

2013

Civil Services Report

Development on Portion 103 of the farm
Driefontein 87-IR
Germiston

This report covers the water demand, sewerage handling, road network and stormwater management for the development on Portion 103 of the farm Driefontein 87-IR in Germiston.

Report Number 1372_RR01_Rev.0

Luleka Consulting Engineers
11/06/2013



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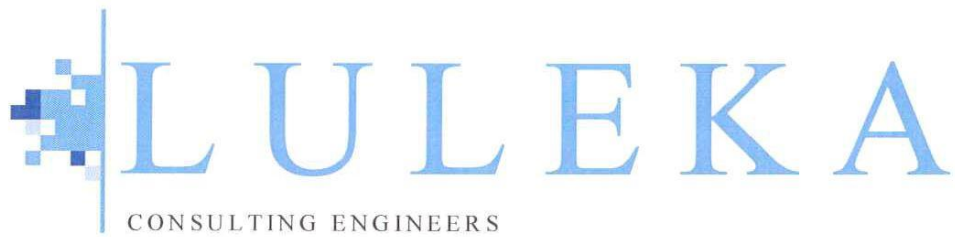
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SCOPE

Luleka Consulting Engineers have been appointed as Consulting Engineers for the design and supervision of the following services:

- Water reticulation
- Sewerage reticulation
- Roads
- Stormwater

This report will cover the design principles and demand for the water reticulation, the sewerage reticulation, roads design standards and the stormwater management for the residential development on portion 103 of the farm Driefontein 87-IR in Germiston. The traffic impact study is a separate study and will be done by others.

SITE DESCRIPTION

Locality

The proposed development is situated on the remainder extend of portion 103 of the Farm Driefontein 87-IR. The site is situated within the urban edge as defined by Ekurhuleni Metropolitan Municipality.



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The property is sized at 6.25 hectares.

The proposed development is fenced by the following:

- The existing township of Germiston South to the east.
- Portion 193 of the Farm Driefontein 87-IR to the north-west.
- Kutalo Station to the west.

Land Use

The proposed development will consist of the following components:

Size of Stands	Description	Number of Opportunities
	Residential	900
	Public Open Space	To be established

Topography and Geology

The site drains gently from north to south and from west to east. The average slope of the site is 0.81% from the high point towards the southern area.

The site has a very high water table with medium vegetation and some trees.

WATER RETICULATION

Existing Services

There is no water on the site and no significant municipal water lines with sufficient capacity to serve the site.

An existing 450mm diameter line runs on the western side of the site. This waterline runs from the Germiston Primrose Reservoir/Russel Road Reservoir. The static head of this line is 60.5 m and a peak head of 36.6 m. The peak flow is 87.5 l/s with a peak velocity of 0.6 m/s. The capacity of this line should be verified by the Ekurhuleni Masterplanners, GLS.

Design Standards

The following design guidelines were used to design the water reticulation for the proposed development:

- “Guidelines for the Provision of Engineering Services in Residential Townships” published by the department of Community Services.
- Developer’s Guideline to Installing Water and Sewerage Services in Ekurhuleni.
- SANS 1200 where applicable.

Materials

The materials for the proposed water reticulation will comply with the requirements of Ekurhuleni Metropolitan Municipality. The water pipelines will be constructed with Class 9 and class 12 (SABS 1283), uPVC material with cast iron fittings as required. Fire hydrants must comply with the latest requirements of SANS 10090 for the risk areas as defined.

All construction work will be done according to SANS 1200 and the requirements of Ekurhuleni Metropolitan Municipality. Testing and inspection of the pipe lines will be done to the standards as required by council.

The minimum cover to pipelines in road reserves will be 1000mm.

Water Flow Calculations

The new flows that were adopted by the Ekurhuleni Metropolitan Municipality in April 2011 were used to calculate the water demand for the development. A table can be found in the Appendix that summarizes the required demand.

Bulk Water Supply

The development will connect to the Germiston Primrose Reservoir/Russel Road Reservoir supply line.

The average annual daily demand for the proposed development was calculated at 7.29 l/s. The peak hourly flow for the development was calculated as 26.25 l/s.

A 250mm connection is proposed. This will deliver sufficient water for the whole development.

Internal Water Reticulation

The internal water reticulation is designed to maintain a minimum head of 24 meters. The water pressure can drop to 5 meters under fire flow conditions.

SEWER RETICULATION

Existing Services

The development drains towards the Germiston-Waterval Dakema Rondebult Sewer System.

There is no outfall sewer close to the site where the development can connect into. There is a 750mm line on the eastern side of the site. This line has a capacity of 824.9 l/s and a max flow of 244.3 l/s. The line connects to the Germiston Watervall WWTP sewer works. The line connecting to the works is a 1200mm with a capacity 2604.2l/s and a max flow 626l/s.

Please refer to the attached drawing in the appendix for the positions of existing and new sewer lines.

Design Standards

The following design guidelines were used to design the water reticulation for the proposed development:

- “Guidelines for the Provision of Engineering Services in Residential Townships” published by the department of Community Services.
- Developer’s Guideline to Installing Water and Sewerage Services in Ekurhuleni.
- SANS 1200 where applicable.

Materials

The materials for the proposed sewerage reticulation will comply with the requirements of Ekurhuleni Metropolitan Municipality. The sewerage pipelines will be constructed with heavy duty Class 34 (SABS 791), uPVC material. All benching in the manholes will be constructed with vitrified clay channels and dolomite aggregate for the benching.

All construction work will be done according to SANS 1200 and the requirements of Ekurhuleni Metropolitan Municipality. Testing and inspection of the pipe lines will be done to the standards as required by Ekurhuleni.

The minimum cover to pipelines in road reserves will be 1200mm.

Sewerage Calculations

The newly adopted flows by Ekurhuleni Metropolitan Municipality were used to calculate the peak flows. A summary of these flows can be found in the appendix.

The minimum pipe diameter will be 200 uPVC with a minimum slope of 1:200.

Sewerage Reticulation

The sewerage reticulation will be taken over by the Ekurhuleni Metropolitan Municipality after construction.

The site drains from north to south. It is proposed that the site connects to the existing sewer system on its eastern boundary.

ROAD NETWORK

Independent consulting engineers will do the detailed traffic impact study for the proposed development. The geometric design of the road network will be adjusted, if necessary, to accommodate the requirements of the traffic impact study.

Existing Road Network

The site is surrounded by the following road network:

Henderson Road: This road runs along the southern boundary of the site.

Ohlanga Street: This road runs along the north-eastern part of the site.

Mgeni Street: This road runs along the south eastern part of the site.

Design Standards

The following design guidelines were used to design the road network for the proposed development:

1. Guidelines for the provision of engineering services and amenities in residential township development by the National Housing Board (Blue Book).
2. Guidelines for human settlement planning and design (2000) compiled under patronage of the Department of Housing and published by the CSIR Building and Construction Technology (New Red Book).
3. Applicable SANS 1200 standards.

Access Roads

The Traffic Impact Study will cover the effect of the development and its impact on the external road network.

Northern Portion

Access to the northern portion of the development will be at an existing access point on Ohlanga Street. See attached drawing. A double lane double line road is proposed for a short distance into the township to accommodate sufficient stacking at peak times.

Southern Portion

Access to the portion south of the site will have to be via Mgeni Street and/or Henderson Street.

At both access points an intersection must be constructed to allow for turning lanes as required by the traffic impact study. A signalized intersection will probably be necessary to handle the peak traffic.

Internal Road Network

The internal road network will be a private road. The internal road network will consist of the following road widths:

Road Reserve	Road Width
13 m	6 m
10 m	5 m

The roads will be constructed with figure 8 mountable kerbs on both sides.

Taxi Rank

Taxi drop-off zones must be provided at the access points to the south (Henderson Street) and north (Ohlanga Street).

STORMWATER MANAGEMENT

Guidelines

The following design standards will be applied for the civil services:

1. Guidelines for the provision of engineering services and amenities in residential township development by the National Housing Board (Blue Book).
2. Guidelines for human settlement planning and design (2000) compiled under patronage of the Department of Housing and published by the CSIR Building and Construction Technology (New Red Book).
3. Design guidelines by Ekurhuleni Metropolitan Municipality to limit flows.
4. Applicable SANS 1200 standards.

Design Methods

Stormwater can be analyzed by various methods. The following methods can be used to analyze the stormwater runoff:

- Rational method.
- Statistical methods.
- Deterministic methods.

The rational method is a manual design method based on empirical data and results in conservative answers. The analyzing of the stormwater catchment by statistical methods is not possible because no records exist of stormwater runoff in the area.

Various computer programs exist to analyze a stormwater catchment area with the deterministic method that uses unit hydrographs to calculate runoff hydrographs from the topology of the catchment area. Two well-known programs that are widely used are WITWAT (or Hydrosim) and ILLUDAS.

The ILLUDAS method, adjusted to South African conditions, will be used to determine the stormwater runoff.

Rainfall Parameters

The following rainfall parameters were used to simulate the design storm:

Mean Annual Precipitation:	700mm
Time to Peak ratio:	0.38
Depression Storage:	
Paved Areas:	3mm
Grassed Areas:	5mm
Horton's Infiltration parameters:	
Initial Infiltration:	20mm/h
Final Infiltration:	2mm/h
Decay constant:	5/h

Design Principles

Minor System

The internal stormwater network will be designed using a storm with a recurrence interval of 5 years. Where water can concentrate, the piped system will be designed for a 25 year storm.

Major System

The internal roads and paved area will be designed in combination with the minor system to handle a storm with a recurrence interval of 25 years. The 25 year storm will be discharged through the piped system and on the road surface.

Larger order storms will be handled as sheet flow over the area and discharged through the road reserve to lower lying areas.

STORMWATER INFRASTRUCTURE

Existing Infrastructure

There is no existing stormwater where the site can connect into.

New Stormwater System

It is a requirement from Ekurhuleni Metropolitan Municipality the stormwater runoff from the site must be retained in such a way that the runoff before development for a 5 year or a 25 year storm be retained after development to restrict the flows to values before development.

The drawing in the appendix indicates possible points on site where retention ponds must be constructed. These ponds must be constructed above the 100 year flood line and the discharge must be controlled to prevent erosion and pollution of the spruit area.

Materials

The materials for the proposed stormwater reticulation will comply with the requirements of Ekurhuleni Metropolitan Municipality and SANS 1200.

Management of Stormwater During Construction

Stormwater will accumulate at low points during construction. This water will carry silts that can damage wetland areas when it concentrates on these areas. It is therefore essential to apply the following precautionary measures during the construction phase:

- Place excavation material on stream-up side of all trenches that will be excavated.
- Before stormwater trenches are excavated, the stormwater retention pond areas must first be prepared to accept stormwater during construction. This will then act as a stilling chamber in which any silts and waste will settle before the water can enter the wetland area.
- Roads can also concentrate stormwater towards the wetland areas. Before road construction, that leads to low lying areas can be constructed, the wetlands must be protected by construction of the retention pond areas to settle stormwater from construction.
- The retention pond areas must be maintained and cleaned during construction and be kept in a working order. After construction the ponds will be cleaned and protected by planting grass.
- Stormwater and sewerage lines must be constructed from the low point towards the high point to prevent accumulation of stormwater in the trenches.
- Particular care must be taken to prevent spillage of oils and fuel, especially around the onsite filling storage of diesel. Preventative measures must be in place if spillages should occur to prevent the spillage to enter trenches or road construction areas. The top layer of soil around the storage tanks must be stabilized with cement to establish an impermeable layer of soil. This must be removed after construction.
- The normal construction management of the site should be done to prevent environmental damage to the area during construction according to the environmental management plan prepared by the environmental consultant.

BULK CONTRIBUTIONS

Bulk contributions will not be payable if the development is done by Ekurhuleni Metropolitan Municipality.

COSTS

The costs of the bulk services to the boundary of the site can be found in the appendix.

CONCLUSION

From a services point of view, the proposed development can be serviced and therefore the development should be supported.

The following decisions must be taken by Ekurhuleni Metropolitan Municipality:

- To approve the services report of Portion 103 of the farm Driefontein 87-IR.
- To connect directly into the Germiston Primrose Reservoir/Russel Road Reservoir supply line.
- To connect directly into the Germiston-Waterval Dekema Rondebult sewer system.

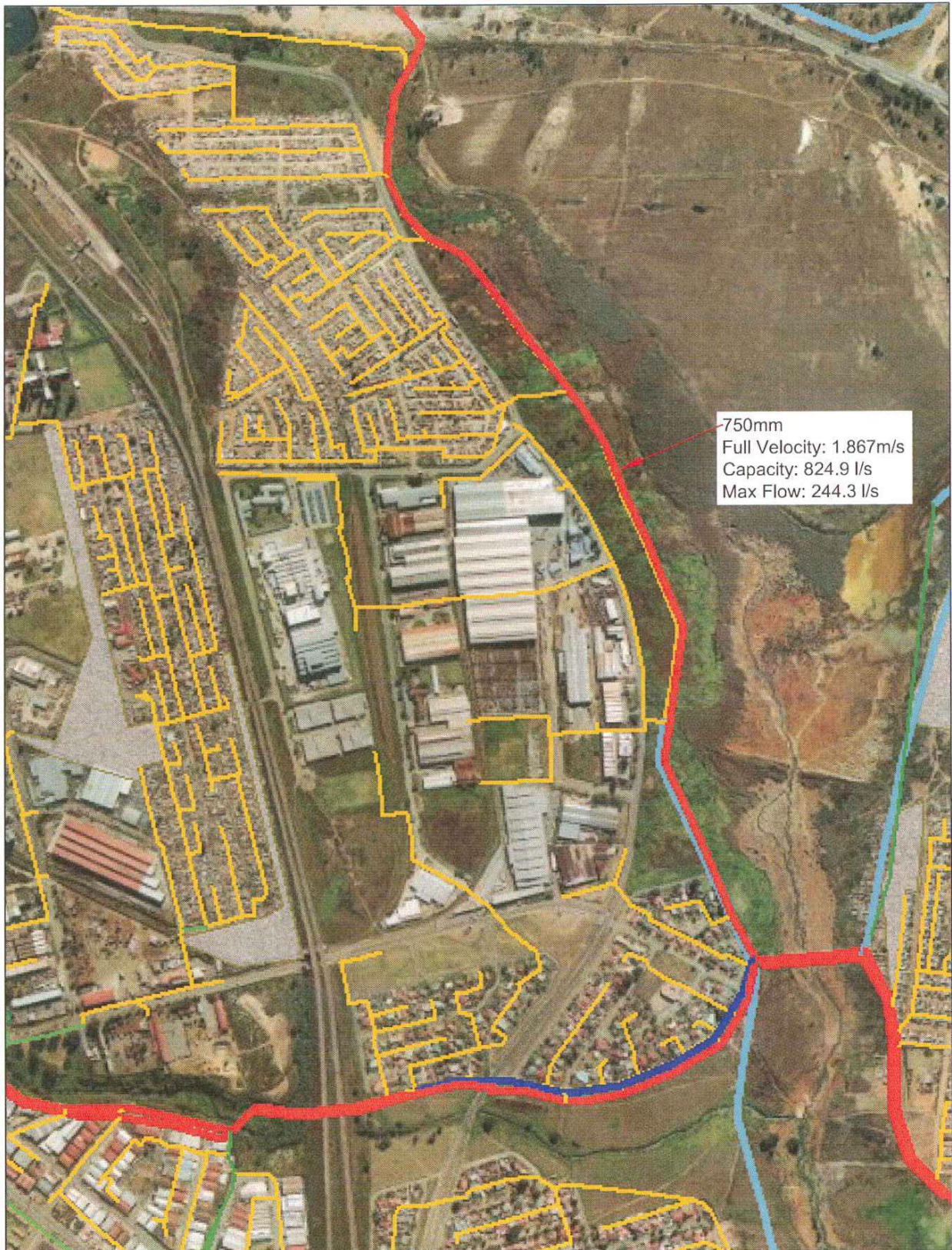
LOCALITY PLAN

WATER AND SEWERAGE CALCULATIONS

1372 - PTN193 of Farm Driefontein 87-IR

Water					
No Units	Type	Kl/erf	l/s	l/s (peak hour)	
900	Low Cost (< 500 m ²)	0.7	7.291666667	26.25	
Fire Safety					
Type	Total Fire Flow (l/s)	Flow at hydrant (l/s)	Min Pressure Fire (m)	Min Pressure rest of system (m)	
Low income single residential	15	15	8	5	
Sewer					
Units	Type	Kl/erf	l/s	l/s (peak hour)	
900	Res 1 (Up to 500 m ²)	0.6	6.25	14.375	

DRAWINGS



750mm
 Full Velocity: 1.867m/s
 Capacity: 824.9 l/s
 Max Flow: 244.3 l/s

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Ekurhuleni
 METROPOLITAN COUNCIL

SEWER SYSTEM:GERMISTON-WATERVAL
 DEKEMA RONDEBULT WWTP

NAME:

KUTALO STATION(SEWER)

NR:

193/87-IR
 103/87-IR



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Ekurhuleni
 METROPOLITAN COUNCIL

SEWER SYSTEM:GERMISTON-WATERVAL WWTP

NAME:

KUTALO STATION(SEWER)

NR:

193/87-IR
 103/87-IR



450mm
 Peak Flow 87.5l/s
 Peak Velocity 0.6m/s
 Static Head 60.5m
 Peak Head 36.6 m

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Ekurhuleni
 METROPOLITAN COUNCIL

WATER SYSTEM: GERMISTON PRIMROSE RESERVOIR/RUSSEL ROAD RESERVOIR

NAME:	NR:
KUTALO STATION(WATER)	193/87-IR 103/87-IR

BULK CONTRIBUTIONS & COSTS

ITEM	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
1	BULK WATER				
1.1	PIPEWORK 200mm pipes	m	650.00	320.00	R 208,000.00
1.2	Pipejacking	m	80.00	1700.00	R 136,000.00
	BULK SEWERAGE				
2	PIPEWORK				
2.1	200mm pipes	m	602.00	540.00	R 325,080.00
	ROADS AND STORMWATER				
3.1	Northern Access to res	m2	362.00	635.00	R 229,870.00
3.2	Southern Access to res	m2	442.00	635.00	R 280,670.00
3.3	Robot STORMWATER	each	1.00	350,000.00	R 350,000.00
3.4	Retention	m3	1875.00	90.00	R 168,750.00
3.5	450 mm pipes	m	60.00	720.00	R 43,200.00
	Total				R 1,741,570.00

2013

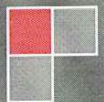
Civil Services Report

Development on Portion 161 of the farm
Driefontein 87-IR
Germiston

This report covers the water demand, sewerage handling, road network and stormwater management for the development on Portion 161 of the farm Driefontein 87-IR in Germiston.

Report Number 1373_RR01_Draft

Luleka Consulting Engineers
11/06/2013



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SCOPE

Luleka Consulting Engineers have been appointed as Consulting Engineers for the design and supervision of the following services:

- Water reticulation
- Sewerage reticulation
- Roads
- Stormwater

This report will cover the design principles and demand for the water reticulation, the sewerage reticulation, roads design standards and the stormwater management for portion 161 of the farm Driefontein 87-IR low cost housing development in Germiston. The traffic impact study is a separate study and will be done by others.

SITE DESCRIPTION

Locality

The proposed development is situated on the remainder extend of portion 161 of the Farm Driefontein 87-IR. The site is situated outside the urban edge as defined by Ekurhuleni Metropolitan Municipality but within the urban edge as defined by the Gauteng Province.



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The property is sized at 6.64 hectares.

The proposed development is fenced by the following:

- Power Street to the North.
- Jan Hofmeyer Street to the east.
- Strachan Street to the south.
- Jack Pienaar Street to the west.

Land Use

The proposed development will consist of the following components:

Size of Stands	Description	Number of Opportunities
	Residential (Existing)	288
	Residential	330
	Public Open Space	

Topography and Geology

The site drains gently from north-west to south-east. The average slope of the site is 1.36% from the high point towards the lowest corner.

The site has a very high water table which causes flooding of the existing basements. The site has a high built up area.

WATER RETICULATION

Existing Services

There is a water line on the southern part of the site. The line is 100 mm diameter with a peak flow and peak velocity of 7.3 l/s and 0.9 m/s respectively. The current static head is 68.5m with a peak head of 43.6 m. The existing water line forms part of the Germiston Primrose Reservoir/Russel Road Reservoir.

There is also a 200 mm diameter line going through the site with a static head of 66.8 m and peak head of 42.2 m which also forms part of the Germiston Primrose Reservoir/Russel Road Reservoir.

The northern part of the site has a 450 mm diameter line with a peak flow of 87.5 l/s and peak velocity of 0.6 m/s. This line is also part of the Germiston Primrose Reservoir/Russel Road Reservoir.

Design Standards

The following design guidelines were used to design the water reticulation for the proposed development:

- “Guidelines for the Provision of Engineering Services in Residential Townships” published by the department of Community Services.
- Developer’s Guideline to Installing Water and Sewerage Services in Ekurhuleni.
- SANS 1200 where applicable.

Materials

The materials for the proposed water reticulation will comply with the requirements of Ekurhuleni Metropolitan Municipality. The water pipelines will be constructed with Class 9 and class 12 (SABS 1283), uPVC material with cast iron fittings as required. Fire hydrants must comply with the latest requirements of SANS 10090 for the risk areas as defined.

All construction work will be done according to SANS 1200 and the requirements of Ekurhuleni Metropolitan Municipality. Testing and inspection of the pipe lines will be done to the standards as required by council.

The minimum cover to pipelines in road reserves will be 1000mm.

Water Flow Calculations

The new flows that were adopted by the Ekurhuleni Metropolitan Municipality in April 2011 were used to calculate the water demand for the development. A table can be found in the Appendix that summarizes the required demand.

Bulk Water Supply

The development will connect to the Germiston Primrose Reservoir/Russel Road Reservoir system. The capacity of the reservoir system must be verified by the Ekurhuleni Masterplanners, GLS.

The average annual daily demand for the proposed development can be calculated at 2.67 l/s. The additional peak flow for the development can be calculated as 9.625 l/s. A 200 mm connection is proposed from the existing 450 mm line. This will deliver sufficient water for the whole development. The line will also be sufficient to accommodate the required 33.025 l/s fire flow. This bulk supply will be handed over to Ekurhuleni Metropolitan Municipality after construction.

Internal Water Reticulation

The internal water reticulation will be designed to maintain a minimum head of 24 meters. The water pressure can drop to 5 meters under fire flow conditions.

SEWER RETICULATION

Existing Services

The site drains towards the Germiston-Waterval Dekema Rondebult sewer system.

There is a 150 mm diameter sewer line going through the site. The capacity of the line is 11.5 l/s.

The capacity of the outfall sewer and purification works must be verified by GLS.

Please refer to the attached drawing in the appendix for the positions of existing and new sewer lines.

Design Standards

The following design guidelines were used to design the water reticulation for the proposed development:

- “Guidelines for the Provision of Engineering Services in Residential Townships” published by the department of Community Services.
- Developer’s Guideline to Installing Water and Sewerage Services in Ekurhuleni.
- SANS 1200 where applicable.

Materials

The materials for the proposed sewerage reticulation will comply with the requirements of Ekurhuleni Metropolitan Municipality. The sewerage pipelines will be constructed with heavy duty Class 34 (SABS 791), uPVC material. All benching in the manholes will be constructed with vitrified clay channels and dolomite aggregate for the benching.

All construction work will be done according to SANS 1200 and the requirements of Ekurhuleni Metropolitan Municipality. Testing and inspection of the pipe lines will be done to the standards as required by Ekurhuleni.

The minimum cover to pipelines in road reserves will be 1200mm.

Sewerage Calculations

The newly adopted flows by Ekurhuleni Metropolitan Municipality were used to calculate the peak flows. A summary of these flows can be found in the appendix.

The minimum pipe diameter will be 160 uPVC with a minimum slope of 1:200.

Sewerage Reticulation

The sewerage reticulation will be taken over by the Ekurhuleni Metropolitan Municipality after construction.

The site drains from north to south. It is proposed that the development connects into the existing 150 mm diameter line in Jack Pienaar Street as the 150mm line going through the site does not have sufficient capacity.

ROAD NETWORK

Independent consulting engineers will do the detailed traffic impact study for the proposed development. The geometric design of the road network will be adjusted, if necessary, to accommodate the requirements of the traffic impact study.

Existing Road Network

The site is surrounded by the following road network:

Power Street: This road runs along the northern boundary of the site

Jan Hofmeyer Street: This road runs along the eastern boundary of the site.

Strachan Street: This road runs along the southern boundary of the site.

Jack Pienaar Street: This road runs along the western boundary of the site.

Design Standards

The following design guidelines were used to design the road network for the proposed development:

1. Guidelines for the provision of engineering services and amenities in residential township development by the National Housing Board (Blue Book).
2. Guidelines for human settlement planning and design (2000) compiled under patronage of the Department of Housing and published by the CSIR Building and Construction Technology (New Red Book).
3. Applicable SANS 1200 standards.

Access Roads

The Traffic Impact Study will cover the effect of the development and its impact on the external road network.

Northern Portion

Access to the northern portion of the development will be at an existing access point on Power Street to the east. See attached drawing. A double lane double line road is proposed for a short distance into the township to accommodate sufficient stacking at peak times.

Southern Portion

Strachan Street will be utilized for access from the southern boundary of the development at an existing access point.

The necessity of a second entrance in the south eastern corner of the site must be further investigated.

Internal Road Network

The internal road network will be a private road. The internal road network will consist of the following road widths:

Road Reserve	Road Width
16m	7.0m
13m	6.0m
10m	5.5m

The roads will be constructed with figure 8 mountable kerbs on both sides.

Taxi Rank

Taxi drop-off zones must be provided at the access points to the two portions on both sides of the PWV3 road.

STORMWATER MANAGEMENT

Guidelines

The following design standards will be applied for the civil services:

1. Guidelines for the provision of engineering services and amenities in residential township development by the National Housing Board (Blue Book).
2. Guidelines for human settlement planning and design (2000) compiled under patronage of the Department of Housing and published by the CSIR Building and Construction Technology (New Red Book).
3. Design guidelines by Ekurhuleni Metropolitan Municipality to limit flows.
4. Applicable SANS 1200 standards.

Design Methods

Stormwater can be analyzed by various methods. The following methods can be used to analyze the stormwater runoff:

- Rational method.
- Statistical methods.
- Deterministic methods.

The rational method is a manual design method based on empirical data and results in conservative answers. The analyzing of the stormwater catchment by statistical methods is not possible because no records exist of stormwater runoff in the area.

Various computer programs exist to analyze a stormwater catchment area with the deterministic method that uses unit hydrographs to calculate runoff hydrographs from the topology of the catchment area. Two well-known programs that are widely used are WITWAT (or Hydrosim) and ILLUDAS.

The ILLUDAS method, adjusted to South African conditions, will be used to determine the stormwater runoff.

Rainfall Parameters

The following rainfall parameters were used to simulate the design storm:

Mean Annual Precipitation:	700mm
Time to Peak ratio:	0.38
Depression Storage:	
Paved Areas:	3mm
Grassed Areas:	5mm
Horton's Infiltration parameters:	
Initial Infiltration:	20mm/h
Final Infiltration:	2mm/h
Decay constant:	5/h

Design Principles

Minor System

The internal stormwater network will be designed using a storm with a recurrence interval of 5 years. Where water can concentrate, the piped system will be designed for a 25 year storm.

Major System

The internal roads and paved area will be designed in combination with the minor system to handle a storm with a recurrence interval of 25 years. The 25 year storm will be discharged through the piped system and on the road surface.

Larger order storms will be handled as sheet flow over the area and discharged through the road reserve to lower lying areas.

STORMWATER INFRASTRUCTURE

Existing Infrastructure

There is an existing stormwater line that runs through Strachan Street which the development will connect into. The capacity of this line should also be verified.

New Stormwater System

It is a requirement from Ekurhuleni Metropolitan Municipality the stormwater runoff from the site must be retained in such a way that the runoff before development for a 5 year or a 25 year storm be retained after development to restrict the flows to values before development.

The drawing in the appendix indicates possible points on site where retention ponds must be constructed. These ponds must be constructed above the 100 year flood line and the discharge must be controlled.

Materials

The materials for the proposed stormwater reticulation will comply with the requirements of Ekurhuleni Metropolitan Municipality and SANS 1200.

Management of Stormwater During Construction

Stormwater will accumulate at low points during construction. This water will carry silts that can damage wetland areas when it concentrates on these areas. It is therefore essential to apply the following precautionary measures during the construction phase:

- Place excavation material on stream-up side of all trenches that will be excavated.
- Before stormwater trenches are excavated, the stormwater retention pond areas must first be prepared to accept stormwater during construction. This will then act as a stilling chamber in which any silts and waste will settle before the water can enter the wetland area.
- Roads can also concentrate stormwater towards the wetland areas. Before road construction, that leads to low lying areas can be constructed, the wetlands must be protected by construction of the retention pond areas to settle stormwater from construction.
- The retention pond areas must be maintained and cleaned during construction and be kept in a working order. After construction the ponds will be cleaned and protected by planting grass.
- Stormwater and sewerage lines must be constructed from the low point towards the high point to prevent accumulation of stormwater in the trenches.
- Particular care must be taken to prevent spillage of oils and fuel, especially around the onsite filling storage of diesel. Preventative measures must be in place if spillages should occur to prevent the spillage to enter trenches or road construction areas. The top layer of soil around the storage tanks must be stabilized with cement to establish an impermeable layer of soil. This must be removed after construction.
- The normal construction management of the site should be done to prevent environmental damage to the area during construction according to the environmental management plan prepared by the environmental consultant.

BULK CONTRIBUTIONS

The bulk contributions towards water and sewerage can be seen as calculated in the appendix. The services agreement must be negotiated with Ekurhuleni Municipality to determine the payment of bulk contributions and the construction of bulk services.

COSTS

The costs to service the development is summarized in the appendix.

CONCLUSION

From a services point of view, the proposed development can be serviced and therefore the development should be supported.

The following decisions must be taken by Ekurhuleni Metropolitan Municipality:

- To include Portion 161 of the farm Driefontein 87-IR into the urban edge.
- To connect directly into the Germiston Primrose Reservoir/Russel Road Reservoir supply line from Rand Water.
- To connect directly into the Germiston-Waterval Dekema Rondebult sewer system.

LOCALITY PLAN

WATER AND SEWERAGE CALCULATIONS

1373 - PTN161 of Farm Driefontein 87-IR

Water					
No Units	Type	Kl/erf	l/s	l/s (peak hour)	
618	Low Cost (< 500 m ²)	0.7	5.006944444	18.025	
Fire Safety					
Type	Total Fire Flow (l/s)	Flow at hydrant (l/s)	Min Pressure Fire (m)	Min Pressure rest of system (m)	
Low income single residential	15	15	8	5	
Sewer					
Units	Type	Kl/erf	l/s	l/s (peak hour)	
618	Res 1 (Up to 500 m ²)	0.6	4.291666667	11.1046875	

DRAWINGS



NOTES

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NOTE:
NOT FOR CONSTRUCTION PURPOSES.

LEGEND:
EXISTING STORMWATER LINE
NEW PROPOSED STORMWATER LINE
PROPOSED RETENTION DAM DATE

DIMENSIONS	
NO.	DESCRIPTION
1	1000
2	1000
3	1000
4	1000
5	1000
6	1000
7	1000
8	1000
9	1000
10	1000
11	1000
12	1000
13	1000
14	1000
15	1000
16	1000
17	1000
18	1000
19	1000
20	1000
21	1000
22	1000
23	1000
24	1000
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26	1000
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28	1000
29	1000
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31	1000
32	1000
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34	1000
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37	1000
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41	1000
42	1000
43	1000
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45	1000
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81	1000
82	1000
83	1000
84	1000
85	1000
86	1000
87	1000
88	1000
89	1000
90	1000
91	1000
92	1000
93	1000
94	1000
95	1000
96	1000
97	1000
98	1000
99	1000
100	1000

PTN 161
DRIEFONTEIN
87-IR

ROAD AND
STORMWATER LAYOUT

SCALE
1:750

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45 WEBBER ROAD DE WILDE
P.O. BOX 111111, SANDHURST, 2011 (JH) 1411
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DESIGN	DATE
REVISION	DATE
APPROVED	DATE
CONSULTING ENGINEER	DATE
CLIENT	DATE
PROJECT NO.	1373_01
SCALE	1:750
DATE	0



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NOTE:
NOT FOR CONSTRUCTION PURPOSES.

LEGEND

-  EXISTING 150mm Ø WATER LINE
-  EXISTING 150mm Ø SANITARY LINE
-  PROPOSED 150mm Ø WATER LINE
-  PROPOSED 150mm Ø SANITARY LINE

AMENDMENTS

NO.	DATE	DESCRIPTION

PTN 161
DRIEFONTEIN
87-IR

SEWER LAYOUT

SCALE: 1:750

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ISSUED		DATE	
DESIGNED		DATE	
APPROVED		DATE	
CONSULTING ENGINEER		DATE	
CLIENT			
PROJECT NO.	1373_03	REV.	0





450mm
 Peak Flow 87.5 l/s
 Peak Velocity 0.6 m/s
 Static Head 66.8 m
 Peak Head 42.2 m

200mm
 Peak Flow 0 l/s
 Peak Velocity 0.6 m/s
 Static Head 66.8m
 Peak Head 42.2m

100mm
 Peak Flow 7.3 l/s
 Peak Velocity 0.9 m/s
 Static Head 68.5 m
 Peak Head 43.6 m

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Ekurhuleni
 METROPOLITAN COUNCIL

**WATER SYSTEM:GERMISTON PRIMROSE
 RESERVOIR/RUSSEL ROAD RESERVOIR**

NAME:

KUTALO STATION(WATER)

NR:

193/87-IR
 103/87-IR



150mm
 Full velocity 11.5m/s
 Capacity 11.5l/s
 Max flow 0.1l/s

161/87-IR

LULEKA

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Ekurhuleni
 METROPOLITAN COUNCIL

SEWER SYSTEM: GERMISTON-WATERVAL
 DEKEMA RONDEBULT

NAME:

KUTALO STATION(SEWER)

NR:

193/87-IR
 103/87-IR

BULK CONTRIBUTIONS & COSTS

ITEM	DESCRIPTION	DESCRIPTION	UNIT	QUANTITY	RATE	AMOUNT
1		BULK WATER				
1.1		PIPEWORK 250mm pipes	m	89.00	280.00	R 24 920.00
1.2		Pipejacking	m	0.00	1700.00	R 0.00
2		BULK SEWERAGE				
2.1		PIPEWORK 160mm pipes	m	160.00	270.00	R 43 200.00
3		ROADS AND STORMWATER				
3.1		Northern Access to res	m2	486.00	400.00	R 194 400.00
3.2		Southern Access to res	m2	486.00	400.00	R 194 400.00
3.3		Robot STORMWATER	each	1.00	350 000.00	R 350 000.00
3.4		Retention	each	1.00	140 000.00	R 140 000.00
3.5		450 mm pipes	m	134.00	350.00	R 46 900.00
				Total		R 993 820.00