

PROPOSED DEVELOPMENT OF SPEKBOOM COMPLEX

ON ERF 4169 HUMANSDORP
Engineering Services feasibility Report

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SYNOPSIS

G Squared Project Management (Pty) Ltd T/A G² Architectural & Engineering has been appointed by Wamabla (Pty) Ltd to prepare an Engineering Services Feasibility report for a residential development situated on Erf 4169, Humansdorp. Baobab Consulting Engineers (Pty) Ltd was subsequently appointed to assist with the Engineering Service Feasibility report.

The purpose of the report is to provide an engineering assessment and feasibility report to provide civil services to the proposed development of the erf. The report can be used for application to Statutory Authorities and to initiate negotiations with the Kouga Municipality to ultimately conclude an Engineering Services Agreement between the Municipality and the Developer.

The following bulk civil services are being addressed in this engineering report:

- Water supply
- Sanitation
- Access roads
- Stormwater drainage
- Solid waste disposal

The report summarises available sources and solutions for each aspect listed above and concludes on feasibility of providing the service for the development.

The report concludes that all civil services to the proposed residential erven are feasible from a civil engineering standpoint.

PREPARED BY:



G GROBLER

For BAOBAB CONSULTING ENGINEERS

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1 INTRODUCTION

G Squared Project Management (Pty) Ltd T/A G² Architectural & Engineering has been appointed by Wamabla (Pty) Ltd to provide civil engineering consulting services for the proposed development of a on the ERF 4169 HUMANSDORP. Baobab Consulting Engineers (Pty) Ltd was subsequently appointed to assist with the Engineering Service Feasibility report.

The total area available for development is approximately 1.847ha to be sectioned as indicated on the layout prepared by Blackhound Architecture and Rendering (Pty) Ltd attached hereto as **Annexure 1: Site Development Plan**.

1.1 PURPOSE

The purpose of the report is to provide an engineering assessment and feasibility report for application to Statutory authorities.

1.2 OBJECTIVE

The objective is to provide overall technical feasibility for the provision of civil services to the development site as detailed in sections 1.3 and 1.4 below.

1.3 TERMS OF REFERENCE

The commission includes the following:

- Identify and asses existing civil engineering services available on-site
- Investigate the availability of municipal bulk services and facilitate negotiations with local authorities
- Make recommendations on applicable standards of bulk and internal services.
- Evaluate and assess layout plans with respect to the installation of effective services
- The report is based on available reports, industry and local knowledge, and discussions with the relevant municipal officials.

1.4 LEVEL OF SERVICES

This is classified as a low to middle income development and will therefore be serviced in line with the following minimum regulatory requirements:

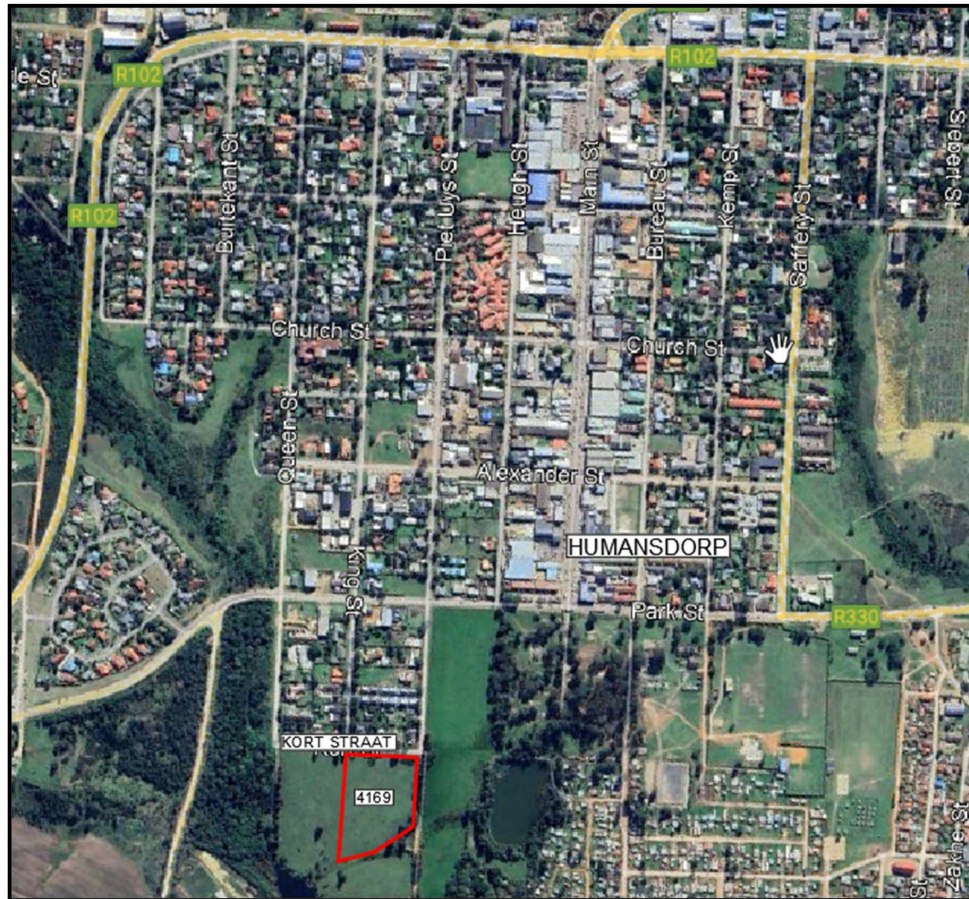
- The latest applicable National Building Regulations (NBR) in terms of the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977);
- The South African National Standards (SANS) which establishes general requirements as well as requirements that are "deemed to satisfy" the National Building Regulations;
- SANS 10400 – The application of the National Building Regulations;
- SANS 10400 A – General principles and requirements;
- SANS 10400 P – Sewer Drainage;
- SANS 10400 R – Stormwater;
- SANS 10400 T – Fire Protection;
- SANS 10400 W – Fire Installation;
- SANS 10252 – Water supply and drainage for buildings;
- Urban Transport Guidelines (UTG) 1-7

- The Neighbourhood Planning and Design Guide, 2019, also known as the “Red Book”;
- Kouga Local Municipality policies and by-laws

2 SITE DESCRIPTION

2.1 SITE LOCATION

The proposed development is located in Kort Street in Humansdorp as indicated in the Figure below.



2.2 SITE DEVELOPMENT PLAN AND DESCRIPTION

The site development plan was prepared by G² Architectural & Engineering (Pty) Ltd in joint venture with Blackhound Architecture and Rendering (Pty) Ltd and is attached hereto as **Annexure 1: Site Development Plan**.

Kort street runs along the northern boundary of the site from where access can be provided.

The proposed development on Erf 4169 (Portion of Erf 3280) would consist of 128 units of varying sizes; 40 -1-bedroom, 1 bathroom apartments, 72 -2-bedroom, 1 bathroom apartments, and 16 3 bedroom, 2 bathroom apartments, refuse area ($\pm 17\text{m}^2$) and a Guard house ($\pm 25\text{m}^2$). The dwelling units (du) are all double storey semi-detached units. The site covers $18\,456\text{m}^2$, with a

new building footprint of 3744m². A total of 289 parking spaces are required, consisting of 256 spaces for dwelling units and 32 spaces for visitors.

2.3 ZONING AND LANDUSE

The proposed site is indicated on erf diagram 2019/2005 and attached hereto as **Annexure 2.1: Surveyor General Diagram**. The site covers an area of 1.847 ha and is zoned as “Residential Zone 3” according to the Kouga Municipality Land Use Scheme as indicated in **Annexure 2.2: Town Planning Approval**.

2.4 DESIGN POPULATION

The occupancy of any building on a property is classified in terms of SANS 10400 A, reg A20 (Table 1), and in the case of erf 2742 the following classification is applicable:

H3 – Domestic Residence – Occupancy consisting of two or more dwelling units on a single site
– **2 persons per bedroom**

The number of persons occupying the building is determined according to the design population in terms of SANS 10400 A, Reg A21 (Table 2).

2.5 TOPOGRAPHICAL INFORMATION

A survey of the site was conducted by Allen Nicholson Surveyor surveyors in June 2024 indicating 0.5m contours and existing buildings and services information indicated in **Annexure 3: Topographical Survey**. The topography of the study area is characterised by a gentle gradient of 7.04% from the north-eastern corner of the site to the south-western corner.

The southern site boundary connects to an existing waterbody to where the landform naturally drains.

The site covers an area of 1.847ha with the highest and lowest point of the site being 110m and 95m amsl respectively. This is over the site length of 213m and therefore the average gradient of the site is 7.04%. The site is covered with grass and a few isolated large trees. There are no services on-site and no existing buildings.



Figure 2: Site Topography

2.6 GEOTECHNICAL INFORMATION

It is recommended that a geotechnical investigation is undertaken before preliminary and detail design of civil infrastructure commences.

2.7 ENVIRONMENTAL

An Environmental Authorisation (EA) has been obtained for this development on the 08 August 2024. Section 3 of the authorisation covers several conditions of which the following is considered to be relevant to this document:

- Demarcation of the no-go areas as Open Space
- No development / infrastructure to be located within the 10m buffer around the drainage line and the 1:100 flood line;
- Water efficient fixtures such as low-flow cisterns, low flow shower heads or taps;
- Provision of rainwater tanks, with piping connected to the building with at least 5 Kl storage, to be provided for each building.
- Comprehensive stormwater management plan to manage stormwater during the operation phase of the development inclusive of measures to prevent any debris or other solid waste from entering any of the wetlands / water courses.
- Homeowners Association to be established for the operational phase of the development to which all internal services will be handed over, operated and maintained.

The complete EA is attached to this document as **Annexure 4: Environmental Authorisation**.

3 CIVIL ENGINEERING SERVICES

The following bulk civil services are being addressed in this engineering report:

- Water supply
- Sanitation
- Access roads
- Stormwater drainage
- Solid waste disposal

Civil engineering services refer to infrastructure installed from source or erf boundary up to a point within 1m of the buildings. At this point, mechanical, electrical and plumbing (MEP), along with other relevant professionals, connect their systems to the civil services.

Bulk servicing feasibility will be based on the latest Site Development Plan annexed to this report in **Annexure 1: Site Development Plan**.

3.1 WATER SYSTEM

The Kouga Municipality serves as the water authority for the area in which the development is located. Humansdorp sources raw water from various fountains and boreholes in the vicinity of the town. The water is treated and stored in a reservoir located north of Humansdorp adjacent to Bosbok street at approximately 185m amsl. This area has been plagued with pressure and supply issues during peak seasons, but the main reason being shortage of water sources as opposed to restrictions within the reticulation network. The municipality is currently busy with the construction of a new bulk pipeline from the reservoir to Park street to provide Kwanozamo with a dedicated supply and alleviate current system constraints and improve water supply in the

There will be a total of three water pipelines running along Park street located approximately 250m north of the proposed development.

domestic metered water connection as indicated in **Annexure 5: Water Layout Plan**

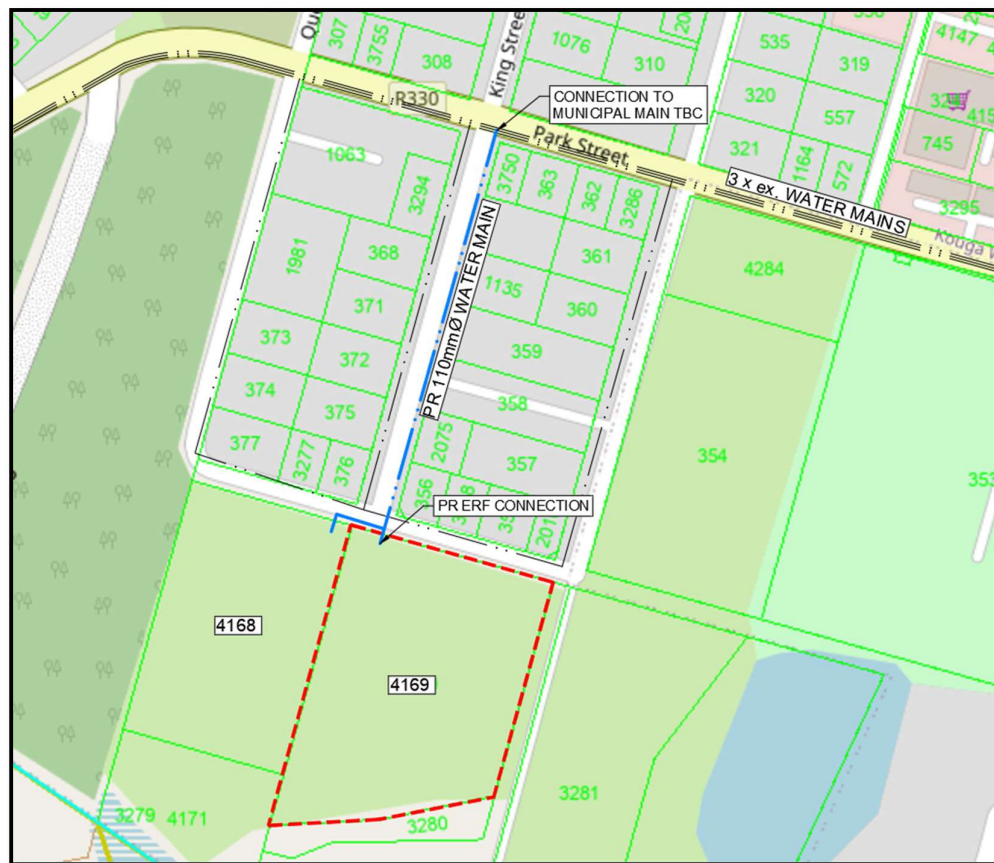


Figure 3: Proposed Bulk Water Connection

3.1.1 WATER SUPPLY DESIGN PARAMETERS

General	Service Standards	Design Parameter
1.1	Level of service	Level 4 – on-site reticulation
1.2	Fire Risk (J17 and J18)	Moderate risk – 25 l /s for 1hr.
1.3	Fire Load	Low fire load
Design Parameter		
2.1	1 Bedroom apartment	350 l /unit/day GL, 300 l /unit/day FL
2.2	2 bedroom apartment	400 l /unit/day GL, 350 l /unit/day FL
2.3	3 bedroom apartment	450 l /unit/day GL, 400 l /unit/day FL
2.4	Instantaneous peak factor	3
2.5	Daily peak factor	1,4
2.6	Flow at fire hydrants	1500 l/min (25 l/s)
2.7	Duration of fire flow	2 hours
2.8	Minimum pressure head in network – peak flow	20 m (2,0 bar)
2.9	Minimum pressure head at a fire hose reel	30 m (3,0 bar)
2.10	Max. pressure head	90 m
2.11	Max. spacing of fire hydrants	180 m apart (90m reach)
2.12	Fire Hose Reels	1 Hose Reel per 500m ² (n/a)
2.13	Isolation valve spacing	To allow for isolation of sections of maximum 600m
		* As per Red Book 2019, Table J.2
Materials (Sizes and type)		
3.1	Minimum pipe diameter	50 mm
3.2	Pipe type and class	uPVC (class 9) and HDPE
3.3	Fire Hydrant	Fire department to approve detail
3.4	Valve type	Waterworks, Clockwise closing
Construction Parameters		
4.1	Minimum cover to pipes	800 mm
4.2	Min. cover at road crossings	1 000 mm
4.3	Erf connections	20 mm

3.1.2 WATER DEMAND

The table below indicates the water usage as prescribed in the Neighbourhood Planning Guideline 2019 (The Red Book). An internal Potable water reticulation will be installed to which individual properties will be connected. Fire hydrants will also be connected to this reticulation. The demand parameters as set out in table J2 for Group/cluster housing of high density is used to calculate the demand at the proposed development.

Table J.2: Recommended unit Average Annual Daily Demands						
Land use		Density #1 units/ha	Stand size #1 m ²	Unit of measure	Water demand (AADD)	
					kl/ ha/d #1	kl/unit/d #3
Group/cluster housing	High density	60 to 40	130 to 200	kl/unit	21	0.40 to 0.45
	Medium density	40 to 30	200 to 270	kl/unit	17	0.45 to 0.50
	Low density	30 to 20	270 to 400	kl/unit	14	0.50 to 0.60
Flats	Very high density	100 to 80	80 to 100	kl/unit	25	0.25 to 0.30
	High density	80 to 60	100 to 130	kl/unit	23	0.30 to 0.35
	Medium density	60 to 50	130 to 160	kl/unit	21	0.35 to 0.40
	Low density	50 to 40	160 to 200	kl/unit	19	0.40 to 0.45

Figure 4: Red Book Table J2 AADD

The table below is a summary of the water demand calculations for the proposed development and shows that the resultant water **Equivalent Erven (EE)** is 46.8.

	Unit s	AADD [m ³ /d/u nit]	Potable water [m ³ /d]	Daily Peak Factor – 1.4 [l/s]	Instantan eous peak Factor – 3 [l/s]
1-bedroom apartment ground level	20	350	7.00	0.081	0.243
1-bedroom apartment First floor	20	300	6.00	0.069	0.208
2-bedroom apartment Gound level	36	400	14.40	0.166	0.500
First Floor	36	350	12..60	0.145	0.437
3-bedroom apartment ground level	8	450	3.60	0.041	0.125
3-bedroom apartment first floor	8	400	3.20	0.037	0.111
TOTAL [m³/day]			46.8	0.75	1.625

3.1.3 FIRE WATER DEMAND

The development can be classified as a Moderate-Risk risk area as set out in Table J.17 of the "Red book". Although the separate building footprints are less than 500m² the upper level units share a common access staircase. SANS 10400 T therefore requires a hose reel at each building for H3 occupancy. The following requirements therefore apply:

Design fire flow (J17)	=	1 x hydrant
	=	2 x hose reels
	=	25l/s + 1l/s
	=	26l/s
Duration of fire flow (J18)	=	2h
Storage required	=	187.2kl

The storage of firewater is required at the Kouga Municipality bulk storage facility.

The existing municipal water reticulation has various fire hydrants connected to it in the vicinity of the development. The closest being located approximately 150m away in Queen street.



Figure 5: Existing Fire hydrant



Figure 6: Existing Firehydrant Layout

It is proposed that fire hydrants be connected to a separate fire water main with a pipe servicing such installation shall not be less than 75mm and of minimum class 16. The new hydrants shall be as per the existing hydrants indicated in the figure above or as required by the fire department. The spacing of hydrants inside of the complex is indicated in **Annexure 5: Water Layout Plan** and shall not exceed a 90m radius. The hydrant connection should be 75mm quick couplings as guided by the Kouga Fire Department. Each block of units will have a 32mm hose reel saddled to the fire main on the first floor and 2 x fire extinguishers in a locked cabinet on the ground floor.

3.1.4 ESTIMATED WATER DEMAND SUMMARY

The required water demand for the Development can be summarised as follow:

	Potable Water
AADD volume [per day]	46.8 kL/d
AADD Volume [per annum]	17 082 m ³ /a
AADD flow	0.542 l/s
Daily Peak [1.4 x AADD]	0.758 l/s
Instantaneous Peak [3 x AADD]	1.625 l/s
Add Fire Fighting Peak	26.0 l/s
Total Peak Flow	27.625 l/s
Bulk storage required [2 x AADD]	93.60kL

The main supply line from the source to the development should be able to supply at a rate equal to the daily peak and the internal distribution main must be able to supply at a rate equal to the instantaneous peak. A 110mm class 12 incoming main with an 80mm combination water meter will therefore suffice for this development. The internal reticulation is proposed to be a 75mm class 12 ring main to which individual 50mm erf connections are saddled for each block of units.

3.2 SEWAGE SYSTEM

The Kouga Municipality is the water authority for the area of the proposed development. There is an existing sewage pumpstation adjacent to erf 4168 called, Queen Street Pump Station. The Queen Street Pumpstation collects sewage from the central town area and pumps it to a



Figure 7: Existing Queen Street Pumpstation

manhole at the watershed, from where it flows to the Kwanozamo Wastewater Treatment Works. The Kwanozamo wastewater treatment works is currently being repaired and upgraded by the Kouga Municipality and is expected to be completed at the end of June 2025.

3.2.1 SEWAGE DESIGN PARAMETERS

General	Service Standards	Design Parameter
1.1	Average daily discharge – residential 1 bedroom	315 l /unit/day GL, 300 l /unit/day FL
1.2	Average daily discharge – residential 2 bedroom	360 l /unit/day GL, 350 l /unit/day FL
1.3	Average daily discharge – residential 3 bedroom	405 l /unit/day GL, 400 l /unit/day FL
1.4	Peak flow factor (residential)	2,5
	(Peak flow rates in sewers applicable only to residential and not to commercial units)	
1.5	Hydraulic design	Manning flow formula to determine the flow velocity and pipe capacity
1.6	n-value	0,011
1.7	Minimum grade	1:80
1.8	Minimum flow velocity	0,60m/s
1.9	Manholes to be provided	At all direction changes of the pipelines
1.10	Maximum direction changes at manholes	90°
1.11	Maximum distance between manholes	60m
1.12	Minimum cover (other than road reserve)	800mm
1.13	Minimum cover road reserves	1200mm below road level
1.14	Cover for house connections	300 – 800mm
1.15	Manhole size – depth ≤ 2,0m	1000mm diameter
1.16	Manhole size – depth > 2,0m	1500mm diameter

3.2.2 SEWAGE DESIGN FLOWS

The table below is a summary of the sewage discharge calculation for erf 4168 and shows a total sanitation Equivalent Erven (EE) to be 44.3.

ERF	Units	Sewage Annual Average Daily Demand	ADDWF Total [kl/d]	ADDWF Total [l/s]	Plus, Peak factor [2.5] – PDWFF	PDWFF + 100% SW infiltration [l/s] – PWWFF
1 bedroom Apartment ground floor	20	350	7.0	0.081	0.182	0.405
1 bedroom Apartment first floor	20	300	6	0.069	0.174	0.347
2 bedroom Apartment ground floor	36	400	14.4	0.166	0.417	0.833
2 bedroom Apartment first floor	36	350	12.6	0.146	0.365	0.729
3 bedroom Apartment ground floor	8	450	3.6	0.041	0.104	0.208
3 bedroom Apartment first floor	8	400	3.2	0.037	0.093	0.185
			46.8	0.513	1.354	2.708

3.2.3 SEWAGE DISPOSAL

The internal sewage reticulation will be designed as a gravity system leading to the Queen Street Sewage Pumpstation. Allowance have been made on erf 4168 for a 4m servitude to allow erf 4169 to connect to the Queen street pump station by crossing through erf 4168. A single **160mm-diameter** pipe connection to an existing municipal sewer pipeline is proposed by construction of a new manhole at the connection point. The invert level of the pipe is not currently known and will only be determined and finalised during construction. The level is estimated to be 94.2m amsl. The pumpstation sump invert level indicated on the Sewage Capacity analysis is 91.05m amsl. It is proposed that an additional disconnection manhole is constructed inside of the proposed development before the connection into the municipal system. The proposed reticulation layout is detailed in **Annexure 6: Sewer Layout Plan**.

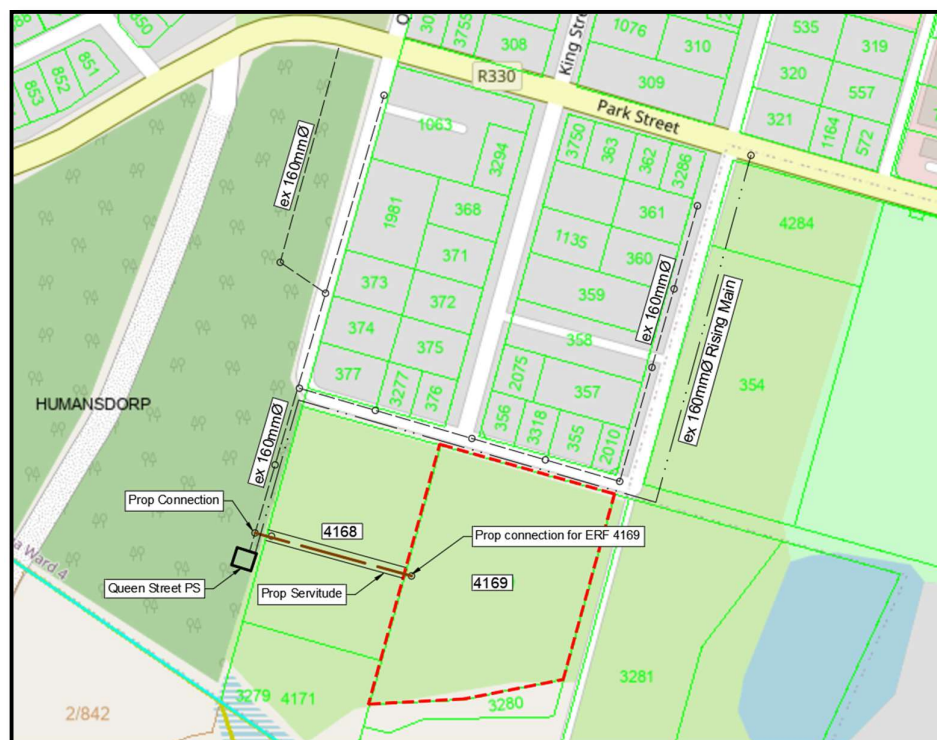


Figure 8: Bulk Sewer Connection

The invert level of the connection point must be verified during construction. If it is determined that not all units can gravitate successfully to the connection point, those unable to do so will be connected to a small onsite pump station. This pump station will then convey the flow to the gravity collector sewer, which ultimately discharges into the Queen Street Pump Station.

3.2.4 SEWAGE PUMPSTATION

A sewer capacity assessment report was conducted by Uhambiso Consult (Pty) Ltd on the existing Queen Street sewage pumpstation as indicated in **Annexure 7: Sewer Capacity Assessment**. The assessment was conducted to check if the pumpstation has sufficient capacity to accommodate the additional demand from the proposed development of erf 4168 and 4169.

The Queen Street Pumpstation, located off Queen Street in Humansdorp, collects sewage from the central town area and pumps it to a manhole at the watershed, from where it flows to the Kwanozamo Wastewater Treatment Works. The infrastructure includes two sumps, one of which is unused and covered by a plastered building, as well as a 625m-long, 160mm-diameter rising

main. The pumpstation has been vandalized, and the Kouga Municipality plans to reinstate its Mechanical and Electrical components. The pump to be reinstated is a Gorman-Rupp V3A-B, operating at 2000–2050 RPM, with a static head of 26.65m. Its operational duty point is 53.9m³/h (15 l/s) at a total pumping height of 28.8m, with a flow velocity of 0.74 m/s in the rising main, which has spare capacity to increase flow to 30 l/s, reaching a velocity of 1.5 m/s.

The existing daily inflow that the Queen Street Pumpstation is handling is approximately 89.64m³/day as outlined in the assessment report. To enable the new development connection to the pumpstation the pumpstation needs to be able to accommodate additional daily inflow of 46.8m³/day at a peak inflow of 2.708l/s.

4-hour emergency storage of AADWF is required at the pumpstation. The existing sump size and emergency overflow is not known at this stage and could be something that requires upgrading to enable further inflow to the pumpstation. There is currently also no back up power supply at the pump station.

The Assessment reports concludes that the pumpstation will be able to accommodate the new development/s with the following recommendations outlined in the capacity assessment report:

- Upgrade the duty pump and add adequate standby capacity.
- Install a telemetry system to monitor inflow, sump levels and pump operation.
- Determine if an upgrade to the sump capacity is required for operational and emergency conditions

3.3 ROADS AND ACCESS

3.3.1 Design Vehicle

The design vehicles for the complex are selected as a standard passenger vehicle ranging from passenger vehicles, SUV's, bakkies and sports cars for the parking areas. The driveways can be accessed with a maximum size 8 ton truck. The driveways will therefore be sufficient for small moving/furniture trucks while also allowing for a vacuum tanker to access the low laying pumpstation in the complex should the need arise.

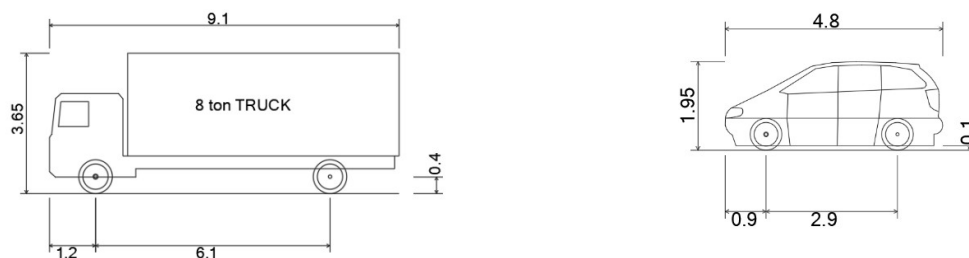


Figure 9: Design Vehicles

3.3.2 Geometric Design Parameters

The geometric and pavement designs of the roads and parking areas will be done in accordance with the “The Neighbourhood Planning and Design Guide” – Section I and Urban Transport Guideline (UTG) 7.

Roads Design Parameters	
Design Parameter:	
Category road	Class 5 (access street)
Design speed	Max speed 20 km/h
Surface	Interlocking concrete paving bricks
Pavement design	Layerworks tbc following geotechnical investigation
Maximum gradient	12%
Minimum gradient	0.6%
Cut and Fill Slopes	Cut and fill slope min 1:2.5m
Vertical curves:	
K-Value Crest	Target 1, but accessible to design vehicles
K-Value SAG	Target 1, but accessible to design vehicles
Stopping Sight Distance	40m
Horizontal curves:	
Maximum deflection	90°
Minimum radius	15m
Kerbing	Figure 3 & 8 kerbs
Parking requirements	As specified in the SDP and TIA

3.3.3 Access

A Traffic Impact Study was conducted by Engineering Advice and Services (EAS), which assessed the access arrangements and traffic flow impacts. The findings and recommendations are detailed in **Annexure 8 : Traffic Impact Assessment**. Access to Erf 4169 will be provided via Kort Street and will feature an access-controlled entrance to manage vehicle movement. The access point must have two entry lanes, with a security gate set back a minimum of 12 meters from the road edge to allow space for vehicle queuing. During peak hours, an estimated 67 vehicles will enter the development, requiring storage for at least one vehicle length between the boom gate and the road edge. The service flow rate for manual recording, such as visitor form completion, is 80 vehicles per hour. Kort Street, classified as a Class 5 residential road, provides access to surrounding properties but is currently in poor condition, which may require future maintenance or upgrades.

The current Site Development Plan (SDP) proposes an 8m-wide main access road, extending inward from the road edge, with a 20m setback to the access control point. The section between the property boundary and the existing road edge will be widened to 15.5m, incorporating a 3.3m radius bell mouth either side to seamlessly tie into the existing kerb line and facilitate off street access to the refuse yard.

The internal road network and parking is indicated on the SDF **Annexure 1: Site Development Plan**.

4 : SOLID WASTE HANDLING

4.1.1 SOLID WASTE GENERATION

The typical general waste composition for domestic use as guided by Section M of the Neighbourhood Planning Guidelines.

WASTE TYPE	RATIO
Organic	8%
Garden	16%
Metal	6%
Plastic	10%
Paper and cardboard	18%
Glass	9%
Unrecoverable	33%

The estimated total waste generated is summarised in the table below:

Waste	People	Demand [kg/c/d]	Total Weight [kg/d]	Refuse Containers	240l Wheelie Bins
1 bedroom	40 x 2 = 80	0.41kg/c/d	32.8 kg	1.5 Containers	6.4 bins
2 bedroom	72 x 3 = 216	0.41kg/c/d	88.56 kg	4.1 Containers	17.2 bins
3 bedroom	16 x 5 = 80	0.41kg/c/d	32.8 kg	1.5 Containers	6.4 bins
			154.16 kg/d	7 Containers	30 Bins

The temporary storage is calculated for 7 day storage.

4.1.2 SOLID WASTE HANDLING

It is proposed that solid waste is stored in a refuse building complying with the Kouga Municipality guidelines. The refuse room should be big enough to comfortably store 7 x 1m³ galvanized steel

containers on wheels or 30 wheelie bins and will be situated next to Kort Street as indicated in **Annexure 1: Site Development Plan**.

120, 140 or 240 l mobile refuse bins (wheelie bins)	- Domestic/household - Small business and industry - Public amenities		Rear-end loading compactors with special lifting equipment
1.0 and 1.2 m ³ mobile refuse containers	Small business and industry		Rear-end loading or front-end loading compactors with special lifting equipment

Figure 10: Refuse Storage Containers

The refuse is proposed to be collected once a week by the Municipality. The refuse room will be accessible from Kort Street. Applicable development charges will be raised by the Municipality to accommodate the additional demand.

4.2 : STORMWATER MANAGEMENT

A stormwater management plan for Erf 4169 was prepared by Baobab Consulting Engineers (Pty) Ltd as indicated in **Annexure 9: Stormwater Management Plan** and summarised below.

The Stormwater Management Plan (SMP) for Erf 4169, Humansdorp, ensures compliance with municipal regulations by integrating Sustainable Urban Drainage Systems (SuDS) and conventional stormwater management methods to minimize runoff impacts, prevent flooding, and improve water quality. Pre-development conditions include natural grass cover with no formal drainage, where runoff currently flows to the south-west corner, collecting in an existing stormwater channel and dam. The development will increase impervious surfaces to 68%, necessitating stormwater detention measures such as detention ponds (195m³ combined capacity), rainwater harvesting tanks and vegetated areas. A controlled outlet system, including a 300mm concrete pipe at a 1% gradient, will manage outflows to an existing dam. The 1:5-year storm event will be managed within detention facilities, while the 1:50-year event will be mitigated to prevent damage, and the 1:100-year event will be accommodated via designated overland flow paths. Stormwater runoff will be directed through stormwater grid inlets and grass-lined drainage channels, reducing erosion and pollution, with targeted reductions of 80% in suspended solids and 45% in total phosphorus. Long-term maintenance, including cleaning of stormwater pipes, silt traps, and vegetation, will be the responsibility of the developer or Homeowners' Association (HOA). With these measures in place, the SMP effectively mitigates flood risks, enhances water quality, and ensures sustainable stormwater management while protecting adjacent and downstream properties.

5 AUGMENTATION FEES

With reference to section 3.1.2 above an EE of 44.3 would be applicable for calculation of the augmentation fees. In terms of the Kouga Tariffs Policy the EE for water is used for all services, except for electricity. The tariffs indicated in the table below are VAT inclusive and are obtained from the Kouga Tariffs Fina 2024/25 document that is available from their website.

SPEKBOOM COMPLEX ERF 4169 – Augmentation Fees (incl. VAT)			
Augmentation Fees	Tarif / EE	EE	Augmentation Fee
<i>Roads and Stormwater</i>	R 6 110,00	46.8	R 285 948.00
<i>Sewage</i>	R 30 273,00	46.8	R 1 416 776.40
<i>Water</i>	R 29 481,00	46.8	R 1 379 710.80
<i>Refuse</i>	R 2 975,00	46.8	R 139 230.00
Total Augmentation Fees for Civil Services			R 3 221 665.20

Note: The Augmentation Fees is an estimate and the final account will be prepared by the Kouga Municipality. The above does not deal with augmentation fees for electricity, which must be dealt with separately.

6 RECOMMENDATIONS

It is recommended that:

- The design criteria, materials and methods of construction mentioned in the report above be accepted.
- That stormwater management plan as set out in Annexure 9 be accepted
- The potable water connection is finalised, but in principle agreed that it can be connected to one of the existing pipelines in Park Road.
- That a servitude is registered in favour of erf 4169 through erf 4168 to allow a gravity sewer to pass through to the Queen Street pumpstation.
- That the Queen Street pumpstation is upgraded as per recommendations of Annexure 7.
- That an environmental consultant and/or water specialist reviews the scope in this document and confirms statutory requirements and compliance.
- That an Engineering Services Agreement is concluded between the Kouga Municipality and the Developer
- Bulk augmentation fees are agreed with the Kouga Municipality in the Engineering Services Agreement and payment be made to the Municipality.

7 SUMMARY AND CONCLUSION

The Engineering Services Feasibility Report for Erf 4169, Humansdorp, assesses the provision of civil services, including water supply, sewage, stormwater drainage, roads, and solid waste management, for a 128-unit residential development. The 1.847 ha site, located in Kort Street, will be connected to municipal water mains in Park Street, with an estimated potable water demand of 48.73 kL/day. Fire hydrants will be installed at 90m intervals, ensuring compliance with fire safety standards. Sewage disposal will rely on the Queen Street Pump Station, with a required servitude through Erf 4168 to facilitate gravity-fed drainage. The stormwater management system incorporates Sustainable Urban Drainage Systems (SuDS), including detention ponds (195m³ combined capacity), rainwater harvesting tanks, and vegetated swales, ensuring compliance with flood mitigation requirements. Access to the development will be through Kort Street, featuring an access-controlled entrance with a 20m security gate setback for vehicle queuing. A Traffic Impact Study highlights potential strain on Kort Street, which is currently in poor condition, but no municipal upgrades are proposed. Solid waste management includes a refuse area near Kort Street, with 30 wheelie bins for weekly municipal collection. Augmentation fees for

roads, sewage, water, and refuse services are estimated at R3.05 million, pending final municipal approval.

We hold ourselves available to discuss this report further.

G GROBLER

BAOBAB CONSULTING ENGINEERS

Annexure 1 – Site Development Plan

Annexure 2 – Town Planning

Annexure 2.1 – Surveyor General Diagram

Annexure 2.2 – Spatial Planning and Land Use Management Act (SPLUMA) Approval

Annexure 3 – Topographical Survey and Existing Services

Annexure 4 – Environmental Authorisation (EA)

Annexure 5 – Internal Water Reticulation Plan

Annexure 6 – Internal Sewer Reticulation Plan

Annexure 7 – Queen Street Sewer Pumpstation Capacity Assessment – July 2024

Annexure 8 – Traffic Impact Assessment

Annexure 9 – Stormwater Management Plan