Civil Services Report

Mixed Use Development – Farm Portion 50 of 202, Pacaltsdorp

Prepared for: L.B.T Properties (Pty) Ltd
12 December 2025
Client Reference No. Erf 202/50

SMEC INTERNAL REF. C3357

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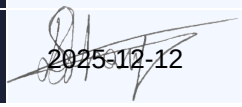
Signature	 2025-12-12

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1. Background

1.1 Introduction

SMEC South Africa (Pty) Ltd, hereinafter referred to as SMEC, was appointed by L.B.T Properties (Pty) Ltd, hereinafter referred to as the Developer, to compile a Civil Engineering Services Report for the proposed Hansmoeskraal Development on Portion 50, Farm 202 Pacaltsdorp, George.

The proposed green fields development consists of 51 residential units (21 950 m^2), and 8 693m^2 of commercial use. The report provides input to the civil engineering services required by the development and is hereinafter referred to as the CES Report.

1.2 Information Received

Delplan Consultants are appointed by L.B.T Properties as the project architects. The architects provided SMEC with a Site Development Plan (SDP) of the proposed commercial and residential development. The SDP is attached hereto as Appendix A.

1.3 Scope of Service

The scope of service entails conceptual civil engineering designs and input. The following civil engineering services are included in the scope of service:

- Access roads, internal roads and parking areas.
- Stormwater management.
- Sewer reticulation; and
- Water supply and reticulation.

Electrical engineering infrastructure is excluded from this report.

1.4 Limitations & Assumptions

The following limitations were encountered during the conceptual design of civil services:

1. An engineering survey has not been conducted due to the early stage of the project. Engineering software was used to obtain elevation and cadastral data to support the design process. The historic information is sufficient for conceptual designs, but more accurate data is required for detailed designs.
2. A geotechnical investigation has not been conducted due to the early stage of the project. Resources from nearby projects and experience from working in the area was used as a basis of conceptual design.

1.5 Locality

Hansmoeskraal is located to the south of Pacaltsdorp and falls within the George Municipality's jurisdiction in the Western Cape Province of South Africa. The figure below indicates that the proposed development is situated south of the N2 just off the Pacaltsdorp off-ramp. The proposed development can be accessed via Hibiscus Road.

Figure 1-1: Proposed Development Area (3 Ha)

1.6 Zoning

The proposed development is within the urban edge according to the latest George Municipality Spatial Development Framework (SDF). The development would have to be sub-categorised as residential and commercial zones.

2. Terms of Reference

The following standards were used to in the preliminary design:

- George Municipality Spatial Development Framework (2019)
- George Municipality Civil Engineering Standards
- The Neighbourhood Planning and Design Guide (2019)

3. Existing Engineering Services

SMEC obtained existing services information from the George Municipality's IMQS system. The following sections discuss existing services in the area.

3.1 Roads and Stormwater Management

The site is accessed via asphalt surfaced Hibiscus Street off the Beach Road Extension. There are no internal roads on the property at this stage.

The site slopes down gradually from north-west to south-east towards the Mooihoek housing development. Hibiscus street has stormwater infrastructure, but there's no stormwater infrastructure on site.

3.2 Water Reticulation

There is an existing 200 mm AC bulk water reticulation pipeline west of the site within the Beach Road extension road reserve. The reticulation pipeline is supplied form the Pacaltsdorp West reservoir. Refer to the figure below for the position of the existing water pipeline.

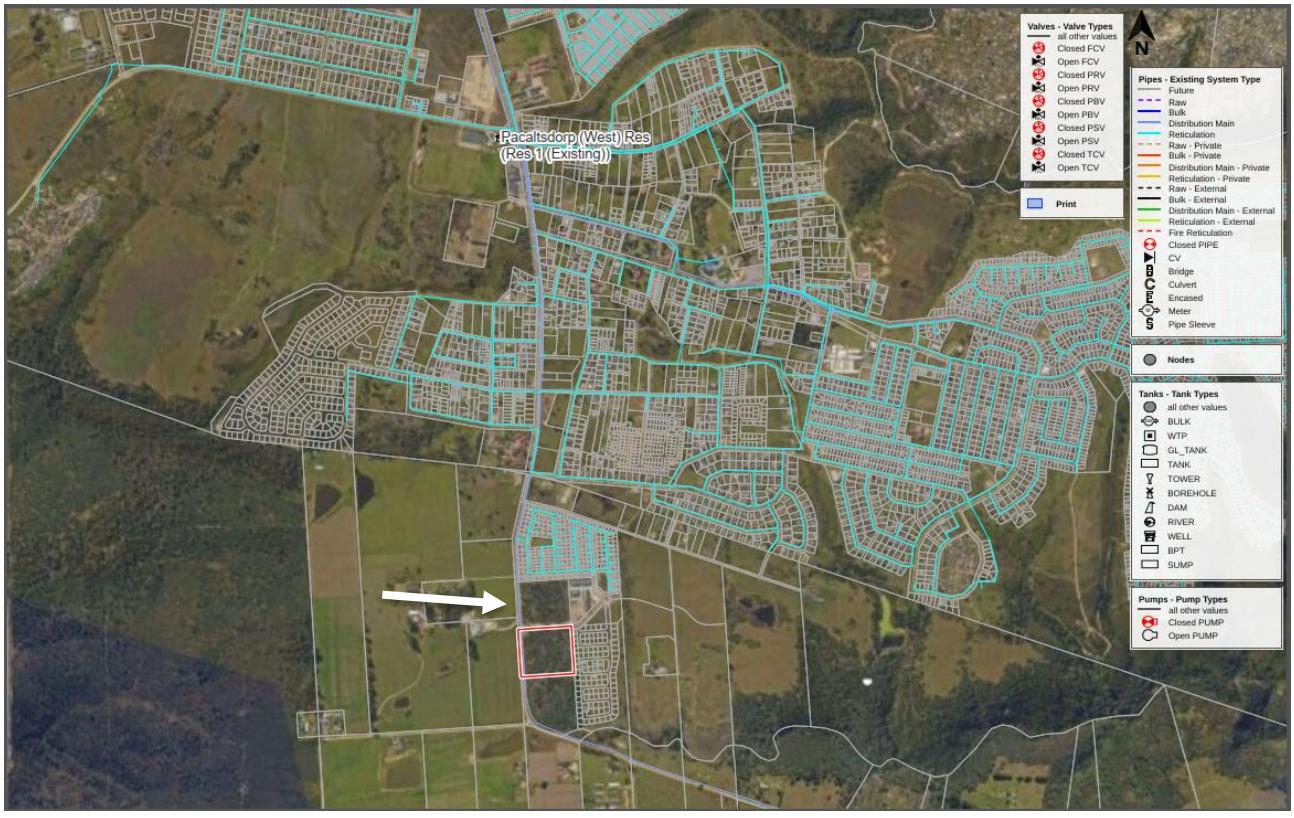


Figure 3-1: Existing Water Reticulation

It is recommended that the George Municipal appointed master planners be consulted to determine the available reservoir capacity.

3.3 Sewer Reticulation

There is no existing sewer infrastructure towards the immediate low point of the site (south-east corner). There is however a sewer manhole approximately 220m south-east of the site, connecting to the Hansmoeskraal pumpstation. Effluent is conveyed from the Hansmoeskraal pumpstation via a series of other pumpstations that discharge at the Outeniqua Wastewater Treatment Works (WWTW). The GIS data indicates future sewer networks planned south of the site. The two figures below indicate existing sewer infrastructure.

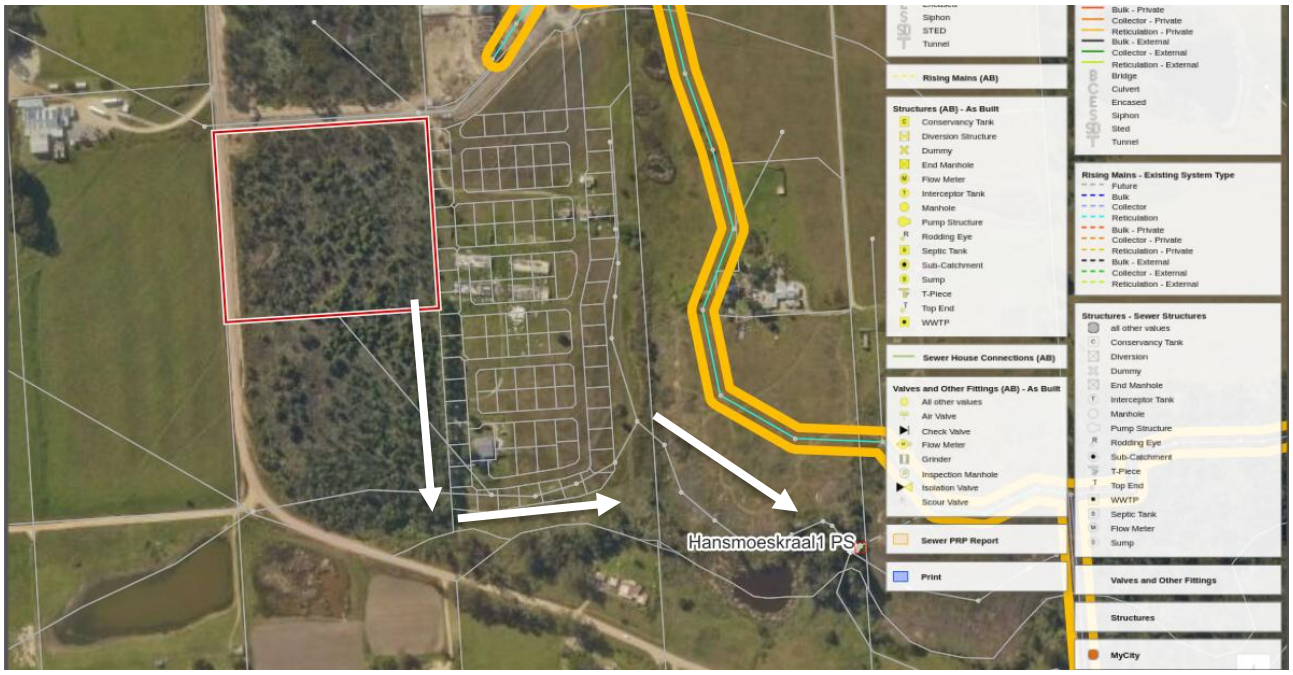


Figure 3-2: Existing Sewer Infrastructure near Site

Figure 3-3: Bulk Sewer Infrastructure near Site

It is recommended that the George Municipal appointed master planners be consulted to determine the available pumpstation and Outeniqua WWTW capacity.

4. Proposed Engineering Services

4.1 Internal Access Roads

4.1.1 Road Reserve

The proposed development has two main entrances. Coming from the west on Hibiscus Street, the first entrance gives access to commercial precinct 1 and 2. The second entrance provides access for service vehicles to the back of the commercial buildings as well as access to the residential area. Although these two entrances are next to each other, they are separated by a boundary wall from the edge of the road reserve.

The table below describes the road reserves and proposals.

Table 4-1: Road Reserves

Description	SDP Road Reserve	Comments
Main roads (running north to south)	10m (6m road width)	The road reserves seem wide enough to cater for civil services, it is proposed however that an additional 2m be added to allow for electrical and telecom services. Alternatively, some services such as the sewer reticulation could be positioned mid-lane. This allows for vehicles to pass should there be maintenance on the pipeline in the future.
Secondary roads (Running East to West)	10m (5.5m road width)	

Refer to Appendix C for the roads and stormwater layout.

4.1.2 Pavement Design

It is proposed that the internal roads should have the following layer works:

- 80mm 30MPa Interlocking concrete block pavers
- 20mm Sand compacted to 100% MOD AASHTO
- 200mm C4 Subbase compacted to 97% MOD AASHTO
- 150mm G7 Subgrade compacted to 93% MOD AASHTO
- In-situ material to be ripped, shaped and recompacted to 90% MOD AASHTO

The walkways are to have the following layer works:

- 60mm Interlocking concrete block pavers
- 20mm Sand compacted 100% MOD AASHTO
- 150mm G5 Subbase compacted to 97% MOD AASHTO
- In-situ material to be ripped shaped and recompacted to 90% MOD AASHTO

Refer to Appendix C: Roads & Stormwater Layout, for the proposed typical road cross sections.

4.2 Stormwater Management

4.2.1 Design Rationale

The nature of this development is such that there is a significant increase in hardened surfaces on the property. The post-development stormwater runoff would therefore be higher than the pre-development runoff as less rainwater is able to permeate the soil.

It is proposed that stormwater for minor intervals be managed via concrete pipe systems. This system will include kerbs, channels, kerb inlets, grid inlets, manholes and outlet structures leading to a detention pond.

For the major storm intervals road reserves will act as open channels to convey stormwater to a proposed detention pond. Detention ponds are designed to attenuate runoff for major storm intervals and discharge attenuated water at pre-development or lower flow rates. The system will flow from the detention pond through a stormwater swale and connect to an existing informal stormwater channel. This stormwater management system prevents flood damage and erosion from occurring downstream of the development.

Refer to Appendix C: Roads & Stormwater Layout, for the proposed stormwater infrastructure.

4.2.2 Rainfall Data

The mean annual precipitation for the town of George is 813 mm (as measured by the George rainfall station). This and other rainfall data from the South African Weather Service were used to establish the rainfall intensity-duration-frequency (IDF) curves and time of concentration for the relevant return periods.

4.2.3 Catchment Area

Due to the topography of the site, the catchment area was taken as the entire site. The pre- and post-development catchment areas are described in the table below.

Table 4-2: Catchment Area Summary

Catchment No.	Size (ha)	Average Slope	Surface Coverage Description
Pre-Development			
CA-01	3.27	3 – 6%	This area largely consists of moderate to dense tree and bush coverage with thick grass in between.
Post-Development			
CA-01	3.27	1 – 6%	Urban developed area with commercial buildings, parking lots, residential units, roads, and a small park.

The table indicates that the surface coverage changes significantly, but the slope and size remain the same.

4.2.4 Stormwater Runoff

The Rational Method was used to determine the stormwater runoff for minor (1:5 Year) and major (1:50 Year) storm intervals. Refer to Table 3 for the estimated stormwater runoffs.

Table 4-3: Preliminary Stormwater Runoff

Catchment No.	Size (ha)	C-Factor	Runoff 1:5 year storm (m^3/s)	Runoff 1:50 year storm (m^3/s)
Pre-Development				
CA-01	3.27	0.33	0.047	0.197
Post-Development				
CA-01	3.27	0.61	0.157	0.370

The total runoff for minor and major storms increases by 0.110 m^3/s and 0.173 m^3/s respectively from pre- to post-development. The change in the surface conditions from grass and forest vegetation for pre-development to surfaced roads, roof coverings and parking areas for post-development is the main contributor to the increased surface run-off.

4.2.5 Detention Pond

One detention pond is proposed for the catchment area. The pond is located on the lowest portion of the site to allow gravitational flow without creating trapped low points. The detention pond has an estimated volume requirement of 780 m^3. This translates to a 2m deep pond approximately 12m wide and 33m long.

Stormwater from both the commercial and residential zones will reach the pond by means of piped flow or in a major storm, by means of open road channels. The stormwater discharge point is located on the south-eastern corner of the site. It is further proposed that a 230m swale be constructed along the eastern border of erf 202/22 that would discharge into a natural stream leading to an existing dam as indicated in the figure below (white),

Figure 4-1: Proposed Stormwater Management Swale

George Municipality appointed stormwater master planners should be consulted to determine the available capacity & overflow particulars of the dam.

4.2.6 Erosion Protection

To mitigate the risk of erosion at the junction between the proposed stormwater swale and the existing non-perennial stream, sections of reno mattress have been strategically placed. These mattresses extend for 5 meters within the swale channel leading up to the connection point and continue for 2 meters on either side of the connection into the natural stream. This arrangement is designed to dissipate the energy of the water flow, reducing potential erosion effectively.

Refer to Appendix F Stormwater details.

4.3 Water Reticulation

4.3.1 Water Source

Potable water will be supplied from the Pacaltsdorp (West) Reservoir via an existing 200 mm Ø AC pipe. It is recommended that the master planners investigate if the Pacaltsdorp (West) Reservoir will be able to supply the required water demand inclusive of firefighting water. It is proposed that rainwater harvesting be implemented to reduce the demand on municipal infrastructure.

4.3.2 Water Demand

The water demand for this development was determined using average annual daily demand (AADD) figures for different land use categories. The table below indicates the estimated water demand for the development.

Table 4-4 Estimated Water Demand

Building Type	Land Use	Ave Erf Size (m^2)	Estimated AADD/unit (ℓ/day/unit)	AADD (kℓ/day)	Peak demand (ℓ/s)
Precinct 1	Business / Commercial	1020	650	6,63	0,25
Precinct 2	Business / Commercial	1670	650	10,86	0,41
Guard house	Business / Commercial	97	650	0,63	0,02
Dwelling Units	Residential	51	500	25.50	0.97
			Total	**43.62**	**1.67**

The table indicates that an AADD of 43.62 kl/d can be expected with a peak flow of 1.67l/s.

4.3.3 Fire Fighting

The fire risk category for this development is taken to be Moderate Risk 1 as the development has business units. A fire hydrant is proposed near the business units with a design fire flow of 50 l/s as per the guidelines. The residential areas, however, can be categorised as Moderate Risk 2 with a design fire flow of 25 l/s. This will allow for smaller pipe sizes in the reticulation network. The Client would have to allow for a mechanical engineer to design the fire requirements for the business and commercial buildings.

Fire hydrants are positioned according to the guidelines to maximise accessibility and ensure that all properties can be reached in the event of a fire. Hydrant positions are indicated on the Water Reticulation Layout attached hereto as Appendix D.

4.3.4 Reticulation Network

The pipes for the development are sized to accommodate both domestic and fire firefighting use. The pipe diameters range from 110mm to 200mm Ø HDPE PE100 PN10 on main lines and 25 – 50 mm Ø for dwelling connections. A ring main is proposed for the development as it provides redundancy in the system and allows for efficient water distribution.

4.3.5 Valves & Fittings

Isolation valves are provided along the internal water reticulation such that no more than four valves need to be closed to isolate a section of a pipe. The offtake for water branches to the commercial allotment and to the residential allotment separately. A water meter is placed on each branch near the entrance of the development

4.4 Wastewater

4.4.1 Hydraulic Load

The hydraulic load was calculated using a percentage of water consumption based on the annual average daily demand (AADD). The table below contains a summary of the hydraulic load expected at the development.

Table 4-5 Peak Hydraulic Load

Building Type	Avg Erf Size (m^2)	AADD (kℓ/day)	% of water consumption to sewer	ADDWF (kℓ/day)	PDWF (kℓ/day)	PWWF (ℓ/s)
Precinct 1	1020	6,63	0,80	5,30	13,26	0,18
Precinct 2	1670	10,86	0,80	8,68	21,71	0,29
Guard house	97	0,63	0,80	0,50	1,26	0,02
Dwelling Units	51	25.50	0,80	22,95	57,38	0,76
			Total	**37,43**	**93,61**	**1,25**

The table indicates that an average daily hydraulic load of say 38 kl/d can be expected in dry weather with a peak dry weather flow of say 94 kl/d. The table further indicates that a maximum flow of say 1,3 l/s is expected in the reticulation network.

The master planners need to confirm if the Outeniqua WWTW has sufficient capacity to treat the additional hydraulic load.

4.4.2 Reticulation Network

Based on the peak flow calculated in Table 4-2, a 160 mm Ø uPVC Class 34 Heavy Duty Solid Wall pipe is proposed to reticulate wastewater. The buildings are to be connected to the main sewer line via 160 mm Ø uPVC pipes. The sewer reticulation is indicated on Appendix E.

Based on the topography of the site it is proposed that the effluent gravitate in a south-eastern direction to the lowest point which is eats of unit 44.

4.4.3 Wastewater Management

It is proposed that the effluent be gravitated to the lowest point of the site and tie into the existing sewer infrastructure 365m south-east of the development. A servitude would have to be registered along the eastern border of erf 202/22 and the northern border of erf 10137 to tie in an existing sewer manhole. From the existing sewer manhole, effluent will gravitate towards the Hansmoeskraal sewer pumpstation.

The figure overleaf indicates the proposed gravity main (white) that ties in to the existing sewer reticulation (yellow).

Figure 4-2 Wastewater Management Layout Plan

It is recommended that the wastewater master planners be consulted to advise on the capacity of the existing 160mm Ø municipal pipeline that the rising main will be connecting to.

5. Cost Estimate

An elemental cost estimate was done based on the conceptual design and is summarised in the table below. The estimates exclude professional fees.

Table 5-1: Preliminary Cost Estimate

No.	Description	Amount (R)
1	**Preliminaries & General**	R2 351 910.00
2	**Site Clearance**	R396 000.00
3	**Roadworks (parking & access roads)**	R7 613 790.00
4	**Water Reticulation**	R1 033 395.00
5	**Sewer Reticulation**	R1 542 875.00
6	**Stormwater Management**	
6.1	Pipes, catchpits, and manholes	R834 952,50
6.2	Stormwater ponds, swales and erosion protection	R428 000.00
	Total Excluding VAT	**R14 200 922.50**
Allowance for 10% Contingencies		R1 420 092.25
	Subtotal	R15 621 014.75
15% VAT		R2 343 152.21
	Total inclusive of VAT	R17 964 166.96

Current rates were used for the estimate; therefore, no escalation was applied. The civil engineering services for the development amounts to R17 964 166.96 including VAT.

6. Recommendations

Based on the findings, investigations, and conceptual designs in this report it is recommended that:

1. The road reserves seem wide enough to cater for civil services, it is proposed however that an additional 2m be added to allow for electrical and telecom services. Alternatively, some services such as the sewer reticulation could be positioned mid-lane. This allows for vehicles to pass should there be maintenance on the pipeline in the future.
2. Wastewater generated by the development be conveyed to the nearest municipal sewer manhole via a lifting station and rising main where it will follow a series of pumpstation and rising mains to the Outeniqua WWTW.
3. The master planners be consulted to determine confirm if the Outeniqua WWTW and pump stations have sufficient treatment capacity to cater for the hydraulic load from the development.
4. The master planners be consulted to confirm if the Pacaltsdorp West reservoir and distribution main have sufficient spare capacity to serve the development.

7. Conclusion

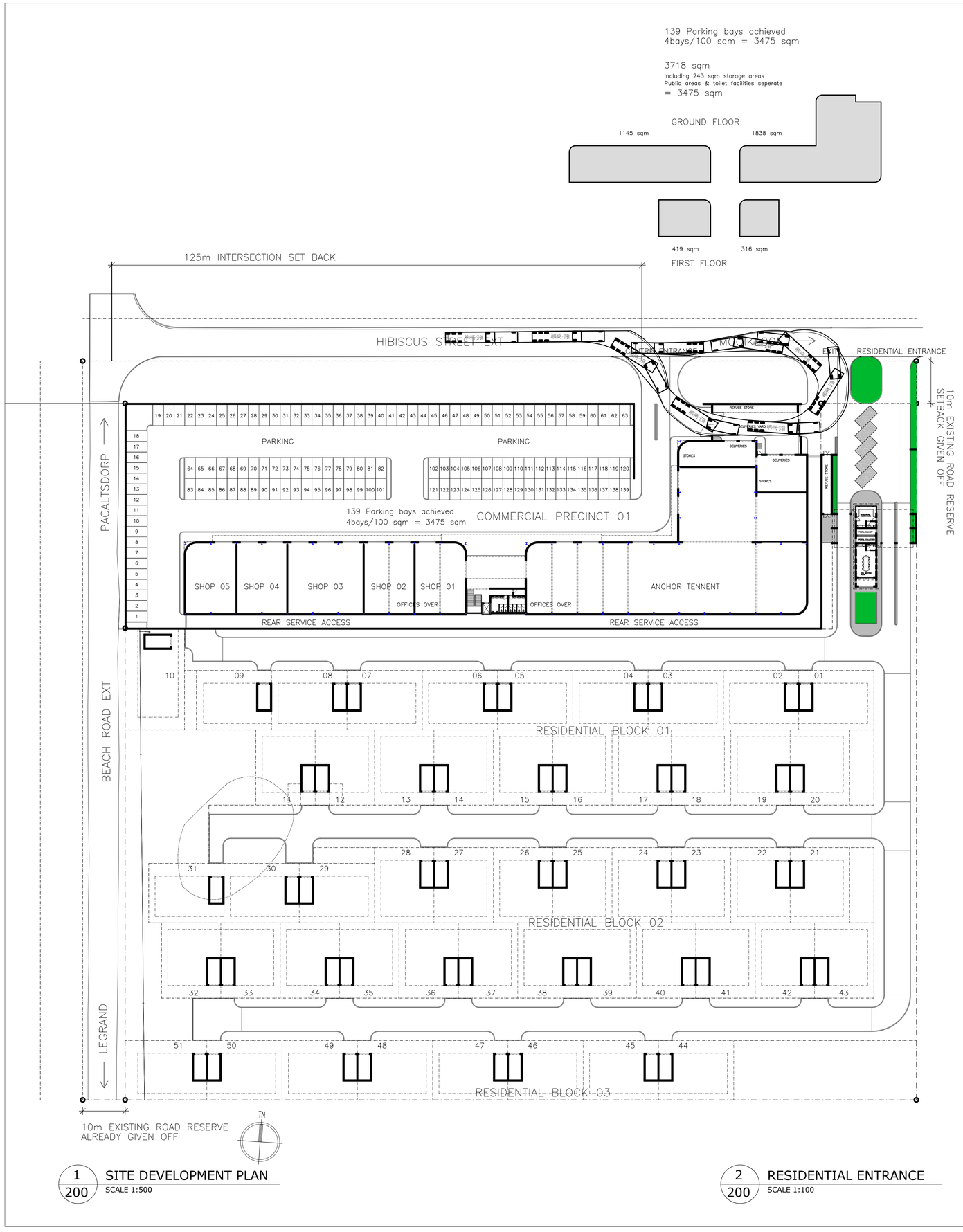
SMEC was appointed by L.B.T Properties (Pty) Ltd to compile a Civil Engineering Services Report for the proposed Hansmoeskraal Development on Portion 50, Farm 202 Pacaltsdorp, George. The development consists of 51 residential units, and 3 718m^2 of commercial buildings.

The conceptual road, stormwater, water and wastewater designs indicate that the development can be accommodated with civil engineering services. However, master planners are to be consulted to confirm traffic demand, water demand and wastewater capacities. Furthermore, the SDP should be adapted according to the recommendations of this report.

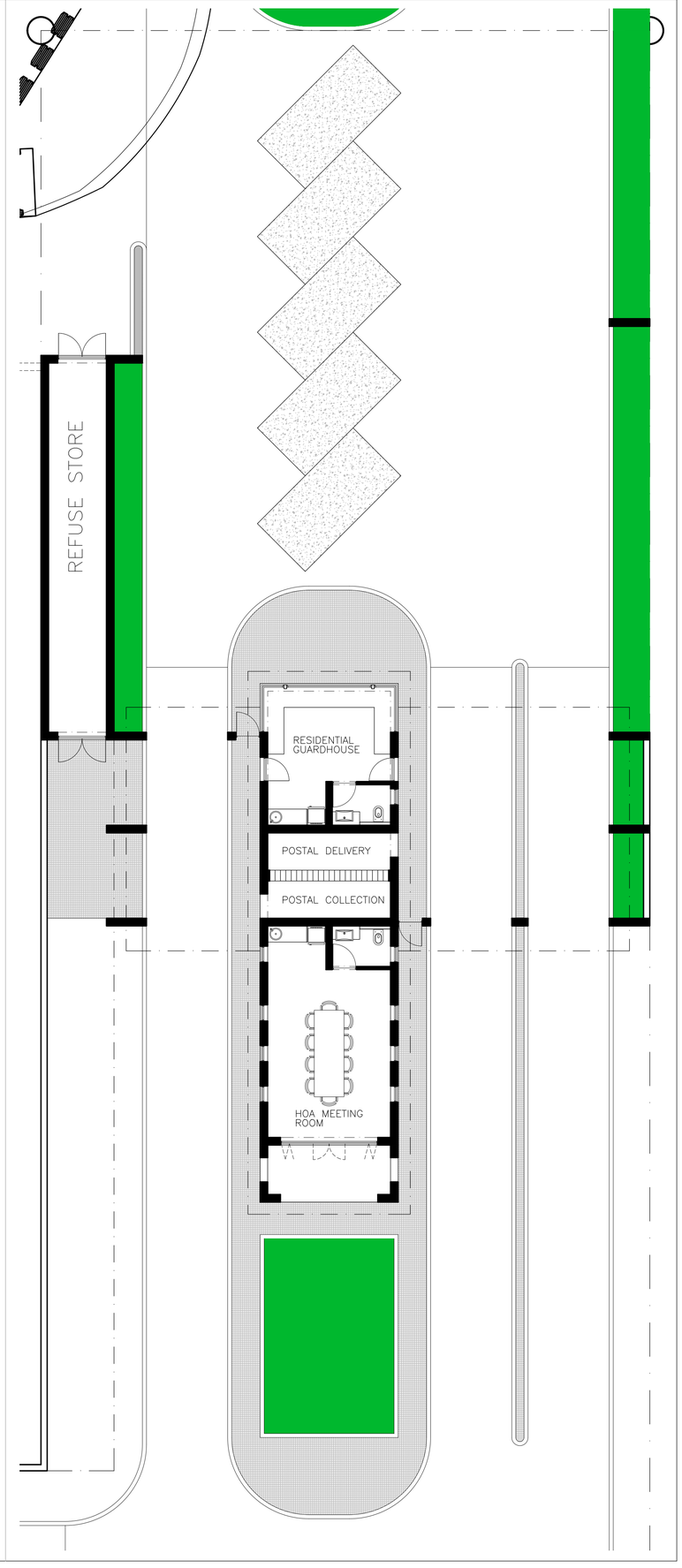
It is estimated that the implementation cost will amount to R17 964 166.96 including VAT and excluding professional fees.

The quantities and assumptions of this report are to be confirmed during the detailed design phase of the project.

Appendix A Hansmoeskraal Site Development Plan



1 / 200 SITE DEVELOPMENT PLAN
SCALE 1:500



2 / 200 RESIDENTIAL ENTRANCE
SCALE 1:100

REV	DATE	DESCRIPTION	BY
L	12.11.25	ISSUED FOR INFORMATION	
K	12.11.25	ISSUED FOR INFORMATION	AAA
J	12.11.25	ISSUED FOR INFORMATION	AAA
I	21.10.25	ISSUED FOR INFORMATION	AAA
H	21.08.25	ISSUED FOR INFORMATION	AAA
G	12.03.25	ISSUED FOR INFORMATION	AAA
F	02.10.24	ISSUED FOR INFORMATION	AAA
E	13.09.24	ISSUED FOR INFORMATION	AAA
D	07.08.24	ISSUED FOR INFORMATION	AAA
C	05.08.24	ISSUED FOR INFORMATION	AAA
B	26.07.24	ISSUED FOR INFORMATION	AAA
A	24.07.24	ISSUED FOR INFORMATION	AAA

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IN ASSOCIATION WITH
lo_a life of .architecture

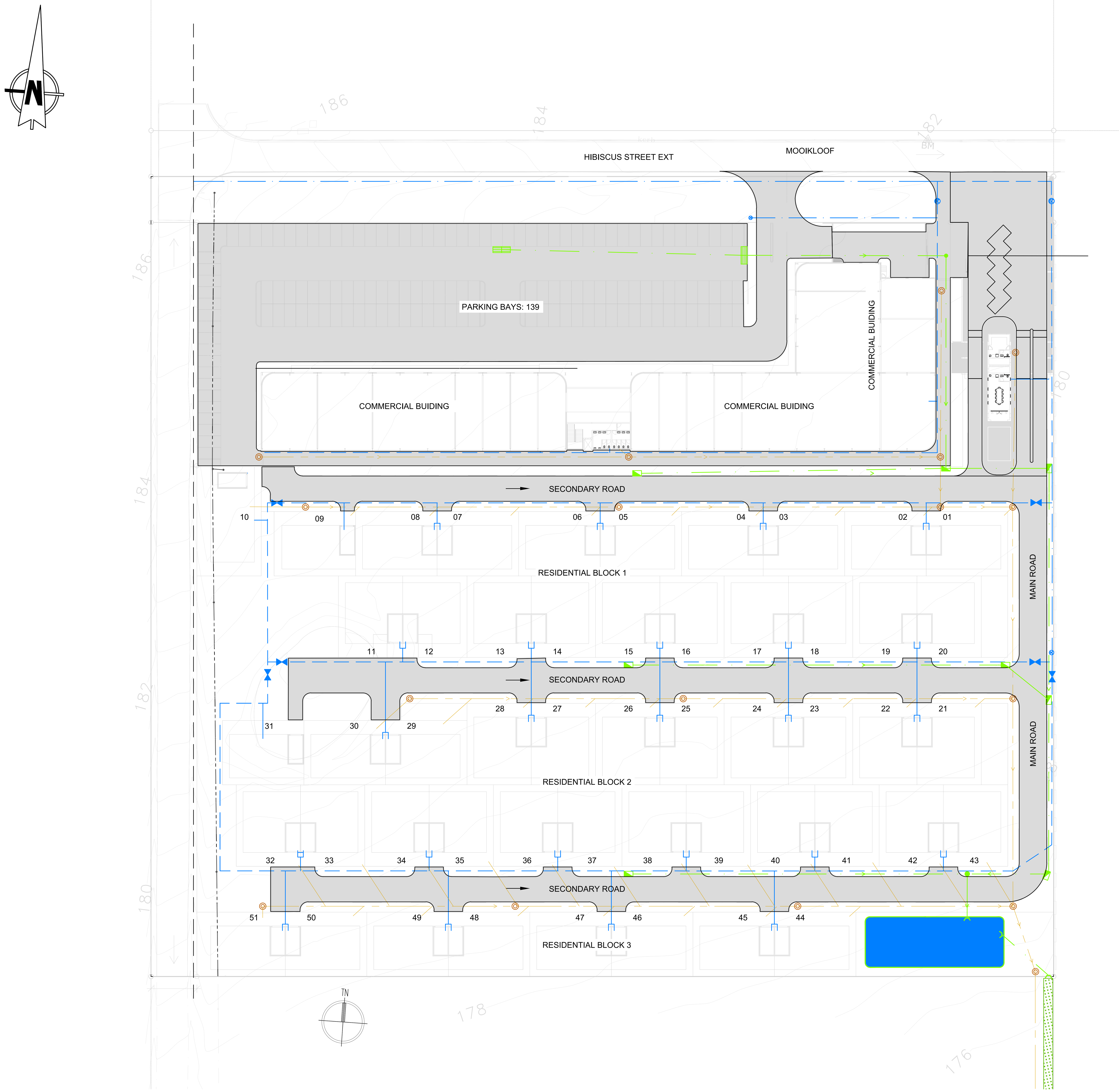
PROJECT TITLE
PACALTSDORP
NEW MIXED USED DEVELOPMENT ON FARM PORTION 50 OF 202

DRAWING TITLE
SITE DEVELOPMENT PLAN
RESIDENTIAL ENTRANCE

JOB No.	LOCALITY	DRAWING No. ERF	TYPE	SHEET	REV No.
	PD	50/202		200	L

DATE JULY 2024
CAD No. 200
SCALE 1:500 1:100
DRAWN CPK
CHECKED

Appendix B All Services Layout



LEGEND

GENERAL
- FENCE
- TELECOM

ROADS
- PAVING SURFACE

STORMWATER MANAGEMENT
- STORMWATER PIPE
- STORMWATER MANHOLE
- KERB INLET
- GRID INLET
- HEADWALL
- DETENTION POND
- STORMWATER SWALE

WATER RETICULATION
- 200mm Ø HDPE PE100 PN10 PIPE
- 110mm Ø HDPE PE100 PN10 PIPE
- 50mm Ø HDPE PE100 PN10 PIPE
- FIRE HYDRANT
- ISOLATING VALVE
- WATER METER

SEWER RETICULATION
- SEWER RETIC PIPE
- SEWER MANHOLE

FOR INFORMATION

Amendments

Rev.	Date	Description	Initials
0	OCT 2024	FOR INFORMATION	L.M
1	DEC 2025	UPDATED SDP	E.D.T

Drawing notes

1. POSITIONS OF EXISTING SERVICES ARE APPROXIMATE AND ACTUAL POSITIONS AND LEVELS MUST BE DETERMINED ON SITEBY CONTRACTORS BEFORE WORK COMMENCES.
2. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE SANS 1200 SPECIFICATIONS AND PROJECT SPECIFICATIONS.
3. NO WORK TO COMMENCE OUTSIDE THE CONSTRUCTION LIMITS. ENGINEER MAY INSTRUCT WORK STOPAGE SHOULD ANY ACTIVITY COMMENCE OUTSIDE THE CONSTRUCTION LIMITS.
4. ALL MATERIAL TO BE APPROVED BY ENGINEER PRIOR TO INSTALLATION.
5. A COMPLETE SET OF DRAWINGS TO BE AVAILABLE ON SITE AT ALL TIMES
6. DIMENSIONS MUST NOT BE SCALED OR ASSUMED, AFTER NOTIFICATION, DISCREPANCIES OR MISSING DIMENSIONS WILL BE CORRECTED IN WRITING BY THE ENGINEER.
7. THE CONTRACTOR SHALL HAVE ALL THE NECESSARY WAYLEAVES IN PLACE PRIOR TO ANY CONSTRUCTION WORK.
8. THE CONTRACTOR TO COMPLETE A DOCUMENTARY EVIDENCE OF ALL THE EXISTING SERVICES SITUATED IN CLOSE PROXIMITY TO THE BULK EARTHWORKS.
9. CONTRACTOR IS TO TAKE COGNISANCE OF SUBSURFACE CONDITIONS AND PLAN ACTIVITIES ACCORDINGLY.
10. ALL LEVELS IN METERS AND REFERS TO M.S.L.
11. CONTRACTOR TO VERIFY ALL LEVELS OF ALL EXISTING PIPES AND MANHOLES AT WHICH CONNECTIONS ARE REQUIRED AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO ANY CONSTRUCTION.
12. TOPSOIL TO BE REMOVED TO A NOMINAL DEPTH OF 150mm, STOCKPILED AND MAINTAINED FOR THE DURATION OF THE WORKS.
13. ALL CUT AND FILL EMBANKMENTS TO BE GRASSED AND PROTECTED WITH SOILSAVER OR SIMILAR EROSION CONTROL BLANKETS AS PER PROJECT SPECIFICATIONS.
14. EXISTING TREES WITHIN THE SITE SHALL BE SURVEYED, CO-ORDINATES OF THE TREE POSITIONS WILL NEED TO BE PROVIDED TO THE ENGINEER, WHO WILL INSTRUCT THE CONTRACTOR TO REMOVE ALL TREES THAT IMPACT THE ENGINEERING WORKS.
15. ALL MANHOLE COVERS TO BE MEDIUM DUTY UNLESS LOCATED IN THE ROADWAY OF WHICH MANHOLE COVER IS TO BE HEAVY DUTY.
16. THE MINIMUM COVER FOR STORMWATER PIPES IS 0.6m
17. THE BEDDING TYPE WILL DEPEND ON THE PIPE MATERIAL BEING USED. FOR CONCRETE PIPES, RIGID CLASS B BEDDING TYPE WILL BE USED AND FOR PVC PIPES, FLEXIBLE PIPE BEDDING TYPE WILL BE USED.
18. CONTOURS ARE INDICATIVE AND NOT ACCURATE. AN ENGINEERING SURVEY IS REQUIRED FOR ACCURATE LEVELS

Service authority approval

Position	Name	Date	Signature

Client(s)

Signature_______________ Date______

Client Drawing No.: Sht Of

Project title: *HANSMOESKRAAL CIVIL SERVICES*

Drawing title: ALL SERVICES LAYOUT

Scale: *1:500* Co-ordinate System: *WGS 84 - LO23*
Paper Size: *A1*

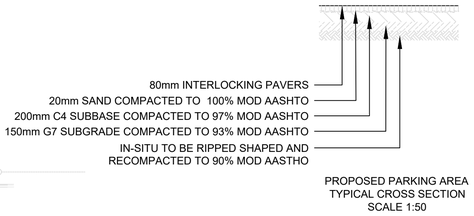
smec

Signature_______________ PR _______ Date _______

Process	Name	Date	Signature
Designed	L. MANYISA		
Checked	D. SHARP		
Verified	J. KAMPMAN		
Drawn	L.MANYISA		
Checked	J. KAMPMAN		

SMEC Drawing No.: C1187-HMK-GEN-GA-001 Rev 01

Appendix C Roads & Stormwater Layout



PROPOSED PARKING AREA
TYPICAL CROSS SECTION
SCALE 1:50

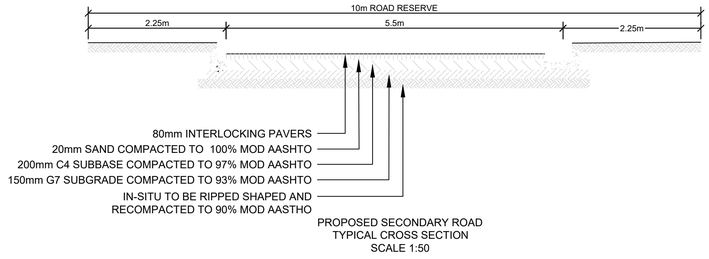
LEGEND

GENERAL
- FENCE
- TELECOM

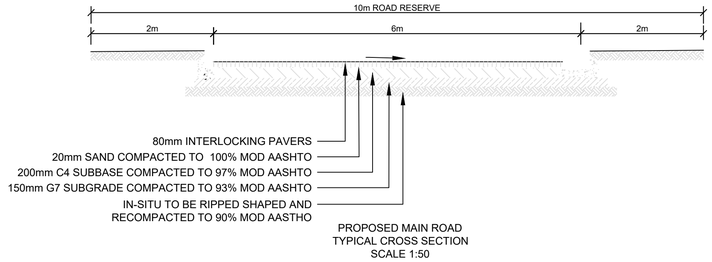
ROADS
- PAVING SURFACE

STORMWATER MANAGEMENT
- STORMWATER PIPE
- STORMWATER MANHOLE
- KERB INLET
- GRID INLET
- HEADWALL
- DETENTION POND
- STORMWATER SWALE

STORMWATER MUNICIPAL TIE-IN LAYOUT
N.T.S



PROPOSED SECONDARY ROAD
TYPICAL CROSS SECTION
SCALE 1:50



PROPOSED MAIN ROAD
TYPICAL CROSS SECTION
SCALE 1:50

FOR INFORMATION

Amendments

Rev	Date	Description	Initials
0	OCT 2024	FOR INFORMATION	L.M
1	DEC 2025	UPDATED SDP	E.D.T

Drawing notes

1. POSITIONS OF EXISTING SERVICES ARE APPROXIMATE AND ACTUAL POSITIONS AND LEVELS MUST BE DETERMINED ON SITEBY CONTRACTORS BEFORE WORK COMMENCES.
2. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE SANS 1200 SPECIFICATIONS AND PROJECT SPECIFICATIONS.
3. NO WORK TO COMMENCE OUTSIDE THE CONSTRUCTION LIMITS. ENGINEER MAY INSTRUCT WORK STOPAGE SHOULD ANY ACTIVITY COMMENCE OUTSIDE THE CONSTRUCTION LIMITS.
4. ALL MATERIAL TO BE APPROVED BY ENGINEER PRIOR TO INSTALLATION.
5. A COMPLETE SET OF DRAWINGS TO BE AVAILABLE ON SITE AT ALL TIMES.
6. DO NOT SCALE FROM THE DRAWINGS. ANY DISCREPANCIES, DISCREPANCIES OR MISSING DIMENSIONS WILL BE CORRECTED IN WRITING BY THE ENGINEER.
7. THE CONTRACTOR SHALL HAVE ALL THE NECESSARY WAYLEAVES IN PLACE PRIOR TO ANY CONSTRUCTION WORK.
8. THE CONTRACTOR TO COMPLETE A DOCUMENTARY EVIDENCE OF ALL THE EXISTING SERVICES SITUATED IN CLOSE PROXIMITY TO THE BULK EARTHWORKS.
9. ALL LEVELS TO BE CONFIRMED ON SITE. SURFACE CONDITIONS AND PLAN ACTIVITIES ACCORDINGLY.
10. ALL LEVELS IN METERS AND REFERS TO M.S.L.
11. CONTRACTOR TO VERIFY ALL LEVELS OF ALL EXISTING PIPES AND MANHOLES AT WHICH CONNECTIONS ARE REQUIRED AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO ANY CONSTRUCTION.
12. ALL CUT AND FILL EMBANKMENTS TO BE GRASSED AND PROTECTED WITH SOILSAVER OR SIMILAR EROSION CONTROL BLANKETS AS PER PROJECT SPECIFICATIONS.
13. EXISTING TREES WITHIN THE SITE SHALL BE SURVEYED, CO-ORDINATES OF THE TREE POSITIONS WILL NEED TO BE PROVIDED TO THE ENGINEER, WHO WILL INSTRUCT THE CONTRACTOR TO REMOVE ALL TREES THAT IMPACT THE ENGINEERING WORKS.
14. ALL MANHOLE COVERS TO BE MEDIUM DUTY UNLESS LOCATED IN THE ROADWAY OF WHICH MANHOLE COVER IS TO BE HEAVY DUTY.
15. THE MINIMUM COVER FOR STORMWATER PIPES IS 0.6m.
16. THE BEDDING TYPE WILL DEPEND ON THE PIPE MATERIAL BEING USED. FOR CONCRETE PIPES, RIGID CLASS B BEDDING TYPE WILL BE USED AND FOR PVC PIPES, FLEXIBLE PIPE BEDDING TYPE WILL BE USED.
18. CONTOURS ARE INDICATIVE AND NOT ACCURATE. AN ENGINEERING SURVEY IS REQUIRED FOR ACCURATE LEVELS

Service authority approval

Position	Name	Date	Signature

Client(s)

Signature _____ Date _____

Client Drawing No.: Sht Of

Project title

HANSMOESKRAAL CIVIL SERVICES

Drawing title

CIVIL SERVICES: ROADS & STORMWATER

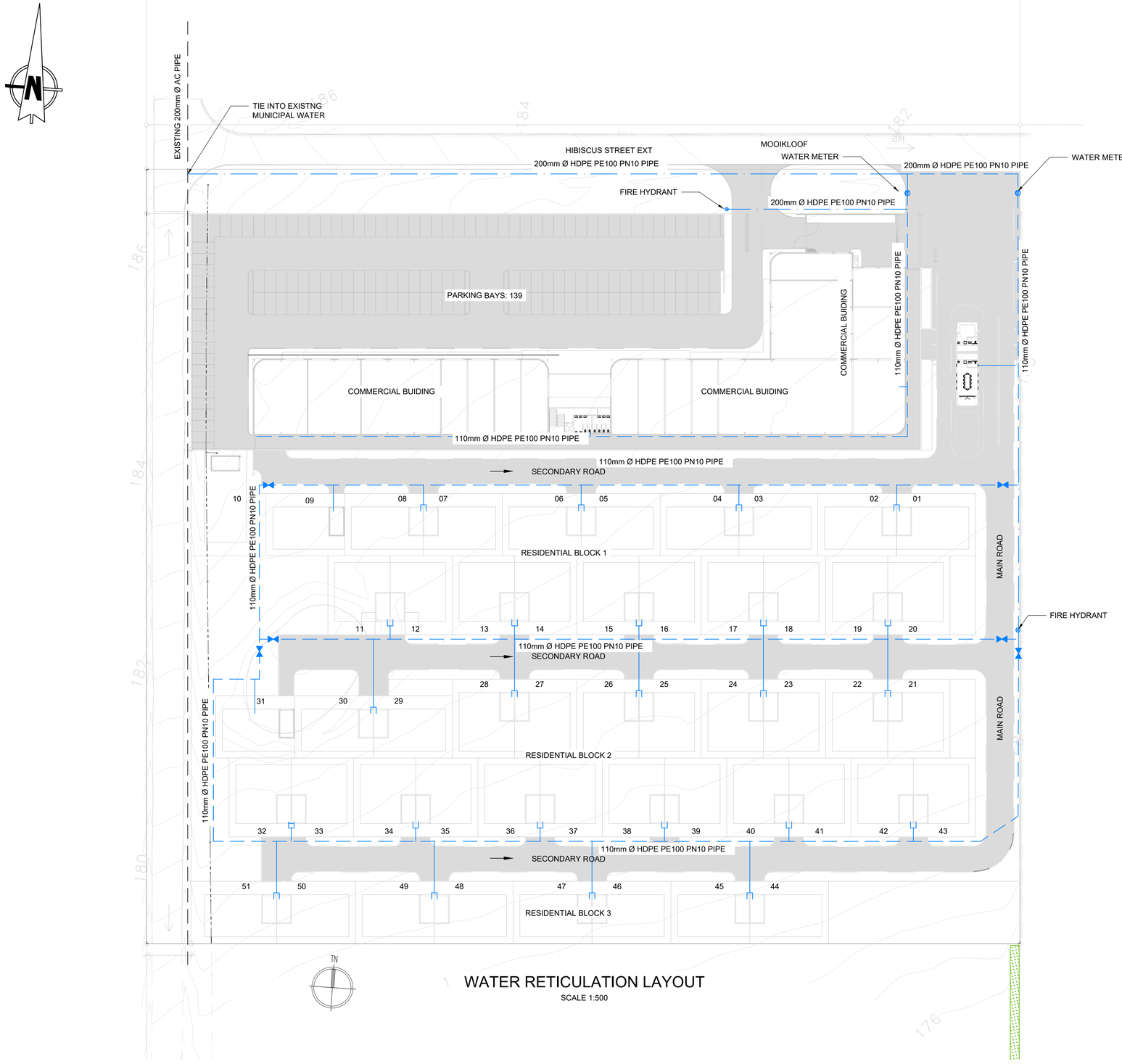
Scale: *1:500* Co-ordinate System: *WGS 84 - LO23*
Paper Size: *A1*

PR _____
Signature _____ Date _____

Process	Name	Date	Signature
Designed	L. MANYISA		
Checked	D. SHARP		
Verified	J. KAMPMAN		
Drawn	L.MANYISA		
Checked	J. KAMPMAN		

SMEC Drawing No.: C1187-HMK-RDS-GA-010 Rev 01

Appendix D Water Reticulation Layout



LEGEND

GENERAL
- TELECOM

WATER RETICULATION
EXISTING INFRASTRUCTURE
- 200mm Ø AC PIPE

PROPOSED INFRASTRUCTURE
- 200mm Ø HDPE PE100 PN10 PIPE
- 110mm Ø HDPE PE100 PN10 PIPE
- 50mm Ø HDPE PE100 PN10 PIPE
- FIRE HYDRANT
- ISOLATING VALVE
- WATER METER

WATER RETICULATION LAYOUT

SCALE 1:500

FOR INFORMATION

Amendments			
Rev	Date	Description	Initials
0	OCT 2024	FOR INFORMATION	E.D
1	DEC 2025	UPDATED SDP	E.D.T

Drawing notes

1. POSITIONS OF EXISTING SERVICES ARE APPROXIMATE AND ACTUAL POSITIONS AND LEVELS MUST BE DETERMINED ON SITE BY CONTRACTORS BEFORE WORK COMMENCES.
2. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE SANS 1200 SPECIFICATIONS AND PROJECT SPECIFICATIONS.
3. NO WORK TO COMMENCE OUTSIDE THE CONSTRUCTION LIMITS. ENGINEER MAY INSTRUCT WORK STOPAGE SHOULD ANY ACTIVITY COMMENCE OUTSIDE THE CONSTRUCTION LIMITS.
4. ALL LEVELS IN METERS AND REFERS TO M.S.L.
5. A COMPLETE SET OF DRAWINGS TO BE AVAILABLE ON SITE AT ALL TIMES.
6. DIMENSIONS MUST NOT BE SCALED OR ASSUMED. AFTER NOTIFICATION, DISCREPANCIES OR MISSING DIMENSIONS WILL BE CORRECTED IN WRITING BY THE ENGINEER.
7. THE CONTRACTOR SHALL HAVE ALL THE NECESSARY WAYLEAVES IN PLACE PRIOR TO ANY CONSTRUCTION WORK.
8. THE CONTRACTOR TO COMPLETE A DOCUMENTARY EVIDENCE OF ALL THE EXISTING SERVICES SITUATED IN CLOSE PROXIMITY TO THE BULK EARTHWORKS.
9. THE CONTRACTOR TO VERIFY EXISTING SURFACE CONDITIONS AND PLAN ACTIVITIES ACCORDINGLY.
10. ALL LEVELS IN METERS AND REFERS TO M.S.L.
11. CONTRACTOR TO VERIFY ALL LEVELS OF ALL EXISTING PIPES AND MANHOLES AT WHICH CONNECTIONS ARE REQUIRED AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO ANY CONSTRUCTION.
12. ALL CUT AND FILL EMBANKMENTS TO BE GRASSED AND PROTECTED WITH SOILSAVER OR SIMILAR EROSION CONTROL BLANKETS AS PER PROJECT SPECIFICATIONS.
13. EXISTING TREES WITHIN THE SITE SHALL BE SURVEYED, CO-ORDINATES OF THE TREE POSITIONS WILL NEED TO BE PROVIDED TO THE ENGINEER, WHO WILL INSTRUCT THE CONTRACTOR TO REMOVE ALL TREES THAT IMPACT THE CONSTRUCTION.
14. ALL MANHOLE COVERS TO BE MEDIUM DUTY UNLESS LOCATED IN THE ROADWAY OF WHICH MANHOLE COVER IS TO BE HEAVY DUTY.
15. THE MINIMUM COVER FOR STORMWATER PIPES IS 0.6m
16. THE BEDDING TYPE WILL DEPEND ON THE PIPE MATERIAL BEING USED. FOR CONCRETE PIPES, RIGID CLASS B BEDDING TYPE WILL BE USED AND FOR PVC PIPES, FLEXIBLE PIPE BEDDING TYPE WILL BE USED.
17. CONTOURS ARE INDICATIVE AND NOT ACCURATE. AN ENGINEERING SURVEY IS REQUIRED FOR ACCURATE LEVELS

Service authority approval			
Position	Name	Date	Signature

Client(s)

Signature _____ Date _____

Client Drawing No.: Sht Of

Project title: *HANSMOESKRAAL CIVIL SERVICES*

Drawing title: CIVIL SERVICES: WATER RETICULATION

Scale: *1:500* Co-ordinate System: *WGS 84 - LO23*

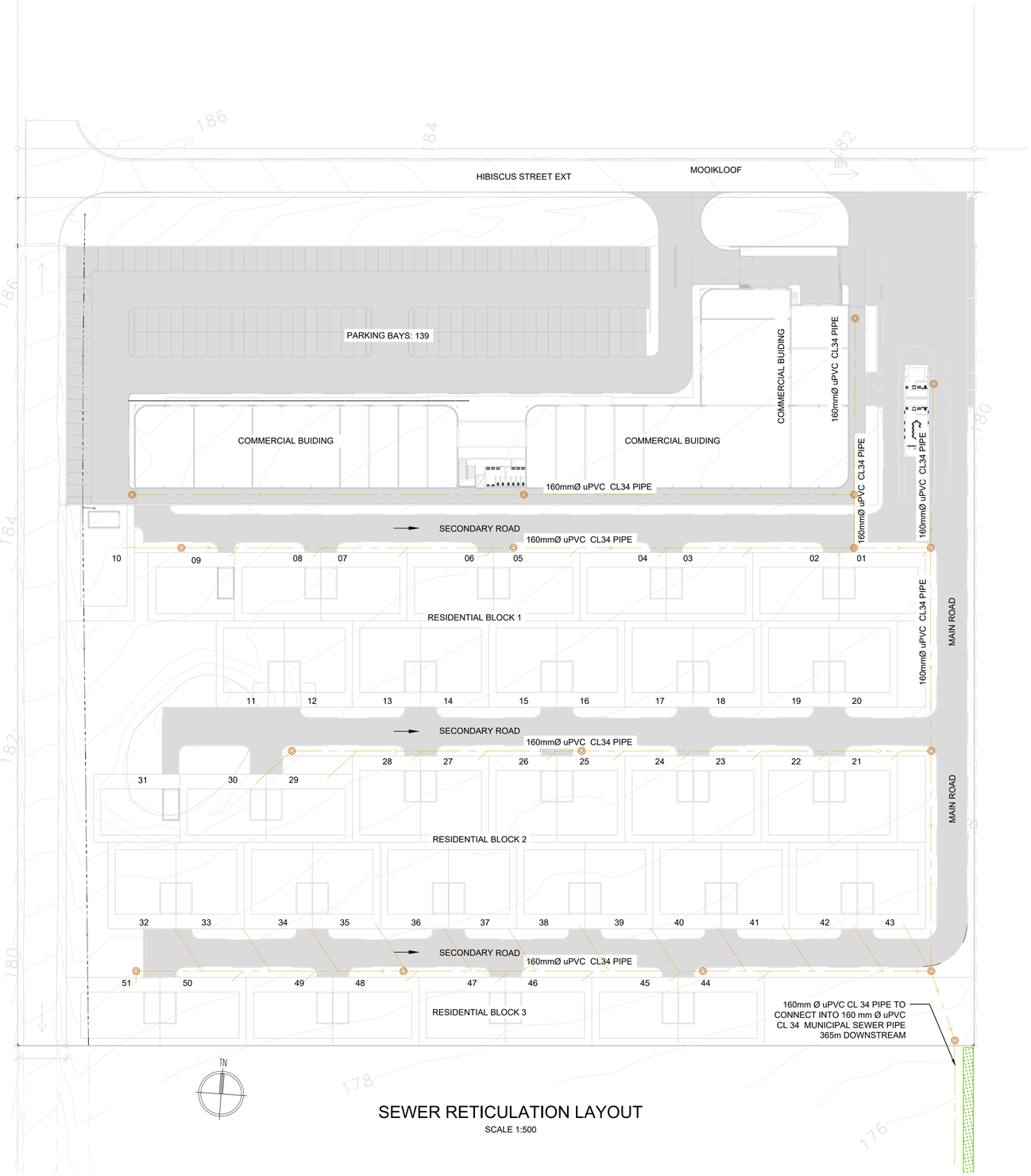
Paper Size: *A1*

Signature _____ PR _____ Date _____

Process	Name	Date	Signature
Designed	E. DU TOIT		
Checked	D. SHARP		
Verified	J. KAMPMAN		
Drawn	E. DU TOIT		
Checked	J. KAMPMAN		

SMEC Drawing No.: C1187-HMK-WAT-GA-030 Rev 01

Appendix E Sewer Reticulation Layout



SEWER RETICULATION LAYOUT

SCALE 1:500

LEGEND

GENERAL

FENCE

TELECOM

SEWER RETICULATION

160mm Ø uPVC CL34 SEWER RETIC PIPE

SEWER MANHOLE

SEWER MUNICIPAL TIE-IN LAYOUT
N.T.S

FOR INFORMATION

Amendments

Rev	Date	Description	Initials
0	OCT 2024	FOR INFORMATION	E.D
1	DEC 2025	UPDATED SDP	E.D.T

Drawing notes

1. POSITIONS OF EXISTING SERVICES ARE APPROXIMATE AND ACTUAL POSITIONS AND LEVELS MUST BE DETERMINED ON SITE BY CONTRACTORS BEFORE WORK COMMENCES.
2. ALL WORK TO COMPLY WITH SANS 10400 IN ACCORDANCE WITH THE SANS 1200 SPECIFICATIONS AND PROJECT SPECIFICATIONS.
3. NO WORK TO OCCUR OUTSIDE THE CONSTRUCTION LIMITS. ENGINEER MAY INSTRUCT WORK STORAGE SHOULD ANY ACTIVITY COMMENCE OUTSIDE THE CONSTRUCTION LIMITS.
4. ALL MATERIAL TO BE APPROVED BY ENGINEER PRIOR TO INSTALLATION.
5. A COMPLETE SET OF DRAWINGS TO BE AVAILABLE ON SITE AT ALL TIMES
6. CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE BEFORE WORK. DISCREPANCIES OR MISSING DIMENSIONS WILL BE CORRECTED IN WRITING BY THE ENGINEER.
7. THE CONTRACTOR SHALL HAVE ALL THE NECESSARY WAYLEAVES IN PLACE PRIOR TO ANY CONSTRUCTION WORK.
8. THE CONTRACTOR TO COMPLETE A DOCUMENTARY EVIDENCE OF ALL THE EXISTING SERVICES SITUATED IN CLOSE PROXIMITY TO THE BULK EARTHWORKS.
9. ALL LEVELS TO BE CONFIRMED WITH SURFACE CONDITIONS AND PLAN ACTIVITIES ACCORDINGLY.
10. ALL LEVELS IN METERS AND REFERS TO M.S.L.
11. CONTRACTOR TO VERIFY ALL LEVELS OF ALL EXISTING PIPES AND MANHOLES AT WHICH CONNECTIONS ARE REQUIRED AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO ANY CONSTRUCTION.
12. TOPSOIL TO BE REMOVED TO A NOMINAL DEPTH OF 150mm. STOCKPILED AND MAINTAINED FOR THE DURATION OF THE WORKS.
13. ALL CUT AND FILL EMBANKMENTS TO BE GRASSED AND PROTECTED WITH KOILSAVER OR SIMILAR EROSION CONTROL BLANKETS AS PER PROJECT SPECIFICATIONS.
14. ALL TREES WITHIN THE SITE SHALL BE SURVEYED, CO-ORDINATES OF THE TREE POSITIONS WILL NEED TO BE PROVIDED TO THE ENGINEER, WHO WILL INSTRUCT THE CONTRACTOR TO REMOVE ALL TREES THAT IMPACT THE ENGINEERING WORKS.
15. ALL MANHOLE COVERS TO BE MEDIUM DUTY UNLESS LOCATED IN THE ROADWAY OF WHICH MANHOLE COVER IS TO BE HEAVY DUTY.
16. ALL MANHOLES TO BE BENCHED AND CHANNELLED.
17. THE BEDDING TYPE WILL DEPEND ON THE PIPE MATERIAL BEING USED. FOR CONCRETE PIPES, RIGID CLASS B BEDDING TYPE WILL BE USED AND FOR PVC PIPES, FLEXIBLE PIPE BEDDING TYPE WILL BE USED.
18. CONTOURS ARE INDICATIVE AND NOT ACCURATE. AN ENGINEERING SURVEY IS REQUIRED FOR ACCURATE LEVELS

Service authority approval

Position	Name	Date	Signature

Client(s)

Signature _____ Date _____

Client Drawing No.: Sht Of

Project title: *HANSMOESKRAAL CIVIL SERVICES*

Drawing title: CIVIL SERVICES: SEWER RETICULATION

Scale: *1:500* Co-ordinate System: *WGS 84 - LO23*

Paper Size: *A1*

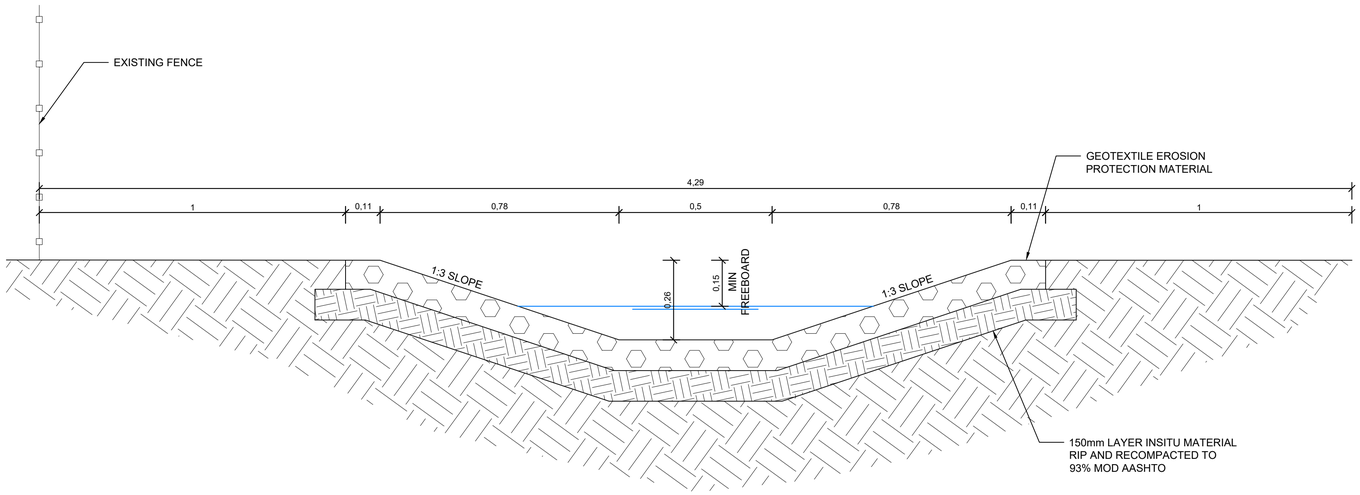
PR _____

Signature _____ Date _____

Process	Name	Date	Signature
Designed	E. DU TOIT		
Checked	D. SHARP		
Verified	J. KAMPMAN		
Drawn	E. DU TOIT		
Checked	J. KAMPMAN		

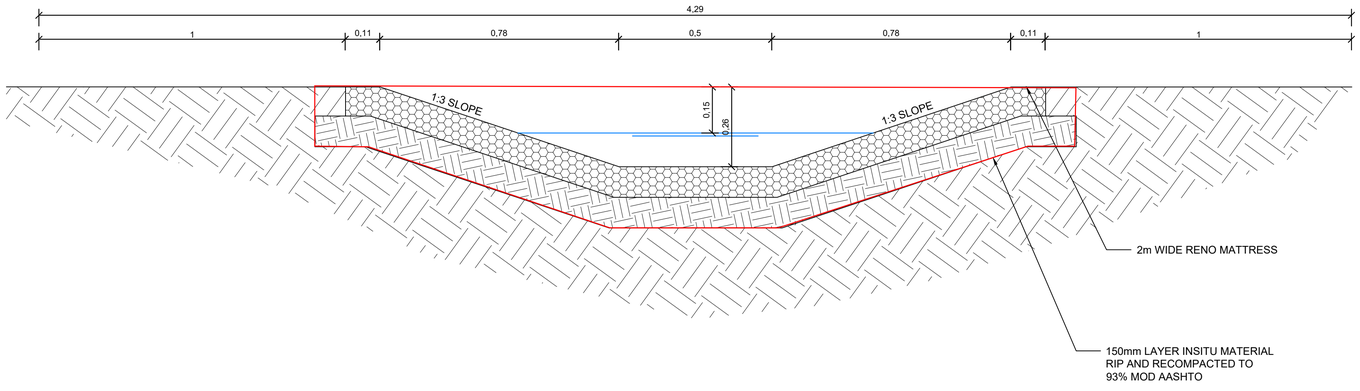
SMEC Drawing No.: C1187-HMK-SEW-GA-020 Rev 01

Appendix F Stormwater Details



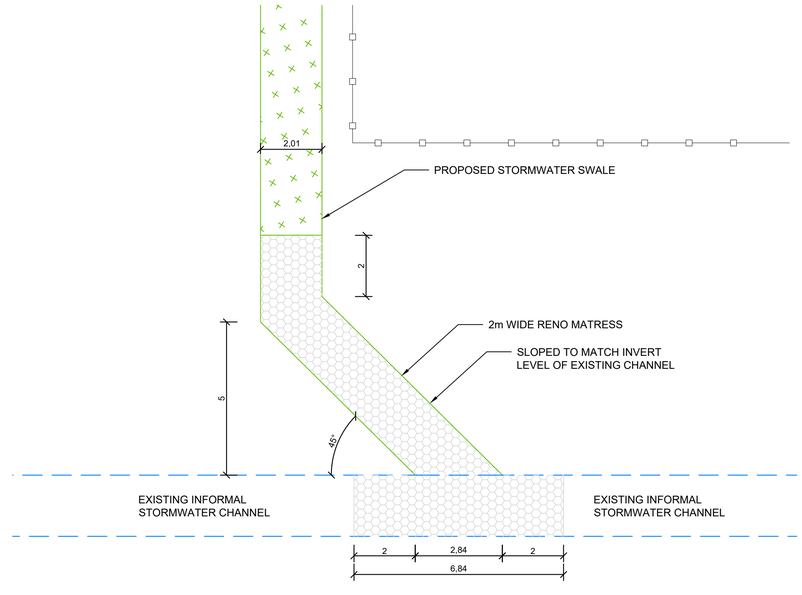
STORMWATER SWALE CROSS SECTION

SCALE 1:10



STORMWATER SWALE DISCHARGE CROSS SECTION

SCALE 1:10



STORMWATER SWALE DISCHARGE PLAN

SCALE 1:100

FOR INFORMATION

Amendments			
Rev	Date	Description	Initials
0	JAN 2025	FOR INFORMATION	E.D.T

Drawing notes

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6. DIMENSIONS MUST NOT BE SCALED OR ASSUMED. AFTER NOTIFICATION, DISCREPANCIES OR MISSING DIMENSIONS WILL BE CORRECTED IN WRITING BY THE ENGINEER.
7. THE CONTRACTOR SHALL HAVE ALL THE NECESSARY WAYLEAVES IN PLACE PRIOR TO ANY CONSTRUCTION WORK.
8. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES TO PROTECT ALL SERVICES LOCATED IN CLOSE PROXIMITY TO THE BULK EARTHWORKS.
9. CONTRACTOR IS TO TAKE COGNIZANCE OF SUBSURFACE CONDITIONS AND PLAN ACTIVITIES ACCORDINGLY.
10. ALL LEVELS IN METERS AND REFERS TO M.S.L.
11. CONTRACTOR TO VERIFY ALL LEVELS OF ALL EXISTING PIPES AND MANHOLES AT WHICH CONNECTIONS ARE REQUIRED AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO ANY CONSTRUCTION.
12. TOPSOIL TO BE REMOVED TO A NOMINAL DEPTH OF 150mm, STOCKPILED AND MAINTAINED FOR THE DURATION OF THE WORKS.
13. ALL DISTURBED AREAS TO BE REVEGETATED, GRASSED AND PROTECTED WITH SOILSAVER OR SIMILAR EROSION CONTROL BLANKETS AS PER PROJECT SPECIFICATIONS.
14. EXISTING TREES WITHIN THE SITE SHALL BE SURVEYED. CO-ORDINATES OF THE TREE POSITIONS WILL NEED TO BE PROVIDED TO THE ENGINEER, WHO WILL INSTRUCT THE CONTRACTOR TO REMOVE ALL TREES THAT IMPACT THE ENGINEERING WORKS.
15. ALL MANHOLE COVERS TO BE MEDIUM DUTY UNLESS LOCATED IN THE ROADWAY OF WHICH MANHOLE COVER IS TO BE HEAVY DUTY.
16. THE MINIMUM COVER FOR STORMWATER PIPES IS 0.6m
17. THE BEDDING TYPE WILL DEPEND ON THE PIPE MATERIAL BEING USED. FOR CONCRETE PIPES, RIGID CLASS B BEDDING TYPE WILL BE USED AND FOR PVC PIPES, FLEXIBLE PIPE BEDDING TYPE WILL BE USED.
18. CONTOURS ARE INDICATIVE AND NOT ACCURATE. AN ENGINEERING SURVEY IS REQUIRED FOR ACCURATE LEVELS

Service authority approval			
Position	Name	Date	Signature

Client(s)

Signature_____ Date_____

Client Drawing No.: Sht Of

Project title: *HANSMOESKRAAL CIVIL SERVICES*

Drawing title: CIVIL SERVICES: STORMWATER DETAILS

Scale: *AS SHOWN* Co-ordinate System: *WGS 84 - LO23*

Paper Size: *A1*

PR _____

Signature_____ Date _____

Process	Name	Date	Signature
Designed	E.DU TOIT		
Checked	D. SHARP		
Verified	J. KAMPMAN		
Drawn	E. DU TOIT		
Checked	J. KAMPMAN		

SMEC Drawing No.: C1187-HMK-STW-DT-016 Rev 00

SMEC South Africa

13 Progress Street
George Western Cape 6539
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Email: George@smec.com

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