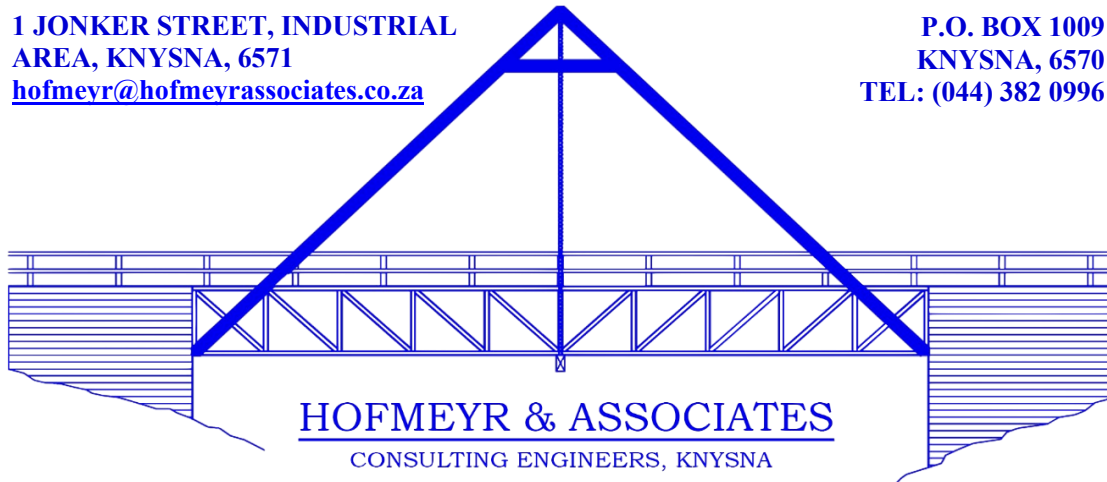


REPORT ON CIVIL ENGINEERING SERVICES

FOR THE PROPOSED CAUSEWAY CAFE ON ERF 1746, FLAMINGO AVENUE, SEDGEFIELD

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29 April 2026

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- Annexure B: Proposed Civil Services Layout – 26-14-001 (P)

1. Introduction

1.1. Background

Hofmeyr and Associates (Pty) Ltd was appointed by Natural Purpose (NPC) to compile a Civil Engineering Services Report for the proposed Causeway Café, Erf 1746, Flamingo Avenue, Sedgefield. The proposed development falls within the Knysna Municipality jurisdiction.

There is an existing restaurant and existing garage / storage area on the property. Current available services are a water connection and electrical connection. There is no sewer connection. The property is serviced by a septic tank system.

1.2. Proposed Development

The erf is approximately 1 950m² in extent and is situated South of the SuperSpar Mall in Sedgefield. The proposed development is for an 80-seater restaurant, office and retail space, a studio and managers' accommodation.

The proposed Site Development Plan (SDP) prepared by Michael Magner Architect in collaboration with Diamond Designs as indicated in **Annexure A**. The SDP shows the full extent of the proposed development with all the various components.

The proposed development will be phased. The initial phase will only be the restaurant (ground floor) with the offices / retail etc to be constructed at a later stage. Thus, the initial demand for the development will be approximately 80% of the estimated demands for water, sewer and solid waste.

The Guidelines for Human Settlement Planning and Design, 2004, herein after referred to as the "Red Book 2004" has been used to calculate the demand of the development for the various services.

Matters dealt with within this report include water supply, sewage management, access and internal roads, stormwater management and solid waste management, electrical reticulation and communication ducts.

2. General Information

2.1. Topography and Vegetation

The terrain is characterized by even topography with slight to moderate slopes that slope down away from Flamingo Avenue towards the open space (South) between Sedgefield Lagoon / Swartvlei and the property. The lagoon is approx. 40m away from the property border. The proposed structures are positioned away from the moderate slopes.

There are several large trees on the site. No trees have been identified to be removed and thus will be incorporated in within the proposed development.

2.2. Geotechnical Investigation

A geotechnical investigation has not yet been done on this specific property, and we recommend that one be conducted once approval has been given for the proposed Development.

The geotechnical information will be used for the design of the parking area, pipelines, and foundations for buildings.

3. Water Supply

3.1. Water Availability, Existing Reticulation and Storage

The GLS-Element (2014) Water Master Plan for Sedgefield indicates a pipeline between 65 and 75mm diameter. This line tees off a 110mm dia. line to the West of the property at the corner of Flamingo Ave and Swan Str.

The static pressure in the area, according to the master plan, is between 6 and 9 bar which should be more than sufficient to supply the proposed development.

3.2. Annual Average Daily Water Demand

The water demands are taken from the Red Book (2004) and are shown in Table 1 below.

Table 1: Total Water Demand

Ref:	Facility Type	Unit of Measurement	no. of units	Peak Daily Demand	Daily Demand
				litres/unit/day	l/day
A	Restaurant	No. of seats	80seats	80*	6 400
B	Managers Accommodation	erf size	37.3m ²	700 [#]	700
C	Retail & Office Space	Per 100m ²	240m ²	400**	960
	TOTAL WATER DEMAND (KL/DAY)				8.06 kl/day

* The water demand is between 65 and 90 l/seat/day.

The water demand is between 600 and 1200 l/day based on an erf size of up to 600m².

** The water demand is between 400 l/day per 100m² of gross floor area.

The total water demand, excluding irrigation and firefighting, is estimated at 8.1 kl/day. The fire fighting and irrigation requirements are discussed below.

Firefighting Water

The proposed buildings are all less than 400 m² and will not be more than 2 storey building. Further, the risk of fire and spread of fire is low. Therefore, the proposed development falls under the low-risk - group 1 fire category.

To summarize tables 9.18, 9.19 and 9.20 of the Red Book, the flow rate, fire flow duration, pressure requirements and the required storage are provided in the table below.

Table 2: Requirements of Fire Risk Categories

Fire Risk Category	Min. Flow Rate	Duration of Fire Flow	Pressure	Storage
Low-Risk – Group 1	15 l/s	2 hrs	7 m	108 kl

We recommend that the Fire Risk Category be confirmed with the Knysna Municipality Fire Department and/or with a fire engineer before commencement of the project.

We propose the installation of fire hose reels and fire extinguishers. The fire engineer to specify the required numbers to ensure compliance.

Irrigation water:

The total stand area is 1945m² of which 775m² is solid surface. Thus, the open area or landscaping area is approximately 1 170m².

Rainwater harvested from roofs to be used to irrigate landscaped areas.

3.3. Water Storage

In terms of the Red Book, a storage capacity of 48 hours of the annual daily average demand is required. Therefore, the estimated water storage demand is 2 days at 8.1 kl/day which is equal to 16.2 kl.

Therefore, the total storage requirement, including the fire storage, is:

$$16.2 \text{ kl} + 108 \text{ kl} = 124.2 \text{ kl}$$

If the Municipal supply is used, there should be sufficient capacity to meet the demand of the development.

3.4. Proposed Water Supply

The nearest water supply is the Municipal water pipeline in Flamingo Avenue. We propose that the current water erf connection be upgraded to suit the proposed development.

The infrastructure required to connect into the Municipal supply is:

- A valved offtake from the existing Municipal system (65 to 75) mm dia.
- A length of 75 mm uPVC pipe cl12 to bring the Municipal water to the property boundary. Length of the 75mm dia. water pipeline depends on which side of the road the Municipal pipeline is located on.
- Bulk water meter for the development, with separate meters for the restaurant, managers' accommodation, retail space and office space if necessary.

The Infrastructure Department of the Knysna Municipality should confirm whether they can supply the development with water.

3.5. Other Water Supply Options

Other supply options, should the Municipality not be able to provide water as a primary or secondary source are:

- Rainwater storage tanks.

3.5.1. Rainwater Tanks

The Mean Annual Precipitation (MAP) for Knysna (gauge 14063) according to Schmidt, Schulze and Dent (1987) is 712mm/year.

Based on the Red Book (2004) the rainwater that can be harvested from the roofs can be calculated at 80% efficiency. *Table 3* below gives a breakdown of the possible rainwater harvesting for the buildings.

Table 3: Possible Rainwater Harvesting Volumes

Description:	Roof Area:	Harvested Rainwater:
Main Building	126.5 m ²	72.05 m ³ /year
Retail Space	107.5 m ²	61.23 m ³ /year
Managers Accommodation	37.3 m ²	11.25 m ³ /year
TOTAL:	271.3 m²	154.53 m³/year (0.42 kl/day)

Applying the calculation set out by the Red Book, the runoff generated by the roofs is calculated as approx. 154.53 kl/year. Therefore, approx. 150 kl/year of rainwater can be harvested on average annually or 0.4 kl/day

The rainwater infrastructure would include roof guttering and tanks with a separate pipe system and pumps. If it is decided to use the rainwater, then a “first foul flush” arrangement (or similar) as shown in Figure 1 below is recommended.

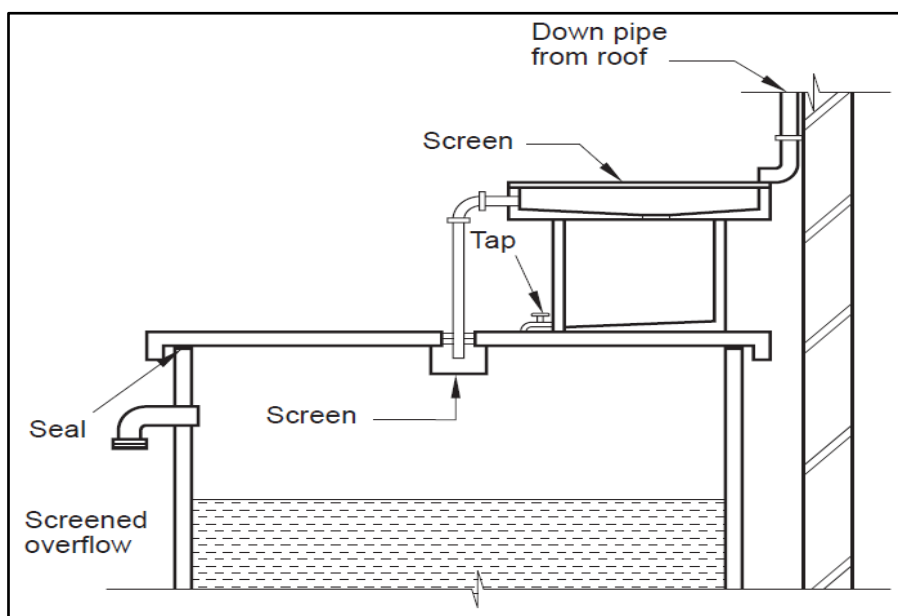


Figure 1: “First Foul Flush” Arrangement

The preferred source of water supply is the Municipal supply for domestic water and the with the rainwater harvesting can be used for irrigation purposes. The rainwater could be used for domestic water in instances when the Municipality cannot supply.

4. Sewage Disposal / Treatment

4.1. Existing Municipal Sewer Reticulation

The nearest Municipal gravity sewer main is at the corner of Flamingo Avenue and Vink Street, which is approx. 100m away.

There is an existing septic tank and soak way sewer system on the site. The sewage generated by the previous house / restaurant was managed by this septic tank.

4.2. Requirements of the Development

As indicated above the calculated water demand is 8.1 kl/day. Generally, 80% of the water demand will enter the sewage system in the case for residential use. Therefore, we estimate that the volume of sewage generated by the development is approx. 6.5 kl/day.

As indicated above the development will be phased, thus the sewer demand per phase is:

- Phase 1 = 5.1kl/day
- Phase 2 = 1.4kl/day
- **Combined = 6.5 kl/day**

There are two possible options to manage the sewer demand of the proposed development. The first option is to connect to the existing Municipal reticulation via a small pumpstation and pump line in Flamingo Street to connect to the existing sewer manhole. The second option, a conservancy tank with a suction line such that the honey sucker can access the conservancy tank from Flamingo Street. small pumpstation to pump the sewer effluent to the nearest Municipal gravity line.

Option 1 – Sewer Pumpstation with Pump Line.

A new sewer pumpstation to be constructed within the parking area of the proposed site. As per *Annexure B*, an area of approx. 25m² has been highlighted for the pumpstation.

The sewer effluent generated by the development will be directed to the pumpstation. A pump line is proposed along the Western border of the property up to Flamingo Street, where it will then run along Flamingo Street to tie into the existing manhole.

The size of the sump chamber, pump and pump line will be determined once approval has been given for the development. The pumpstation will be design to Municipal standards with allowance for 4hrs emergency storage in the case of a power failure.

The pumpstation will be sized for the demand of the full development at 6.5kl/day.

The Municipality to confirm whether there is capacity in the existing Municipal system for the additional demand of the proposed development.

Augmentation fees will be applicable for the connection to the Municipal system.

Option 2 – Conservancy Tank:

The alternative option is to construct a conservancy tank in the parking area in the same position as the proposed pumpstation if the Municipal system cannot manage the additional demand of the development.

It is envisaged to have the tank emptied by the Municipality a minimum of twice a week. The conservancy tank will be sized to suit the frequency that the tank can be emptied as well as additional emergency storage.

A connection point will be provided at the Northwestern corner for the honey sucker such that it can operate unobstructed.

Irrespective of which option is implemented, a grease trap should be sized and installed for the restaurant. The grease trap will remove the oils, fats and solid foods that enter the sewage system. The grease trap should be maintained daily to remove the solids.

The preferred option is to connect to the Municipal infrastructure.

4.3. Proposed Sewage Disposal System

The proposed system will consist of the following:

- 160 mm ø PVCu Solid Wall SABS 791 Class 34 400 kPa or similar spigot & socket pipes for mainline and should be in accordance with SANS 1200 LD.
- 110 mm ø PVCu Solid Wall SABS 791 Class 34 400 kPa or similar spigot & socket pipes for internal connections and should be in accordance with SANS 1200 LD.
- All sewer mains will have a minimum grade of 1 in 100.
- Internal drainage will have a minimum grade of 1 in 60.
- Sewer manholes will be 1.05 m ø ROCLA or similar approved precast concrete rings with concrete covers and frames. Medium duty covers for roadside verges and non-trafficked areas, and heavy-duty concrete covers and frames will be specified for trafficked areas. It is recommended that all the joints on the precast rings be sealed for water ingress with a 100 x 1 mm wide Polyurethane Bandage (combiflex or similar).
- All pipelines will be bedded on a selected granular material. These materials shall comply to Class B bedding and SANS 1200 LB and be non-cohesive and be free draining. Initial tests have shown that the on-site material would be suitable for selected fill.
- All internal drainage to structures and units shall comply with the provisions of SANS 0252 Part 2: Drainage installations for buildings.

5. Road Network

5.1. Access Road

Access will be from Flamingo Avenue via the current access onto the property. The proposed new access to be minimum 7.5m wide and at 90 degrees to Flamingo Avenue.

This roadway is asphalt covered and runs parallel to and South off the N2. The speed limit is 60 km/hr. The road is min. 5.0m wide.

Sight distances existing the development to the left and to the right are not an issue as they are in the order of 225m and 175m respectively. There are no intersections within 15meters of the proposed access point.

It is our opinion that the proposed development will not have significant impact on the access road, or surrounding road networks. Thus, we do not see the need for a traffic impact statement (TIS).

5.2. Internal Roads

There are no internal roads, only the proposed parking area. Provision has been made for 15 parking bays (2.5 x 5.0m) with additional 4 parking bays (1.5 x 2.5m) for motor bicycles.

Soil tests must be conducted to determine the final design of the layer works. However, it is our opinion that a conventional road design and construction will suffice. All materials for the road construction will most likely have to be sourced from commercial sources

It is recommended that the in-situ material be ripped for at least 150mm and recompacted to a density of 93% MOD AASHTO density to create a suitable SSG layer.

The proposed design is as follows:

- Subbase Layer: 150mm thick G7 material compacted to 95% MOD AASHTO.
- Base Layer: 150mm thick G5 material compacted to 97% MOD AASHTO.
- 80mm interlocking pavers placed on 20mm sand or crusher dust bedding.
- Edges to be constructed with a header course.
- Kerbs to be an edge or mountable kerb and a combination kerb to manage runoff water into stormwater reticulation.
- Min. cross fall of roads at 3.0%.
- Min. longitudinal fall at 0.5% with Max. fall at 15% (this may not be achievable with slope of existing terrain).

The parking area will be owned and maintained by the developer or an internal User's (Home Owners) Association.

6. Stormwater Network

The purpose of this report is to deal with the internal stormwater reticulation to manage all stormwater runoff effectively to limit the effect on the surrounding areas once the development has been completed. It is assumed that the

The primary consideration for the proposed stormwater system is that the system shall comply with the draft National Guidelines for Sustainable Drainage Systems (SuDS). The principles of SuDS are that the developed system mimics the natural or undeveloped state.

The proposal is to manage runoff water from the parking area to the site boundary (East boundary). This runoff will be piped along the restaurant, and then daylighted into a

dissipating structure before it is allowed to free flow above ground in a swale channel along the Eastern border. Provision for a swale channel along the Western border should also be made to manage stormwater. The in-situ material is very sandy and thus permeability is very high. The grassed swale channel will allow the runoff water to penetrate safely into the ground before it reaches the lagoon. The swale channel to be sized to ensure the runoff is managed within the property.

As far as possible, roof water to be collected in rainwater harvesting tanks. The overflow of each tank to be directed onto the paving or into the proposed grassed swale channels.

Collected rainwater can be used for irrigation purposes.

ALL concentrated stormwaters will be discharged into a dissipating structure to break all the energy before it is allowed to flow into open spaces to avoid any erosion.

A flood line study for the proposed development is not necessary as there are no defined water courses and the site is well above mean sea level (MSL). The proposed property is a single stand within a developed area with no catchments feeding into the property.

7. Solid Waste Management

Based on the Guidelines for Human Settlement Planning and Design (Red Book -2004), solid waste consists mainly of packaging material such as glass, paper and plastics, cans etc. with limited quantity of foodstuff. However, in the case of the restaurant, the volume of foodstuff increases drastically.

The quantity of solid waste generated by the proposed development greatly depends on the waste management practices such as recycling and compaction. Other forms of waste management, in the case of the restaurant, is to place excess food in drums which can be collected or distributed to pig farmers. Alternatively, compostable material can be composted on site for use in gardens etc.

Refuse generated within the development will be separated into food waste, compostable material, recycling material and material for land fill disposal.

Quantities estimated based on a restaurant of a similar size are:

Excess food waste (to be collected by pig farmer):	1 drum/day
Recyclable material (to be collected by Municipality):	2 bags/day = 0.5 m ³ /day
General waste (to be collected by Municipality):	1 bag/day = 0.25 m ³ /day

Therefore, excluding the excess food waste, the restaurant produces approx. 0.75 m³/day of waste or 5.25 m³/week of waste.

The estimated volume of refuse generated (un-compacted) by the development is as follows:

Manager Accommodation:	0.12 m ³ /week
Retail Space:	0.96 m ³ /week (based on 0.24 m ³ /week per retail space)
Office Space:	0.48 m ³ /week
Restaurant:	2.52 m ³ /week
Shop:	1.2 m ³ /week
TOTAL:	5.28 m³/week

Strict waste management practices, such as recycling and compaction, will be implemented to ensure that the volume of waste generated is reduced. The compaction of cardboard boxes, packing items etc. will greatly reduce the solid waste volume.

Based on the above, we propose a refuse storage area of 10m² (minimum) to store the solid waste. The waste station design should ensure that baboons, monkeys, birds and other animals cannot enter the station.

8. Electrical Supply

The Electrical supply is not dealt with in this report.

The electrical supply and reticulation will be in accordance with the design by the appointed Engineers. An electrical services report, design, plans etc. will be submitted separate to this report for approval by the Electrical Department – Knysna Municipality.

9. Communication Ducts

Provision of ducts for telecom and fibre system with junction boxes (if required) to run parallel to the proposed buildings within the proposed parking area. The connection, if available, will be in Flamingo Street. 32mm dia. sleeves for connections will be provided for the separate components of the proposed development.

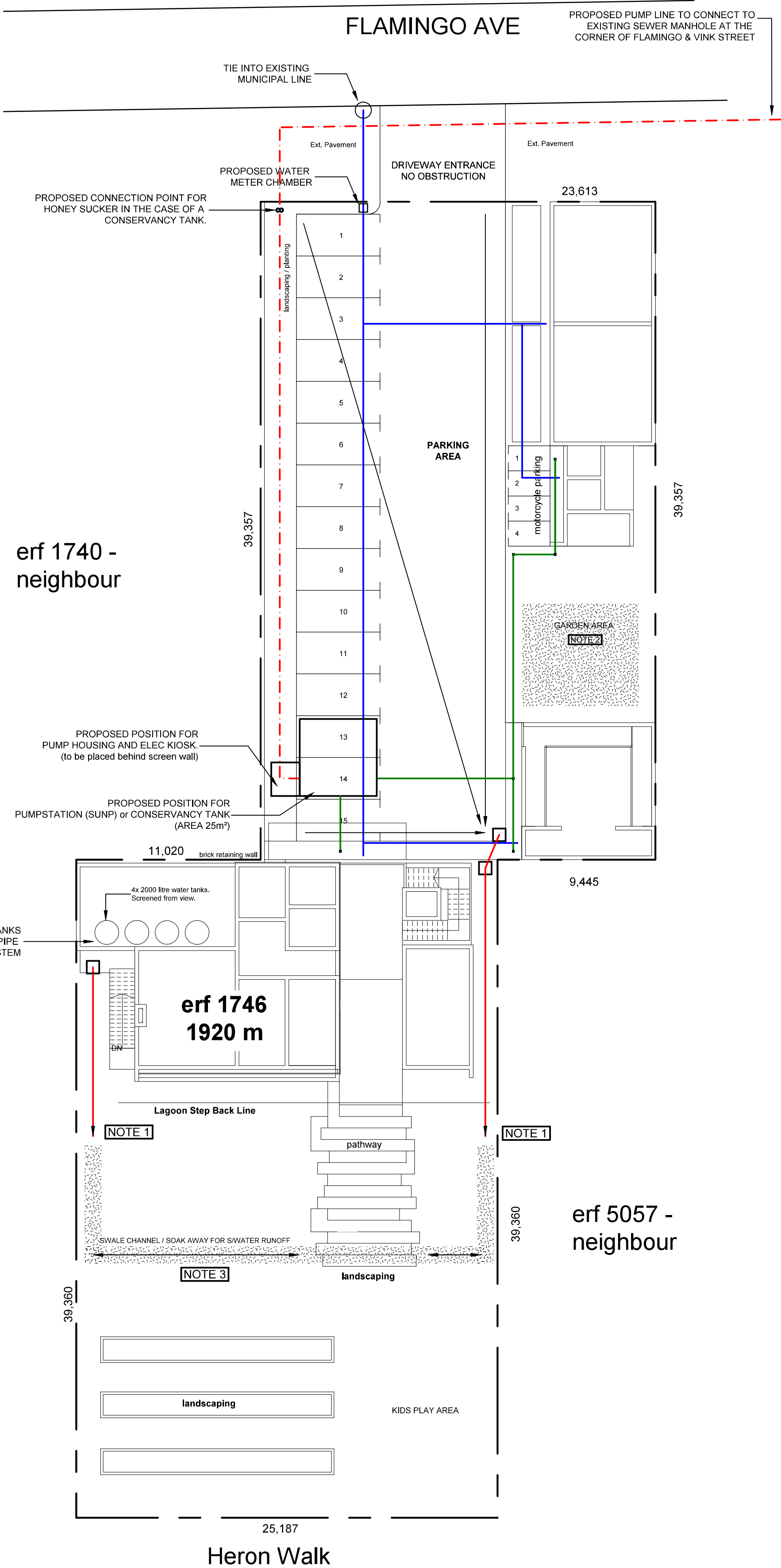
The proposed communication system will consist of the following:

- All cable ducts will be 110 mm ø uPVC Class 4 pipes, with 450 x 450 mm junction boxes. 32 - 50 mm ø HDPE pipe ducts will serve each individual unit.
- All manholes/draw boxes will be brick-built chambers with polymer or similar heavy duty covers and lids.

10. Conclusion

- Domestic water will be supplied by the Municipal water supply in Flamingo Avenue.
- The sewage effluent generated by the development will be managed by the existing septic tank / soak away system.
- Treated effluent to be used for irrigation.
- Access will be from Flamingo Avenue.
- Stormwater management will comply with the principles of Sustainable Drainage Systems (SuDS).

- It is proposed that the solid waste is collected by the Knysna Municipality. Provision to be made on the site for one collection point.
- Electrical design will be completed by the Electrical Engineer appointed by the client. The Electrical Engineer will submit their reports to the Electrical Department for comment and approval.
- Provision (if necessary) will be made for communication ducts.



LEGEND:

WATER RETICULATION:

- PROPOSED WATER RETICULATION
- PROPOSED WATER METER CHAMBER

SEWER RETICULATION:

- PROPOSED INTERNAL SEWER RETICULATION
- PROPOSED PUMP LINE or SUCTION LINE FOR HONEY SUCKER

STORMWATER RETICULATION:

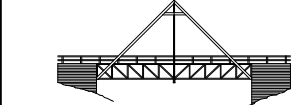
- PROPOSED STORMWATER RETICULATION
- PROPOSED STORMWATER MANHOLE / GRID
- PROPOSED FLOW OF RUNOFF WATER
- PROPOSED SWALE CHANNEL / SOAK AWAY

NOTES:

- STORMWATER TO DISCHARGE INTO DISSIPATING STRUCTURE BEFORE FLOWING ONTO GRASS LINED SWALE CHANNEL.
- GARDEN AREA TO BE USED AS A SOAK AWAY FOR RUNOFF WATER GENERATED BY THE RETAIL SPACE & ABLUTION BLOCK.
- SOAK AWAY TO MANAGE RUNOFF WATER GENERATED BY THE PARKING AREA, RESTAURANT & ACCOMODATION UNIT

GENERAL NOTES:

- A. ALL ROOF WATER TO BE PIPED TO DISCHARGE INTO TANKS, MAIN STORMWATER SYSTEM OR ONTO SOAK AWAYS.

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PROJECT				CAUSEWAY CAFE, ERF 1746 FLAMINGO STREET, SEDGEFIELD			
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