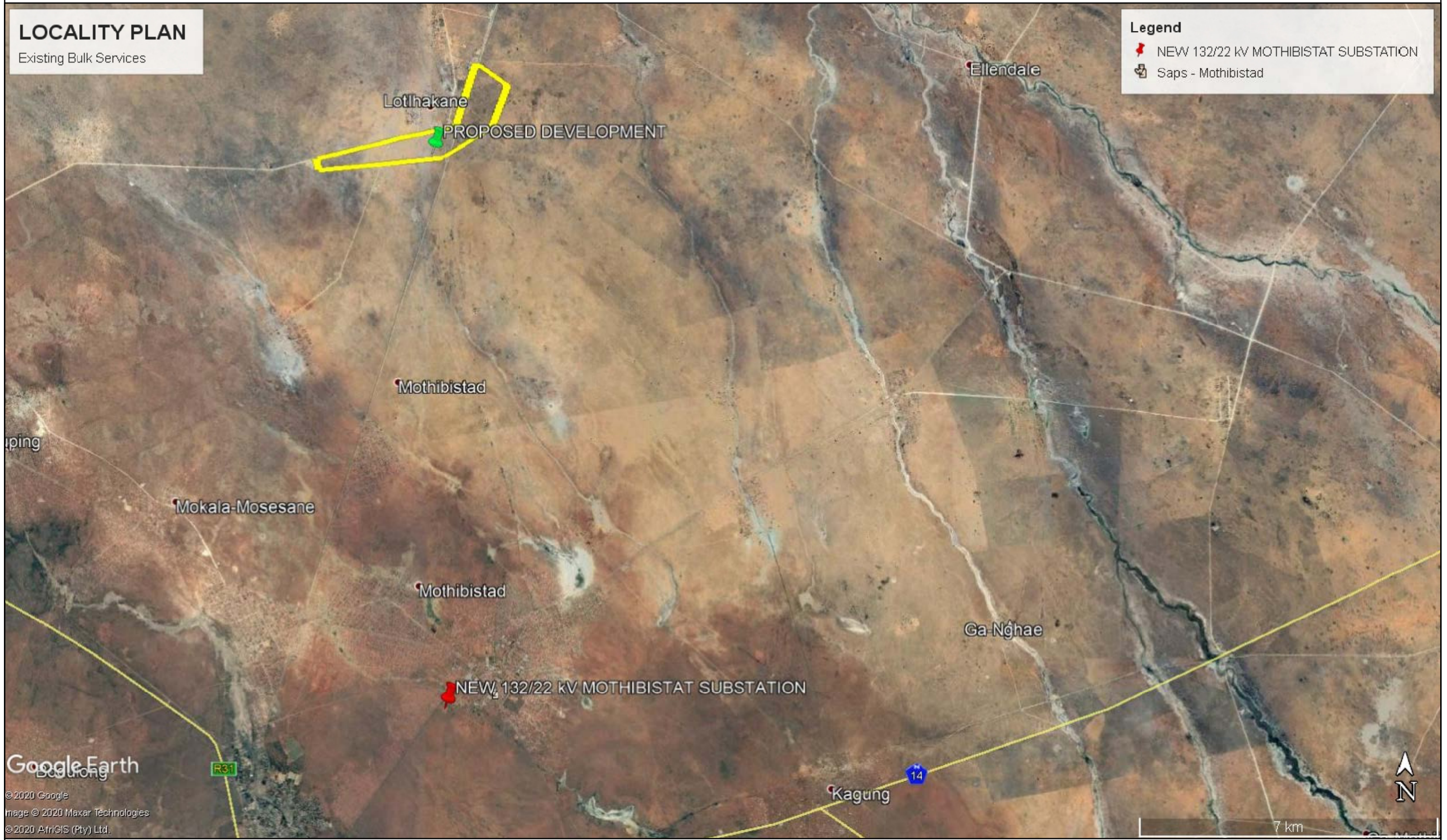
Annexure B:
Location of Mothibistat
Substation

LOCALITY PLAN

Existing Bulk Services

Legend

- * NEW 132/22 kv MOTHIBISTAT SUBSTATION
- Saps - Mothibistad



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NOTE/NOTA :
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NO. NR.	DATE DATUM	AMENDMENTS WYSIGINGS

CLIENT/KLIJNT	-----
DRAWING DESCRIPTION/TEKENING BESKRYWING	LOCALITY PLAN

PROJECT/PROJEK							
PROPOSED TOWNSHIP CHURCH HILL - REPORT							
DESIGN ONTWERP	---	DRAWN GETEKEN	---	CHECKED NAGEGAAN	---	CLIENT KLIJNT	---
						SCALE SKAAL	N.T.S
						DATE DATUM	March 2020

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