ANNEXURE "U" – CLOSED CORPORATION RESOLUTION

RESOLUTION PASSED AT A MEETING OF THE MEMBERS OF HANSMOESKRAAL ENTERPRISES CC - REGISTRATION NUMBER 1986/015685/23

HELD VIRTUALLY

ON THE 22ND OF APRIL 2024

RESOLVED THAT:

1. The Close Corporation enters into a Joint Venture with Redrock Developments Pty (Ltd) to develop the following properties:

   1.1 ERF 4645, PACALTSDORP;
   1.2 ERF 4646, PACALTSDORP;
   1.3 ERF 4647, PACALTSDORP; and
   1.4 ERF 1291, PACALTSDORP

2. The Close Corporation shall accept all the responsiblities as per the Joint Venture Agreement entered into and signed by the Parties and specifically undertakes to:

   a) Avail the aforesaid properties for rezoning, developing and subdividing into full- and sectional title units;

   b) Pass transfer of the subdivided full- and sectional title units to third party purchasers;

   c) Pay the normal and current municipal rates and taxes on the property until the last phase of development is completed.

   d) Bear the risk of abnormal costs associated with the Property, including but not limited to the re-zoning of erf 1291, the transfer of erf 4647 into the name of Hansmoeskraal CC and a possible road construction with entrances on erf 1291, as/if required by the George municipality.

3. The Close Corporation shall be compensated as per Clause 5 of the Joint Venture Agreement entered into and signed by the Parties.

4. NOLAN LEECH MUNSAMY, in his capacity as a MEMBER be and is hereby authorised to sign:

   4.1 the relevant documents which may be necessary for the development of the properties and;

   4.2 the relevant documents which may be necessary for the registration of transfer of the properties into the names of third party purchasers.

5. It is further recorded that as soon as the Close Corporation is compensated in terms of the Joint Venture Agreement, NOLAN LEECH MUNSAMY, shall become responsible for the day to day management of the Close Corporation and shall attend to any business, legal and accounting

4.1 the relevant documents which may be necessary for the development of the properties and;

4.2 the relevant documents which may be necessary for the registration of transfer of the properties into the names of third party purchasers.

5. It is further recorded that as soon as the Close Corporation is compensated in terms of the Joint Venture Agreement, NOLAN LEECH MUNSAMY, shall become responsible for the day to day management of the Close Corporation and shall attend to any business, legal and accounting engagements and shall be authorised to sign all documentation and correspondence on behalf the Close Corporation relating to the aforesaid.

MEMBERS **SIGNATURES**

1. Belinda Munsamy

2. Mandy Ilona Munsamy

3. Selvan Munsamy

4. Nolan Leech Munsamy

5. Geraldine Munsamy

TO BE SIGNED BY EACH AND EVERY MEMBER

ANNEXURE "V" – POWER OF ATTORNEY

POWER OF ATTORNEY

I, the undersigned

Nolan Leech Munsamy

in my capacity as the Authorized Member/Director of

Hansmoeskraal Enterprises CC Registration number CK86/15685/23

the registered owner of

Erven 4645 and 4646 Pacaltsdorp

do hereby appoint Jan Vrolijk Town Planner/Stadsbeplanner to prepare, sign and submit the following applications to the George Municipality:

- an application in terms of Section 15(2)(f) of the Land Use Planning By-Law for the George Municipality, 2023 for the removal of the endorsement on page 5 of Title Deed T795/87, the Title Deed of Erf 4645 Pacaltsdorp.
- an application in terms of Section 15(2)(f) of the Land Use Planning By-Law for the George Municipality, 2023 for the removal of the endorsement on page 5 of Title Deed 796/87, the Title Deed of Erf 4646 Pacaltsdorp.
- an application in terms of Section 15(2)(e) of the Land Use Planning By-Law for the George Municipality, 2023 for the consolidation of Erven 4645 to 4647 Pacaltsdorp.
- an application in terms of Section 15(2)(a) of the Land Use Planning By-Law for the George Municipality, 2023 for the rezoning of the consolidated erf from Resort Zone to a Subdivisional Area to allow for group housing development comprising of the following:

    - 47 Residential Zone II erven (group housing at a density of ±28du/ha);
    - 1 Open Space Zone II erf (private open space);
    - 1 Transport Zone III erf (private road); and
    - 1 Transport Zone II erf (public road).

- an application in terms of Section 15(2)(d) of the Land Use Planning By-Law for the George Municipality, 2023 for the subdivision of the Subdivisional Area into:

    - 47 Residential Zone II erven (Portions 1 to 27 and 29 to 48);
    - 1 Open Space Zone II erf (Portion 28)
    - 1 Transport Zone III erf (Portion 49); and
    - 1 Transport Zone II erf (Portion 50).

- an application in terms of Section 15(2)(b) of the Land Use Planning By-Law for the George Municipality, 2023 for the relaxation of the northern building line on Portions 9 to 21 from 3.0 metres to 1.5 metres and the eastern building line on Portion 21 to 27 from 3.0 metres to 1.5 metres to allow for the construction of dwelling units.

Signed at Pacaltsdorp on 28 March 2025

Nolan Leech Munsamy

ANNEXURE "W" – CONVEYANCER CERTIFICATE

CONVEYANCER CERTIFICATE

I, the undersigned,

IZAK STEPHANUS VENTER (84995), in my capacity as conveyancer

do hereby certify that a search was conducted in the Deeds Registry, Cape Town regarding the following properties:

1. ERF 4645 PACALTSDORP
   IN THE MUNICIPALITY AND DIVISION OF GEORGE
   PROVINCE OF THE WESTERN CAPE

2. ERF 4646 PACALTSDORP
   IN THE MUNICIPALITY AND DIVISION OF GEORGE
   PROVINCE OF THE WESTERN CAPE

In respect of which it was found that there are no bonds or restrictive conditions registered against such properties prohibiting it from being utilised / developed for the following purposes (as elaborated on in more detail in the accompanying application):

1. That prevent the consolidation and subdivision of the erven for the development of group housing.

SIGNED at **George on 1 April 2025.**

IZAK STEPHANUS VENTER (84995)

ANNEXURE "X" - PACALTSDORP / HANSMOESKRAAL LOCAL SPATIAL DEVELOPMENT FRAMEWORK, 2015

Project / Projek:

LOCAL STRUCTURE PLAN
PACALTSDORP / HANS MOES KRAAL
PLAASLIKE STRUKTUURPLAN

Plan:

LOCAL STRUCTURE PLAN / PLAASLIKE STRUKTUURPLAN

PROPOSED LAND USES	VOORGESTELDE GRONDGEBRUIKE
Nature Area	Natuurgebied
Public Open Space	Publieke Oop Ruimte
Private Open Space	Privaat Oop Ruimte
Agricultural	Landbou
Rural Residential	Landelike Bewoning
Single Residential	Enkel Residensieël
Medium Density Residential	Medium Digtheid Residensieël
High Density Residential	Hoë Digtheid Residensieël
Subsidised / Social Housing	Gesubsidieërde / Sosiale Behuising
Business	Besigheids
Authority Use	Oweheidsgebruik
Community	Gemeenskap
Resorts	Oorde
Residential Estate	Residensiële Landgoed
Special Investment Area	Spesiale Investerings Area
Roads	Paaie

Anotation / Anotasie

Public Parking	P	Openbare Parkering
Picnic Area	PA	Openbare Parkering
Primary School	PS	Laerskool
Secondary School	SS	Hoërskool
Creché	CS	Bewaarskool
Clinic	CL	Kliniek
Church	CH	Kerk
Municipal Offices	MO	Munisipale Kantore
Library	B	Biblioteek
Police	PL	Polisie
Sports Fields	SF	Sportvelde
Resevoirs	R	Resevoirs
Sewerage Works	SW	Rioolwerke
Cemetery	C	Begrafplaas
N2 National Road		N2 Nasionale Pad
Main Distrubutor Roads		Hoof Verspreiderspad
Secondary Distributor Roads		Sekondêre Verspreiderspad
Railway Lines		Spoorlyn
Urban Edge		Stedelike Grens

FIG. NO.:	ANNEXURE H
DATE / DATUM:	SEPTEMBER 2013
SCALE / SKAAL:	1 : 15000

Client / Kliënt:

GEORGE MUNICIPALITY

GEORGE MUNISIPALITEIT

setplan
SETTLEMENT PLANNING SERVICES
CONSULTING TOWN & REGIONAL PLANNERS

PO BOX 1566, GEORGE, 6530
85 DAVIDSON ROAD, GEORGE
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FAX: 044 874 4549
E-MAIL: setplangr@telkomsa.co.za

ANNEXURE "Y" – TRAFFIC IMPACT ASSESSMENT

URBAN ENGINEERING CONSULTANTS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

TRAFFIC IMPACT ASSESSMENT

PROPOSED DEVELOPMENT OF ERVEN 4645 & 4646, PACALTSDORP, GEORGE

Report Number 24-150_TIA

Date: December 2024 Revision (0)

URBAN ENGINEERING
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

COVER LETTER

It is herewith certified that this Traffic Impact Investigation has been prepared according to requirements of the TMH 16 (Committee Draft 2.0 – May 2018) South African Traffic Impact and Site Traffic Assessment Manual.

This Traffic Assessment was undertaken by:

Name:	Frans Rudolf van Aardt
Telephone number:	044 204 6834
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ECSA registration:	Professional Engineer (Pr.Eng)
ECSA Registration Number:	20090271
Academic Qualifications:	B. Ing (RAU 2002) M. Ing (UJ 2011)

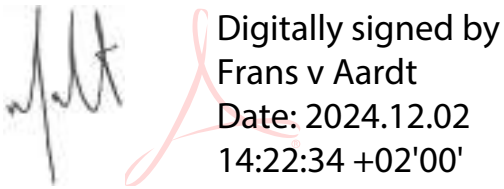
QUALITY ASSURANCE DATA

Report Title:	PROPOSED DEVELOPMENT OF ERVEN 4645 & 4646, PACALTSDORP, GEORGE
Client:	Redrock Development
Report Number:	24-150_TIA
Revision Number	Revision (0)

Revision History

Date	Rev	Written By	Issued to		Distribution	Format
			Name	Institution		
02 Dec 2024	0	Frans v Aardt	Jan Vrolijk	Jan Vrolijk Town Planners	email	.pdf
			Gerrit Gouws	Redrock Development	email	.pdf

Prepared by:



Frans Rudolf van Aardt (B.Ing, M.Ing, Pr.Eng)
(on behalf of Urban Engineering Consultants (Pty) Ltd)

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LIST OF ABBREVIATIONS

TIA	Traffic Impact Assessment
SANRAL	South African National Roads Agency SOC Limited
PGWC	Provincial Government of the Western Cape
AMP	Access Management Plan
WCG	Western Cape Government
RDE	Roadside Development Environment
GLA	Gross Leasable Area
SATGRM	South African Trip Generation Rates Manual
LOS	Level of Service
DoT	Department of Transport
RDE	Roadside Development Environment
MR	Main Road
DR	Divisional Road
RNIS	Road Network Information System
SRZ1	Single Residential Zone 1
BZIII	Business Zone 3
AWSC	All Way Stop Controlled Intersection
LILO	Left-in Left-Out

1 INTRODUCTION

Urban Engineering Consultants (Pty) Ltd was appointed by Redrock Development to undertake a Transportation Investigation pertaining to the proposed consolidation and subsequent development of erven 4645 & 4646 in Pacaltsdorp, George.

1.1 BACKGROUND

It is the intention of Redrock Development to apply for approval for consolidation of the existing erven, to enable the development of a new residential estate consisting of 52 dwelling units.

1.2 TERMS OF REFERENCE

Transportation investigations essentially need to be undertaken in accordance with the following guidelines:

- National Land Transport Act, 2009 (Government Gazette No. 32110)
- South African Traffic Impact & Site Traffic Assessment Manual (TMH 16 Volume 1, COTO)
- Access Management Guidelines (WCG Dept. Transport and Public Works, 2020)
- Manual for Traffic Impact Studies RR 93/635 (DoT, 1995)

To better align with the recommendations of the TMH16, the Access Management Guidelines recommends that when a development is likely to generate a minimum of 50 additional vehicular trips in a highest hour of its traffic generation, (including passer-by trips) a TIA is required.

1.3 PRIMARY OBJECTIVES OF THIS REPORT

This study will look at the effect of the additional traffic generated by the proposed operation, on the surrounding road network. Where necessary, the report will aim to introduce mitigation measures in order to reduce this impact at the site, as well as on the surrounding transportation network.

1.4 STUDY OBJECTIVES

The study objectives are:

i. Assess the traffic conditions on the existing road network.

ii. Assess the traffic generation effects of the proposal (if any)

iii. Assess the interface conditions between the road network and the proposed development.

iv. Highlight any traffic concerns resulting from the proposed development (including parking and non-motorised transport)

v. Make recommendations.

1.5 SITE INVESTIGATION

A site inspection was done by Frans van Aardt of Urban Engineering on Friday 22 November 2024. A record of some of the photos taken during the site inspection has been attached as **ANNEXURE A** to this report. During the inspection, the upgrade of Heather Street was underway, and Heather Street was open for one way traffic only (refer to the photos attached as **ANNEXURE A**). This partial road closure significantly impacted traffic volumes

2 LOCALITY AND SITE DESCRIPTION

The site is situated on the corner of Heather Street and Beach Road in Pacaltsdorp. The site center has approximate WGS 84 coordinates of 34°1'24.72"S and 22°27'7.06"E.

Figure 2-1 - Locality Plan

Access to the site is directly opposite the Heather/Clinic Street intersection, as indicated in Figure 2-2 below.

Figure 2-2 - Erven 4645 and 4646

3 ZONING

According to George Municipality's GIS Viewer, the site is zoned RZ for Tourist Accommodation.

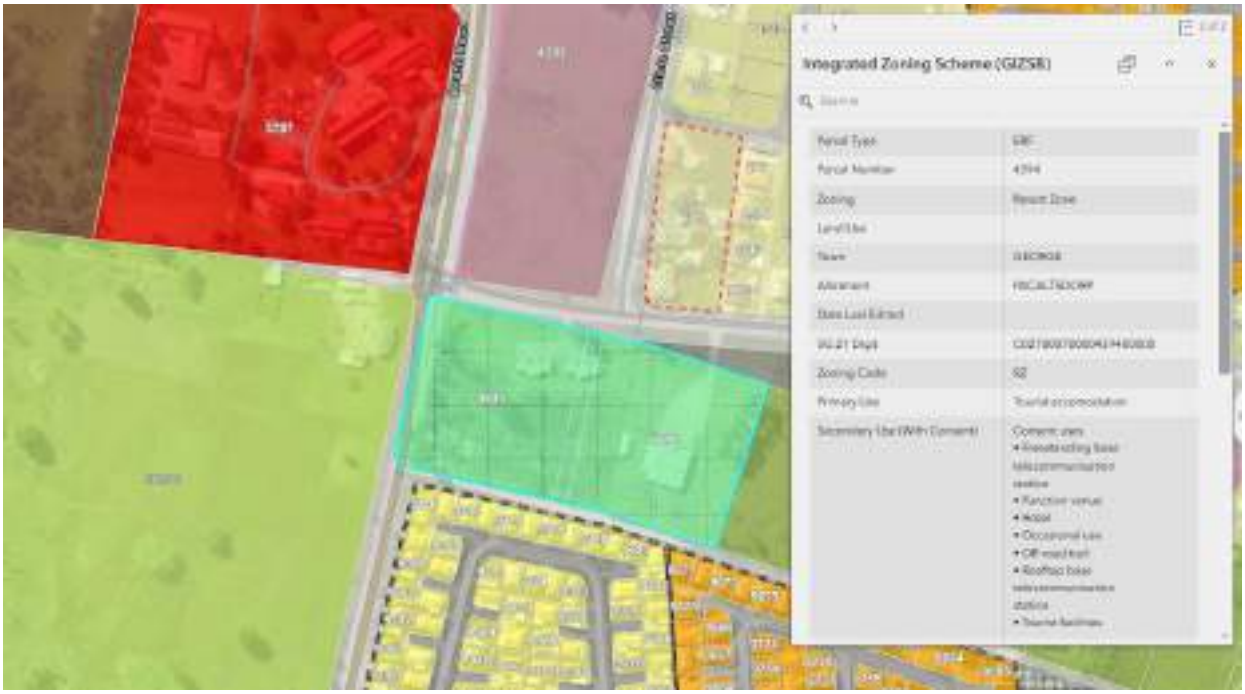


Figure 3-1 - Current Zoning

4 SITE INSPECTION

The site was visited by Frans van Aardt of Urban Engineering on 22 November 2024. Photos taken during the inspection have been attached as **ANNEXURE A** to this report. During the inspection, the upgrade of Heather Street was underway, and Heather Street was open for one way traffic only (refer to the photos attached as **ANNEXURE A**).

Figure 4-1 - Site Photo

5 THE DEVELOPMENT PROPOSAL

The developer intends to consolidate erven 4646 and 4645 to enable the development of 54 residential dwellings, as indicated in Table 5-1 below:

LEGEND				
COLOUR CODE	ZONING	AMOUNT	AREA m²	% OF TOTAL AREA
	GENERAL RESIDENTIAL ZONE II - GROUP HOUSING (100m² - 249m²)	43	9510.75m²	50.4%
	GENERAL RESIDENTIAL ZONE II - GROUP HOUSING (250m² - 300m²)	9	2485.63m²	14.72%
	OPEN SPACE ZONE II	2	454.14m²	2.68%

Table 5-1 - Proposed Zonings

A conceptual Site Development Plan (SDP) was prepared by Jan Vrolijk Town Planners and has been attached as **ANNEXURE B** to this report. It is the owner's intention to develop the site in two distinct phases as indicated in Figure 5-1.

Figure 5-1 - Extract of SDP

6 SURROUNDING ROAD NETWORK

Depending on which guidelines is being used, the nomenclature used in road classification varies slightly. The differences between the terms used in the 2006 Department of Transport (DoT) Guidelines and those specified in the South African Road Classification and Access Management Manual (COTO TRH 26, May 2018), are listed below:

Road Class	Function	DoT 2006 Guidelines	COTO 2012 (TRH 26 Manual)
Class 1	Mobility	Primary Distributor	Principal Arterial
Class 2		Regional Distributor	Major Arterial
Class 3		District Distributor	Minor Arterial
Class 4	Access	District Collector	Collector
Class 5		Access Road	Local Street
Class 6		Non-motorised access way	Walkway

Table 6-1 - Road Classification Nomenclature

Roadways are classified by function on the basis of the priority given to land access versus through-traffic movement. Class 1 and 2 arterial roads provide a predominantly “mobility” function and Classes 4 and 5 roads perform a collector and local “access” function.

The functions of “mobility” and “access” overlap on minor arterials (Class 3 roads). This relationship between access and mobility has been indicated schematically in Figure 6-1.

Access Management is particularly important along Principal, Major and Minor Arterials and other primary roads that are expected to provide safe and efficient movement of traffic as well as limited access to property. However, Access Management is also necessary on lower-order roadways, such as Collector Streets and Local Streets, to address safety considerations, such as sight distance and corner clearance.

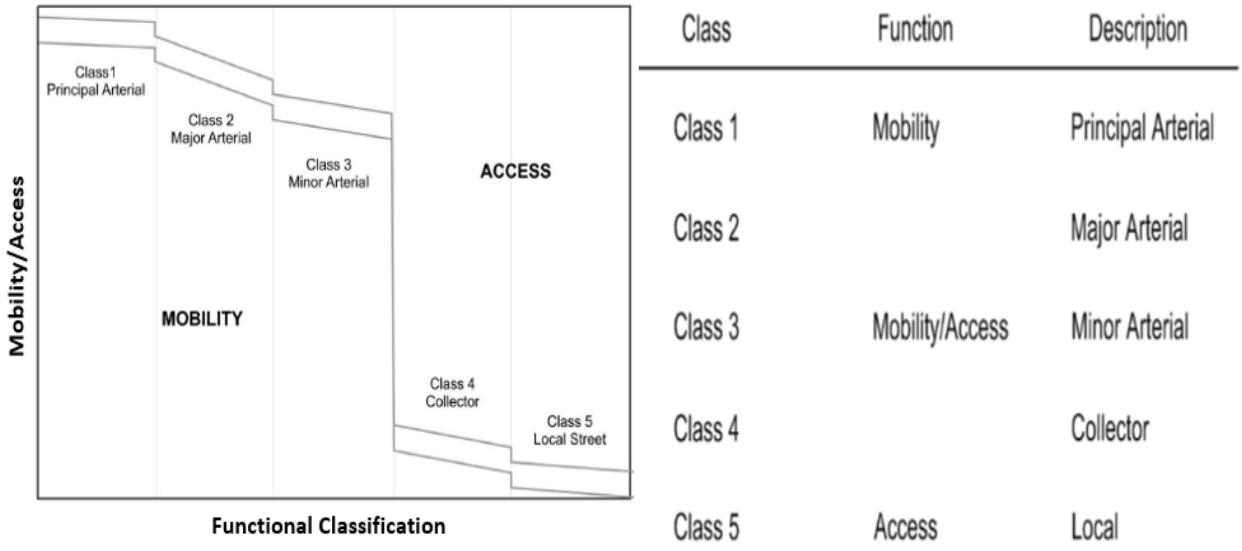


Figure 6-1 - Relationship Between Access and Mobility

6.1 BEACH ROAD (MR00349)

Beach Road (MR349) is situated within the George municipal area but falls under the authority of the Western Cape Provincial Government. Even though the proposed development does not border directly onto the road, Beach Road still plays a critical role in the proposed development's surrounding road network as Beach Road ultimately acts as a primary connection between the development and the rest of the George transportation network. It is expected that most of the traffic generated by the development, will ultimately make its way onto Beach Road at some point in time.

According to the current (2006) "*George Roads Master Plan*" compiled by Kantey and Templer, Beach Road (MR349) is classified as a Class 3, District Distributor. It is a four-lane divided arterial which forms a crucial link between Pacaltsdorp's Residential areas, the George CBD & Industrial areas as well as the N2-National Road. It is a major carrier of light and heavy vehicles, public transport and non-motorised road users.

Figure 6-2 - View Along Beach Road

According to Western Cape Government's RNIS website, MR00349 is a 4.63km long, Class 3 (Urban) Minor Arterial. The road spans between TR209 (Hope Street Circle) and Heather Street. (Relevant RNIS Data has been attached as **ANNEXURE C** to this report)

Figure 6-3 - RNIS DR01297 Strip Chart

This is further reinforced in the Beach/Main and York Street Arterial Management Plan (Nadeson Consulting, Rev 02 dated May 2020), which classifies the relevant section of Beach Road as a Class 3 Minor Arterial.

Intersection From	Intersection To	Classification
Courtenay Street (N12)	Hope Street	Class 3
Hope Street	N2 Interchange	Class 2
N2 Interchange	Unnamed Road (Pacaltsdorp)	Class 3

Figure 6-4 - Road Classification according to Beach/Main/York AMP (Nadeson Consulting)

According to the AMP, the Heather Street intersection is the boundary between the Intermediate and Suburban Roadside Development Environment.

Road	Intersection From	Intersection To	Classification
York Street	Courtenay Street (N12)	Union Street	CBD - Urban
York Street	Union Street	Railroad south of Hope Street	Suburban
York Street	Railroad south of Hope Street	N2 Interchange	Intermediate
Beach Road	N2 Interchange	Pacaltsdorp High School	Suburban
Beach Road	Pacaltsdorp High School	Beukes Street	CBD - Urban
Beach Road	Beukes Street	Heather Street	Intermediate
Beach Road	Heather Street	Unnamed Road Pacaltsdorp	Suburban

Figure 6-5 - RDE according to Beach/Main/ York AMP (Nadeson Consulting)

Ther are no intersection improvements or changes suggested for the Beach/Heather intersection in the Nadeson Beach/Main/York AMP.

6.2 HEATHER STREET

As noted earlier in this report, the Heather Street road upgrade was underway at the time of this report and hence some of the information supplied in this paragraph may possibly be outdated once the road upgrade has been completed.

Heather Street was not included in the George Roads Master Plan and Classification prepared by Kantey and Templer in June 2006, but according to the Road Classification on the George IMQS website, Heather Street is classified as a Class 4 Collector (refer to Figure 6-6)

Figure 6-6 - IMQS Road Classification

Prior to the Heather Street upgrade, the road was a 6m wide, residential street surfaced with interlocking paving blocks. The road reserve is approximately 18m wide and includes a 1.8m wide pedestrian sidewalk along the North and North Western road edge. The road edges are protected by means of pre-cast barrier kerbs and properties situated next to the road have direct driveway access onto the street.

Figure 6-7 – Historic photos of Heather Street (prior to road upgrade)

Heather Street forms part of the GIPTN bus routes with various GO GEORGE bus stops situated along this specific section of road:

6.3 CLINIC STREET

Clinic Street is a 5m wide residential street situated within an 18m road reserve. The road is surfaced with interlocking paving blocks with mountable kerbs along both edges. There are no sidewalks installed along Clinic Street. At the time of the inspection, the Clinic Street/ Heather Stret intersection was closed as it formed part of the Heather Street road upgrade (Figure 6-8). Clinic Street is classified as a Class 5 Local Residential Road.

Figure 6-8 - Clinic/Heather Street Intersection

6.4 ROAD CLASSIFICATIONS

In terms of the TRH 26 (South African Road Classification and Access Management Manual), the relevant road classifications are defined as follows:

6.4.1 CLASS U3 URBAN MINOR ARTERIALS

Urban minor arterials would typically be required to serve traffic in most urban areas, including small towns.

In cities and larger towns, the Class U3 arterials would be used to provide connections between districts of the city or town and form the last leg of the journey on the mobility road network, bringing traffic to within one kilometre of its final destination. In small towns, they would be used to provide general overall mobility to the whole town. The arterials can also be used to serve economic activity centres that are not served by Class 1 or 2 arterials.

The Class U3 arterials should also be used to serve as connectors to rural Class 3 routes. They should preferably start and stop at arterials of equal or one higher Class (2 to 3), but can connect to Class 1 principal arterials.

Minor arterials function as through routes on a district scale. While still carrying predominantly through traffic, they serve shorter distance trips with a length of around 2 km, but can be as short as a single block if connecting higher order routes. The minor arterials would typically carry volumes of traffic of between 10 000 and 40 000 vehicles per day.

6.4.2 CLASS U4 URBAN COLLECTOR ROADS

Collector streets are used to penetrate local neighbourhoods with the purpose of collecting (and distributing) traffic between local streets and the arterial system. The streets are mainly intended to serve an access function with limited mobility and traffic volumes; trip lengths and continuity must be limited.

They should ideally not carry any through traffic but only traffic with an origin or destination along or near to the street. The majority of the traffic using the collector street will have a destination in the street itself or in a local street leading off the collector. A collector street must not be quicker to use to pass through an area than a mobility road although it is recognized that in the absence of a mobility route, collectors must allow for some through traffic, albeit at low speeds.

Class 4a major collectors may also be used in preference to arterials when “mixed” through and local traffic is unavoidable, such as when arterials pass commercial centres with no alternative access. In this case, the local access traffic must be favoured at the expense of the mobility function.

In terms of the TRH 26 Manual, collectors must be classified as either 4a or 4b as follows:

i) Class 4a Commercial collector street

These collectors are found in areas with commercial, business, industrial, shopping and mixed-use residential developments. The streets carry a high percentage of heavy vehicle traffic and public transport.

Typical commercial collectors are CBD streets (whether two-way or one-way), shopping centre streets, activity spines and industrial distributors.

Traffic volumes on the collectors vary greatly depending on their location. In busy shopping areas, the collectors can carry up to 25 000 vehicles or even more per day. The lengths of the roads should be limited to a maximum of about 2 km or 3 km if no through traffic is present.

ii) Class 4b Residential collector street

These collectors are found in residential areas and almost exclusively serve residential traffic and public transport.

Residential collectors should not carry more than about 10 000 vehicles per day or 1 000 vehicles during peak hours. These volumes are the maximum that can safely be accommodated on this class of streets. If Class 4b residential collector street volumes exceed 10 000 per day, this is an indication that re-classifying the road may be required.

The lengths of the roads should be limited to a maximum of about 2 km.

6.4.3 CLASS U5 URBAN LOCAL STREETS

Class 5 streets provide access to individual properties. As they must provide exclusively an access or activity function, both traffic volumes and trip lengths must be limited. They must not be continuous between roads of an order higher than Class 4.

Local streets should not carry any through traffic but only traffic with an origin or destination along the street, i.e. all the traffic using the local street will have a destination in the street itself.

In terms of the TRH 26, local streets must be classified as either 5a or 5b as follows:

i) Class 5a Commercial local street

These local streets are found in areas with commercial, business, industrial, shopping and mixed-use residential developments. The streets often carry a high percentage of heavy vehicle traffic which uses the street to access loading areas or bus stops.

Commercial local streets should not carry volumes of more than about 5 000 vehicles per day. The length of the street should be limited to a maximum of about 1 km.

ii) Class 5b Residential local street

These local streets are found in residential areas and almost exclusively serve residential traffic and possibly some public transport as well as refuse and small delivery trucks.

Residential local streets should not carry more than about 1 000 vehicles per day or 100 vehicles during peak hours. If Class 5b residential local street volumes exceed 5 000 per day, this is a criterion to classify the road as a Class 4b residential collector.

Local residential streets should be short blocks of less than 0.5 km, with one kilometre being the maximum for safety reasons.

7 INTEGRATION WITH GO GEORGE

The George Integrated Public Transport Network (GIPTN) is a project aimed at providing a new and improved public transport system for George and surrounding areas. GO GEORGE is operated by the public transport operators with existing services in the George area. Heather Street plays an important role in the Go George network as indicated in Figure 7-1.

Figure 7-1 - Extract of GO GEORGE Route Map

8 BACKGROUND TRAFFIC VOLUMES

Due to the Heather Street road upgrade, traffic counts at the Heather/Beach Road and Heather/Clinic Street Intersections could not be recorded at the time of this investigation. However, a recent (September 2023) provincial traffic count at the Beach/Heather intersection revealed that a total of 1,387 vehicles (Light, Heavy, taxi and busses) moved through the intersection, during the 18-hour traffic count period (04:00 to 22:00). The AM Peak Hour occurred between 07:00 and 08:00 (115 light vehicles) and the PM peak hour between 17:00 and 18:00 (146 light vehicles). The RNIS data has been attached as **ANNEXURE C**, but an extract of the traffic flow profile has been included below.

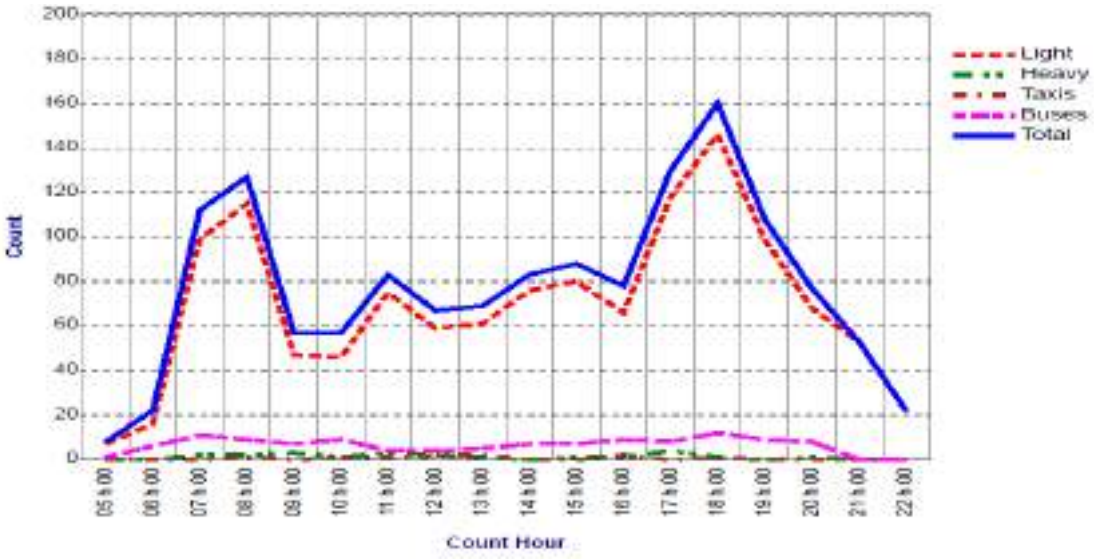


Figure 8-1 - Traffic Flow Profile

9 OTHER RELEVANT DEVELOPMENTS AND STUDIES

9.1 PTN 20 OF FARM HANSMOESKRAAL NR 202

The proposed development entails the subdivision of PTN 20 of Farm 202 into 16 residential erven. Access is proposed from Heather Street with a servitude right of way over Erf 1291, which belongs to the same owner as PTN 20 of Farm 202. The position of PTN 20 of Farm 202 in relation to the site is indicated in Figure 9-1 below.

Figure 9-1 – Position of "The Site" vs PTN 20 of Farm 202

The town planning application was submitted by the office of Marike Vreken Urban & Environmental Planners and includes an unreferenced Transport Impact Assessment (dated April 2023) prepared by Liezl Stodart. According to the TIA, the proposed development has the potential to generate a total of 14 AM and 14 PM peak hour trips. The TIA includes SIDRA intersection analysis based on background traffic counts recorded by Nick Venter of NVTS on Thursday 24 February 2022. An extract of Figure 3 of the Liezl Stodart TIA has been included below. (Note: The figure has been edited to only include the background traffic volumes at the Heather/Beach intersection.)

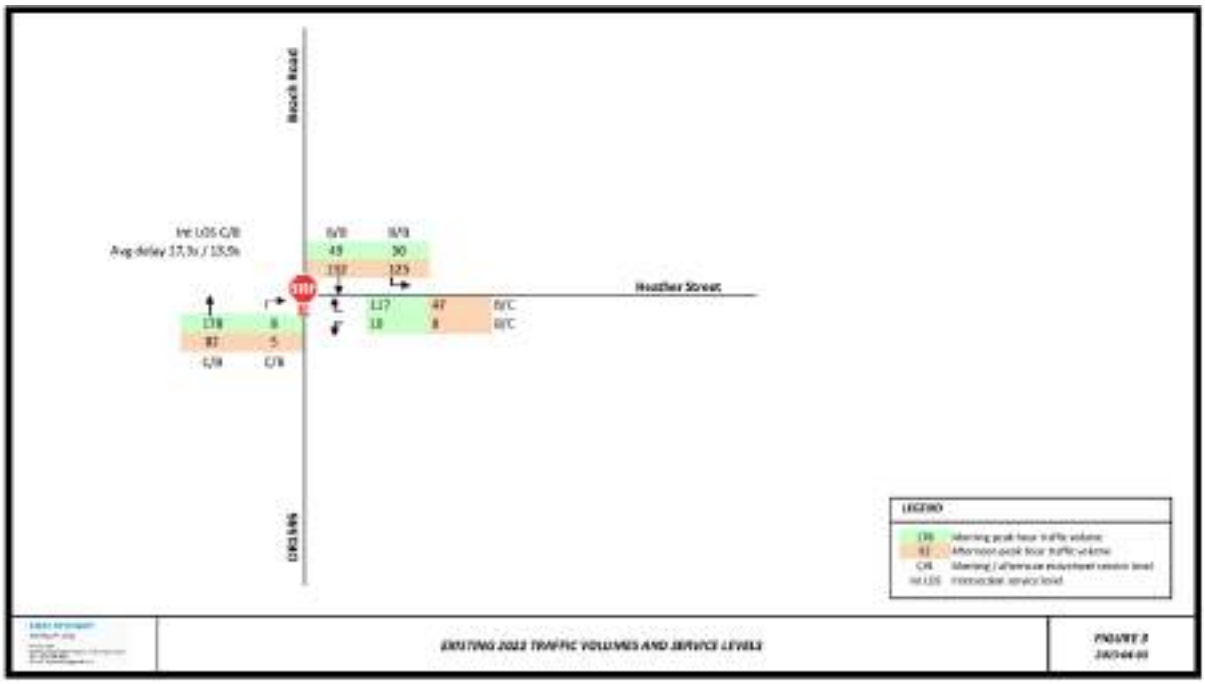


Figure 9-2 - Extract of Figure 3 of Liezl Stodart TIA

10 TRIP GENERATION

10.1 TRIP GENERATION

The trip generation potential of the site has been calculated based on the guidelines published in TMH 17 (South African Trip Data Manual, COTO May 2018).

The COTO TMH 17 land use that best describes the proposed land use is that of Townhouse (simplex and duplexes). The relevant TMH 17 definition of the land use is listed below:

231 Townhouses (Simplexes and Duplexes) Dwelling Units

Dwelling units typically provided in clusters or in complexes. Units could be detached or provided within one building structure. Parking is often provided within a communal area.

The trip generation potential has been summarised below:

231 Townhouses (Simplexes and Duplexes)				**Dwelling Units**
Description	AM Peak	PM Peak	Saturday	Sunday
Trip Rate	0.85	0.85	0.45	0.45
IN/OUT	25:75	70:30	50:50	50:50

The resultant trip generation calculation has been summarised in the table below.

Land Use	Units	AM Peak		PM Peak		Saturday		Sunday	
		IN	OUT	IN	OUT	IN	OUT	IN	OUT
Townhouses	52	11	33	31	13	12	12	12	12
Total		44		44		24		24	

Table 10-1 –Trip Generation Potential

The COTO guidelines differentiates between the various peak hours as follows:

- Weekday AM peak hour (06:00 to 08:30)
- Weekday PM peak hour (16:00 to 18:30)
- Weekday Midday peak hour (11:30 to 14:00)
- Weekday Evening peak hour (18:30 to 24:00)

10.2 TRAFFIC DISTRIBUTION

It is assumed that up to 95% of the newly generated trips will make their way to the Beach Heather intersection, from where they will move north towards the N2 and George proper where key services, amenities, and attractions are located.

The distributions are indicated schematically in **ANNEXURE D**.

11 INTERSECTION OPERATIONAL ANALYSIS

The operational analysis was done with the "SIDRA INTERSECTION 9.1" (network version 9.1.6.228) computer aided software that is developed specifically for traffic engineering capacity analysis. When elements of a road network such as intersections are analyzed, their operating conditions are described in terms of Level of Service (LOS).

The six letters from A to F are used to indicate different LOS. LOS A indicates very low traffic flows with correspondingly low delays. LOS E reflects capacity conditions, with high delays and unstable flow. LOS F reflects conditions where traffic demand exceeds capacity and traffic experiences congestion and delays. Generally, LOS A to D is considered acceptable in accordance with international standards. LOS E and F on the other hand are considered to be unacceptable.

The Average Delay is the delay in seconds that a motorist is likely to experience on an approach to the junction, while waiting for the junction to clear or other vehicles to maneuver. A further measure of the operating conditions at any point in a road network is the volume to capacity ratio (v/c). As the name implies it is the traffic demand volume divided by the available capacity of the road element. Generally, ratios of up to approximately 0.9 are internationally considered acceptable. Values exceeding 1.0 implies saturation of the facility.

The intersection analysis was based on the intersection layout indicated schematically in Figure 11-1.

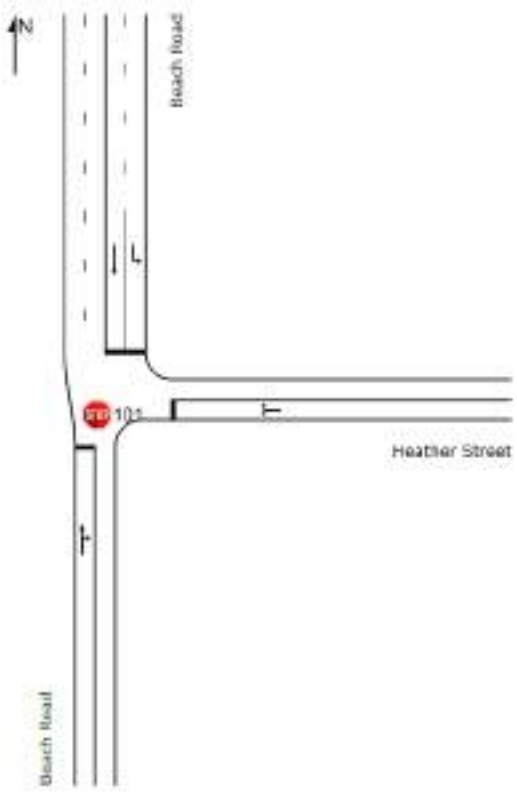


Figure 11-1 - SIDRA Intersection Layout

The SIDRA analysis was performed for the following two scenarios:

- **Status Quo:** The 2022 background traffic volumes were increased with 3%/a for a 2-year period, to determine the estimated 2024 (Status Quo) background traffic volumes.
- **No Go (2029):** The 2022 background traffic volumes were increased with 3%/a for a 7-year period to determine the estimated 2029 (No Go) background traffic volumes
- **Operational Traffic (2029):** The trip generation potential of both "THE SITE" and the proposed "PTN 20 of Farm 202" development were added to the 2029 No-Go traffic volumes to determine the impact on the level of service during the future "operational" phase.

11.1 STATUS QUO (2024)

The analysis revealed that the intersection is operating at an acceptable Level of Service. The results of the SIDRA Analysis have been attached as **ANNEXURE E** to this report, but a summary of the results has been included below.

APPROACH	MOVEMENT	WEEKDAY AM PEAK			WEEKDAY PM PEAK		
		LOS	AVE DELAY (s)	V/C RATIO	LOS	AVE DELAY (s)	V/C RATIO
Beach Road (Southern Approach)	Through	C	20.9	0.458	B	13.5	0.168
	Right	C	20.7		B	13.3	
Heather Street (Eastern Approach)	Left	B	14.9	0.253	C	15.6	0.136
	Right	B	14.7		C	15.4	
Beach Road (Northern Approach)	Left	C	20.9	0.213	C	18.3	0.345
	Through	C	20.4		C	17.9	

Table 11-1 - Status Quo (2024) SIDRA Results

11.2 NO GO (2029)

The future (2029) NoGo scenario indicated a reduction in LOS of the Heather Street Eastern Approach. The results of the SIDRA Analysis have been attached as **ANNEXURE E** to this report, but a summary of the results has been included below.

APPROACH	MOVEMENT	WEEKDAY AM PEAK			WEEKDAY PM PEAK		
		LOS	AVE DELAY (s)	V/C RATIO	LOS	AVE DELAY (s)	V/C RATIO
Beach Road (Southern Approach)	Through	C	23.0	0.527	B	13.8	0.196
	Right	C	22.8		B	13.6	
Heather Street (Eastern Approach)	Left	C	15.4	0.291	C	15.8	0.156
	Right	C	15.2		C	15.6	
Beach Road (Northern Approach)	Left	C	21.2	0.242	C	19.3	0.396
	Through	C	20.9		C	18.9	

Table 11-2 - No Go (2029) SIDRA Results

11.3 OPERATIONAL PHASE TRAFFIC

The operational phase analysis indicated a reduction in the LOS of the Beach Road Southern Approach during the AM peak hour. This is mainly due to the relatively large volume of vehicles (originating from the Mooikloof and LeGrand developments), that approach the intersection from the south. The analysis was based on the full trip generation potential of the site plus the trips generated by the proposed PTN 20 of Farm 202 development. The results of the SIDRA Analysis have been attached as **ANNEXURE E** to this report, but a summary of the results has been included below.

APPROACH	MOVEMENT	WEEKDAY AM PEAK			WEEKDAY PM PEAK		
		LOS	AVE DELAY (s)	V/C RATIO	LOS	AVE DELAY (s)	V/C RATIO
Beach Road (Southern Approach)	Through	D	26.3	0.572	B	13.8	0.198
	Right	D	26.1		B	13.6	
Heather Street (Eastern Approach)	Left	C	15.2	0.334	C	15.5	0.175
	Right	B	14.9		C	15.3	
Beach Road (Northern Approach)	Left	C	23.3	0.257	C	19.8	0.422
	Through	C	22.2		C	20.4	

Table 11-3 - Operational Phase SIDRA Results

12 SITE ACCESS

The proposed site access is situated directly across the Clinic Street intersection which is ideal from a traffic and transportation point of view.

12.1 THROAT LENGTH

The proposed SDP makes provision for access control at the site entrance. Where some form of access control is provided, the ingress throat must be of sufficient length to prevent queue spillback onto the surrounding public road or street system. In order to determine the 95th percentile queue length (for a gate/boom) the following formula should be used:

$$Traffic\ Ratio = \frac{Total\ Traffic\ Volume/PHF}{Service\ Flow\ Rate}\ 100$$

The Peak Hour Factor (PHF) is the factor required to convert the hourly volume to a peak 15-minute volume. Peak-hour factors in urban areas generally range between 0.80 and 0.98. Lower values signify greater variability of flow within the subject hour, and higher values signify little flow variation. Peak hour factors over 0.95 are often indicative of high traffic volumes, sometimes with capacity constraints on flow during the peak hour. Service Flow Rates for various types of access control are indicated in Table 12-1

Service flow rates (veh/h) fo different control types	
Control type	Service flow (vph)
Swipe magnetic card	480
Remote controlled gates	450
Ticket dispenser: Automatic	390-450
Ticket dispenser: Push button	220-360
Pin number operated gates	150
Pay fee on entry	120
Cell-phone operated gates(gate opens when a call is receieved)	100
Manual recording, Visitor completes form	80
Intercom operated gates(visitor contacts resident by intercom)	50

Table 12-1 - Service Flow Rates for Different Control Types

Based on the SDP, it is assumed that access control will be in the form of self-service gates or booms (no provision for a gatehouse). Of the various "Self-Service" controls listed in Table 12-1, a conservative assumption would be to assume access control will be in the form of cell-phone operated gates. A service flow rate of 100vph will therefore be used for the throat length calculation.

From Table 10-1 it follows that the worst-case scenario from a site ingress point of view will take place during the Weekday PM peak hour period when a total of 31 vehicles can be expected to enter the site via the security gate.

Using a PHF of 0.80, the corresponding minimum throat length is calculated as follows:

$$Traffic\ Ratio = \frac{31/0.80}{100}\ 100$$

The above equation returns a Traffic Ratio of 39. The corresponding 95th percentile queue length (based on the calculated traffic ratios) is indicated in Table 12-2.

95th Percentile queue length (vehicles per channel) at controlled accesses						
Storage (Vehs)	Traffic ratio (Pecentage) for different Numbers of Channels					
N_{Que}	1 Channel	2 Channel	3 Channel	4 Channel	5 Channel	6 Channel
1	23	58	97	140	188	235
2	39	94	155	220	292	363
3	49	115	186	261	341	421
4	56	128	205	283	367	449
5	61	137	216	297	382	466
6	65	143	22	306	392	476
7	68	147	229	312	399	484
8	70	151	233	317	403	489
9	71	153	236	321	407	493
10	73	155	239	324	410	496

Table 12-2 - 95th Percentile Queue Length at Controlled Accesses

Based on Table 12-2, it follows that one (1) ingress channels with sufficient stacking distance (storage) for 2 vehicles (approximately 12 m) will be required between the access control structure and the Heather Street road reserve.

13 PARKING AND INTERNAL LAYOUTS

13.1 GIZSBL PARKING SPECIFICATIONS

George Municipality's Integrated Zoning Scheme By-Law (2023) is very clear regarding parking related definitions and specifies the following in Section 46 of the document:

"46. (1) The following parking layout requirements apply unless otherwise stated in this zoning scheme:

a) parking layout configurations, minimum dimensions and ramps to a parking area must be in accordance with this zoning scheme or an approved site development plan.

b) A standard 90-degree parking bay for a motor vehicle shall measure at least 2,5 metres in width and 5.0 metres in length with 7.5 metres manoeuvring space or otherwise determined by the Municipality.

c) the layout of any parking area, except for parking in Single Residential Zone I, Single Residential Zone III and General Residential Zones I to III must ensure that vehicles can readily leave the site without reversing across the sidewalk, unless otherwise approved by the Municipality.

d) a tandem bay accommodating two motor vehicles is regarded as one bay for the purposes of this zoning scheme, except for Single Residential Zone I, Single Residential Zone III and General Residential Zones I to III, where a tandem bay is regarded as two bays.

e) visitor parking bays must be clearly demarcated, readily visible and accessible to visitors, and preferably grouped together.

f) parking areas must be used for the parking of vehicles which are lawfully allowed on them, and any activity which causes an obstruction for vehicular traffic or pedestrian use of the sidewalk is prohibited.

g) parking areas must be constructed and maintained in a state suitable for the parking and movement of vehicles.

h) control of access to and reservation of parking bays and / or areas is not permitted unless written approval has been obtained from the Municipality; either through an approved site development plan or other written approval; and

i) despite paragraphs (a) to (h), the Municipality may lay down more restrictive requirements related to parking, site access or motor vehicle carriageway crossing, if it considers this to be necessary from a pedestrian or traffic safety point of view."

13.2 PARKING REQUIREMENTS

The GIZSBL's parking requirements for General Residential Zone II (Group Housing) developments are indicated in Figure 13-1 below.

Land Use	Normal Areas	PT1 Areas	PT2 Areas
Group housing/Town Housing	1.25 bays per dwelling unit with 2 habitable rooms or less 1.75 bays per dwelling unit with 3 habitable rooms or more 0.25 bays per unit for visitors	1 bay per dwelling unit 0.25 bays/unit for visitors	1 bay per dwelling unit or As determined by the Municipality or a parking study/TIA

Figure 13-1 - GIZSBL Parking Requirements

13.3 GARAGES, CARPORTS AND OUTBUILDINGS

Page 79 and 80 of the GIZSBL's specifies the following with regards to the position of garages within group housing developments:

Building lines within a group housing site

The following building lines apply within a group housing site:

(i) street boundary building lines on internal private roads are 0 metres; provided that any garage door facing the private road, or a private right of way servitude intended to give vehicle access to the property, must be set back at least 5 metres from the kerb of such internal road or private right of way servitude; and

(ii) side and rear boundary building lines within the group housing site are 0 metres, unless the Municipality requires a building line for fire-fighting purposes, in which case the common boundary building lines must be determined by the Municipality.

14 NON-MOTORISED TRANSPORT

At the time of the site inspection, the boxcut for the Heather Street road upgrade, included the existing pedestrian sidewalk that was originally situated along the northern boundary of the street. The walkway was therefore no longer visible, and it was not clear whether the current Heather Street upgrade includes the reinstatement of a new Universally Accessible pedestrian sidewalk. If the current upgrade does not include the construction of sidewalks, it is recommended that any possible road development contribution, rather be offset by the construction of new asphalt surfaced sidewalks.

15 SUMMARY

1. Introduction and Background:

The traffic impact investigation is for a proposed residential development (52 dwelling units) on erven 4645 & 4646 in Pacaltsdorp, George. The investigation was conducted by Urban Engineering Consultants (Pty) Ltd for Redrock Development, and aligns with South African regulations (TMH 16, Access Management Guidelines). The primary objective is to assess the impact of the development on the surrounding road network and propose mitigation measures where necessary. A site inspection was performed on 22 November 2024, noting that Heather Street was under upgrade and open for one-way traffic only.

2. Locality, Site Description, and Zoning:

The site is located at the corner of Heather Street and Beach Road. The site's is zoned RZ for Tourist Accommodation according to George Municipality's GIS Viewer.

3. Development Proposal and Surrounding Road Network:

The development plan includes consolidating the two erven to create 52 new residential units. The surrounding road network was analysed based on road classifications from various guidelines (DoT 2006, COTO 2012). Beach Road is identified as a major arterial, while Heather Street is a collector road (currently under upgrade), and Clinic Street is a local residential road. Heather Street also plays a crucial role in the George Integrated Public Transport Network (GO GEORGE), accommodating various routes and bus stops. Based on the proximity to GO GEORGE bus routes, the site can be classified as falling within a PT1 Area (Public Transport 1).

4. Traffic Volumes and Other Relevant Studies:

Due to the Heather Street upgrade, traffic counts were unavailable at the time of the report. However, the report utilizes existing data, including:

a) A recent (September 2023) provincial traffic count on Beach Road, showcasing the average daily traffic volume and peak hour volumes

b) Relevant data from the Road Network Information System (RNIS), and

c) Reference to a previous Transport Impact Assessment (TIA) prepared by Liezl Stodart pertaining to the for a nearby development of PTN 20 of Farm 202.

5. Trip Generation and Distribution:

Trip generation for the development was estimated using COTO TMH 17 guidelines for townhouses. The development has the potential to generate 44 new trips for both the weekday AM – and PM Peak Hour Periods. It is estimated that Saturdays and Sundays will generate 24 trips. The report assumes that 95% of trips will go through the Beach Road/Heather Street intersection.

6. Intersection Operational Analysis:

The intersection's operational performance was analysed using SIDRA software under three scenarios: the Status Quo (2024), a "No Go" scenario (2029) assuming no development, and the operational phase (2029) incorporating the development's traffic. The analysis provides Level of Service (LOS) and average delay calculations for different approaches and movements. Results generally indicate acceptable LOS, although some minor reductions in service levels are projected especially along the Beach Road Southern approach to the intersection as indicated in **ANNEXURE D**.

7. Site Access, Parking, and Internal Layouts:

The proposed site access is situated directly across the existing Clinic Street intersection. At least 12m throat distance is required between the access control and Heather Street road reserve. Internal layouts must ensure at least 5m set back from the garage door and internal road kerb.

16 RECOMMENDATIONS

Based on the findings of the report, the proposed development of erven 4645 and 4646 are supported from a traffic and transportation point of view, subject to the following recommendations:

1. The access control must be position in such a way that provides at least 12m stacking distance between the access control and the Heather Street road reserve.
2. If the current Heather Street upgrade does not include the construction of sidewalks, it is recommended that any possible road development contributions payable by this development, rather be used for the construction of a new UA compliant, asphalt surfaced sidewalk. The extend of the sidewalk construction should be a function of the value of the relevant road-oriented development contribution. It is proposed that the sidewalk start at the Heather/Beach intersection and continue along Heather Street towards the proposed site access. The position of the sidewalk should make provision for a landscaped “furniture zone” as per the George Municipality Universal Design Guidance Note. (Min furniture Zone width = 1,2m, minimum sidewalk width = 1,8m)
3. Although not a condition pertaining to the development of erven 4645 and 4646, any possible road contributions applicable to the development of PTN 20 of Farm 202 could ideally also be used to continue with the UA compliant sidewalk referred in point 2 above.
4. Internal erf layouts must make provision for a 5m set back between the garage door and kerb of the internal road or private right of way servitude.
5. The George Municipality parking requirements specific to PT1 Areas should be adhered to.

ANNEXURE A

SITE PHOTOGRAPHS









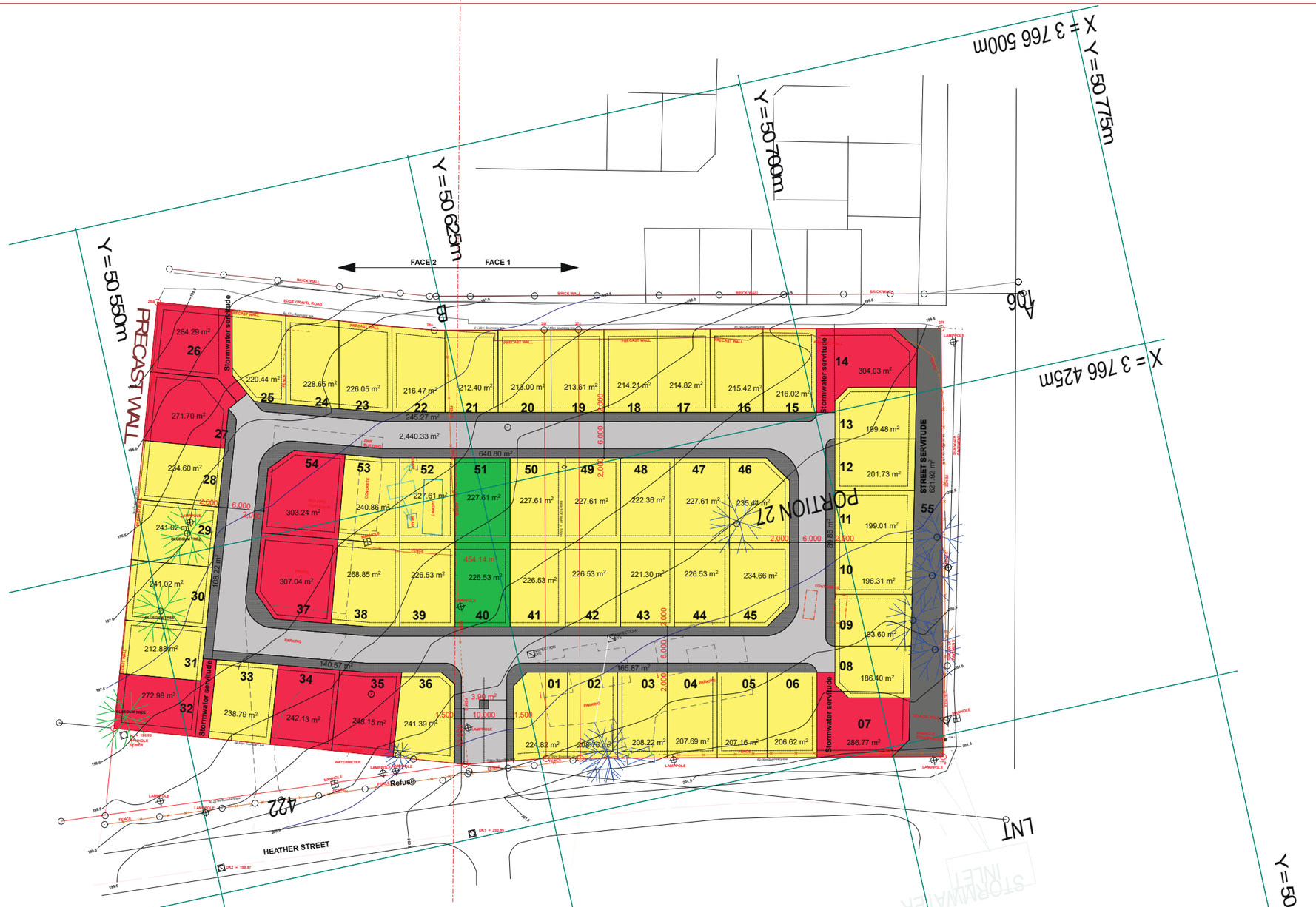
CLINIC STR


HEATHER STR


MUNSIDE CHALETS
Self Catering
HEATHER ROAD
PACALTSDORP
076 953 4879

ANNEXURE B

SITE DEVELOPMENT PLAN



LEGEND

COLOUR CODE	ZONING	AMOUNT	AREA m²	% OF TOTAL AREA
	GENERAL RESIDENTIAL ZONE II - GROUP HOUSING (100m² - 249m²)	43	9516.78m²	56.4%
	GENERAL RESIDENTIAL ZONE II - GROUP HOUSING (250m² - 300m²)	9	2485.83m²	14.72%
	OPEN SPACE ZONE II	2	454.14m²	2.68%

SITE DEVELOPMENT PLAN

SCALE 1:500

GENERAL RESIDENTIAL
ZONE II - GROUP HOUSING
USED

SITE AREA = 16 877.67m²
ROAD AREA = 2 408.44m²
PAVEMENT AREA = 1 390.59m²
OPEN SPACE ZONE II = 454.14m²
TRANSPORT ZONE 11 = 621.92m²

BUILDING LINES OF INDIVIDUAL ERVENS.
STREET = 1m
SIDES = 1 SIDE 1m AND 1 = 0m
REAR = 1.5m

SIGNATURE OF OWNER/ CLIENT: | DATE:

SIGNATURE OF ARCHITECT: | DATE:

REVISIONS

PROJECT TITLE

SUBDIVISION LAYOUT DESIGN ON ERF 4645, 4646 & 1291 PACALTSDORP

DRAWING DESCRIPTION

NEW PROPOSED HOUSING DEVELOPMENT

DESIGNED BY:

JV TOWN PLANNERS
TEL: 044 873 3011 FAX: 086 510 4383 EMAIL: janvrolijk@jvtownplanner.co.za
CELL:082 464 7671 PO Box 710 George 6530
OFFICE: Millwood Building corner of York and Victoria Street, George
SACPLAN REG No. A/1386/2010

A4 ARCHITECTURE

PROJECT NO:	DRAWING NO:	REVISION
2024/06/015	001	

ANNEXURE C

RELEVANT RNIS DATA

ROAD LOG

Road Number : DR01626 (DR1626 +) Start Description: Jct. MR352 Olifantshoek End Description: Jct. OP06893 Hoekwil End Km: 1.52

KM	S	Type Description / SADC	Left Desc / LMB	Right Desc	Ref/Sign Date	Sign Text/File No	Clr / Job	Doc/Img Ref/Appr Date
0.71	A	OTHER-1	Start of DR Status	T4302 @ km 0.00				
0.71	A	OTHER-2	Article 66(3) Closure 21/05/2015	(Job 22998) from MR352 to Erf 73				
0.78	C	ROAD OVER RIVER	0.45m PC					
0.88	A	WAYLEAVE	Telkom O/H		TELKOM			
0.88	L	JUNCTION ROAD	Loerie Rd					
0.89	A	WAYLEAVE	Eskom O/H		ESKOM			
1.07	A	WAYLEAVE	Telkom O/H		TELKOM			
1.09	A	WAYLEAVE	Eskom O/H		ESKOM			
1.10	L	PRIVATE ACCESS, COMMERCIAL	Hildesheim B&B	Paved Open				
1.15	L	BARRIER LINE START	Start					
1.18	C	ROAD OVER RIVER	0.45m PC					
1.24	L	PRIVATE ACCESS, HOMESTEAD	Unknown	Gravel Gate				
1.27	L	PRIVATE ACCESS, HOMESTEAD	Unknown	Concrete Gate				
1.30	R	PRIVATE ACCESS, HOMESTEAD	Gravel Gate	Unknown				
1.33	L	PRIVATE ACCESS, HOMESTEAD	Unknown	Gravel Gate/2				
1.42	R	BARRIER LINE START		Start				
1.43	A	WAYLEAVE	Telkom O/H		TELKOM			
1.44	R	PRIVATE ACCESS, HOMESTEAD	Gravel Gate	Unknown				
1.47	A	WAYLEAVE	Eskom O/H		ESKOM			
1.51	A	WAYLEAVE	Telkom O/H		TELKOM			
1.52	B	AT GRADE INTERSECTION	OP6893 Hoekwil	Seesig St	T2617			
1.52	R	BARRIER LINE END		End				
1.52	L	BARRIER LINE END	End					
1.52	A	WAYLEAVE	Telkom O/H		TELKOM			
1.52	L	WAYLEAVE ALONG ROAD INSIDE, END	End Telkom O/H 10m		TELKOM			
1.52	R	WAYLEAVE ALONG ROAD INSIDE, END		End Eskom O/H 10m	ESKOM			

SUMMARY PAGES

Road Number : DR01626 (DR1626) Start Description: Jct. MR352 Olifantshoek End Description: Jct. OP06893 Hoekwil End Km: 1.52

DESCRIPTION

Start Km	0.00	End Km	1.52
Start Description	Jct. MR352 Olifantshoek	End Description	Jct. OP06893 Hoekwil
Start Datum	Jct. MR352 near Olifantshoek	End Datum	Jct. OP06893 & Seesig St at Hoekwil

ELEMENT

Start Km	End Km	Carway
0.71	1.52	+

BOUNDARY INFORMATION

Start Km	End Km	Local Municipality Name	District Municipality Name	Regional Office Name
0.71	1.52	George	Garden Route	Oudtshoorn

URBAN MUNICIPALITY

Start Km	End Km	Urban Area

MAINTENANCE BOUNDARY

Start Km	End Km	Auth	Maintenance Authority Name
0.71	1.52	DMC	Garden Route

MAGISTRATE BOUNDARY

Start Km	End Km	Magisterial District Name
0.71	1.52	George

TRAFFIC BOUNDARY

Start Km	End Km	Traffic Authority
0.71	1.52	Knysna

SURFACED

				Shoulder Width		Shoulder Type		Lanes		Carway
Start Km	End Km	Width	Surface Type	L	R	L	R	L	R	
0.71	1.52	6.70	Surfaced	1.50	1.50	Unsurfaced	Unsurfaced	1	1	+

GRAVEL

Start Km	End Km	Width

TERRAIN

Start Km	End Km	Terrain Type
0.71	1.52	Flat

CLIMATE

Start Km	End Km	Climate Type
0.71	1.52	Wet

THORNTHWAITE

Start Km	End Km	Thornthwaite	Thornthwaite Type
0.71	1.52	4	Moist Sub-Humid (0 to 20)

WEINERT

Start Km	End Km	Weinert
0.71	1.52	3

MEAN MONTHLY PERSIPITATION

Start Km	End Km	MMP
0.71	1.52	60

SUMMARY PAGES

Road Number : DR01626 (DR1626) Start Description: Jct. MR352 Olifantshoek End Description: Jct. OP06893 Hoekwil End Km: 1.52

ROAD CATEGORY

Start Km	End Km	Category
0.71	1.52	RESIDENTIAL ACCESS COLLECTORS

FUNCTIONAL CLASS

Start Km	End Km	Class
0.71	1.52	LEVEL4 (TERTIARY)

RCAM CLASSIFICATION

Start Km	End Km	Class
0.71	1.52	R5a

STATUTORY WIDTH

Start Km	End Km	Width
0.71	1.52	20.00

ROAD NAME

Start Km	End Km	Road Name
0.71	1.52	HOEKWIL

ROUTES

Route	Start Km	End Km	Sequence

LOGHISTORY

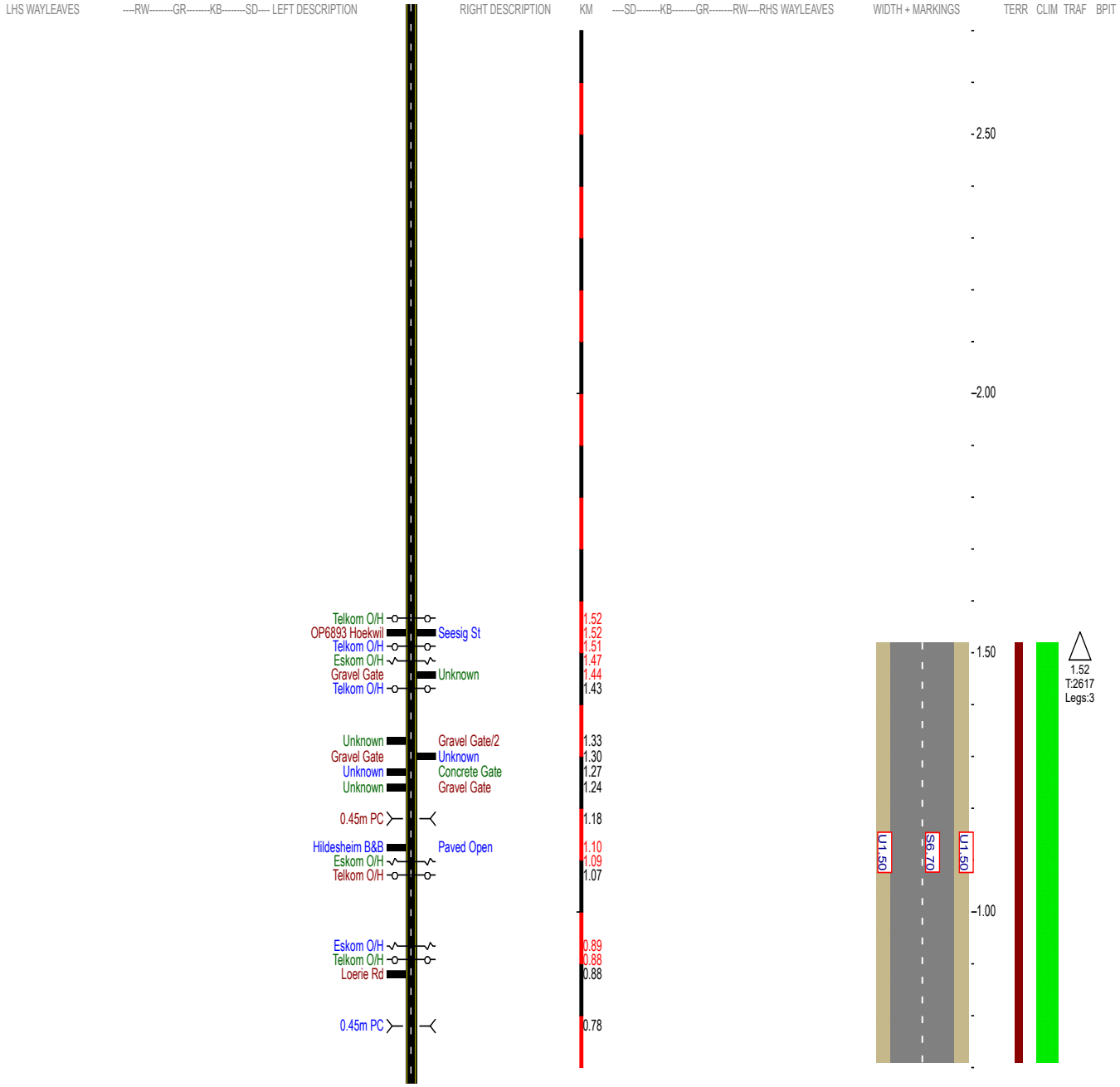
Start Km	End Km	Carway	LogDate	LoadDate
0.71	1.52	+	04-MAR-03	18-SEP-03
0.71	1.52	+	19-NOV-98	06-JAN-00
0.71	1.52	+	04-MAR-92	04-MAR-92

Western Cape Government FOR YOU

Road Strip Chart

Print

(end) Roadno:DR01626(+) Km: 1.52 Road end Description: Jct. OP06893 Hoekwil



(start) Roadno:DR01626(+) Km: 0.71 Road start Description:Jct. MR352 Olifantshoek

Traffic Counts

Time	Light	Heavy	Taxis	Buses
00-01h00				
01-02h00				
02-03h00				
03-04h00				
04-05h00	0	0	0	0
05-06h00	0	0	0	0
Sub-Totals	**0**	**0**	**0**	**0**
06-07h00	12	0	0	0
07-08h00	33	0	0	0
08-09h00	37	0	0	0
09-10h00	35	2	0	0
10-11h00	29	0	0	0
11-12h00	29	2	0	0
12-13h00	25	1	0	0
13-14h00	59	2	0	0
14-15h00	4	0	0	0
15-16h00	25	2	0	0
16-17h00	51	0	0	0
17-18h00	34	0	0	0
Sub-Totals	**373**	**9**	**0**	**0**
18-19h00	17	0	0	0
19-20h00	7	0	0	0
20-21h00	3	0	0	0
21-22h00	2	0	0	0
22-23h00				
23-24h00				
Sub-Totals	**29**	**0**	**0**	**0**
Totals	**402**	**9**	**0**	**0**

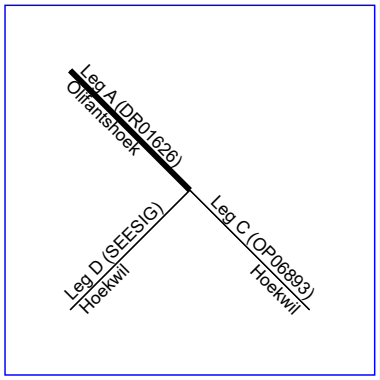
Station AADT's

	Light	Heavy	Taxis	Buses
	486	**11**	**0**	**0**
Total	**497**			

Station Data

Station No	**2617A**
Road No	**DR01626**
Km Distance	**1.52**
Count Date	**04/09/2023**
Hours Counted	**18**
Day Counted	**Monday**
Counted by	**C**
Expansion Factor	**1.21**
Stratum	**GA**
Peak Hour Ratio	**0.00**
Total AADT	**497**

Sketch (Click on Leg to Display Data)



Print

Print

Intersection

Diagram

Growth Rate

Growth Rate Chart

Historical Data 1 of 6

< 2023/09/04 >

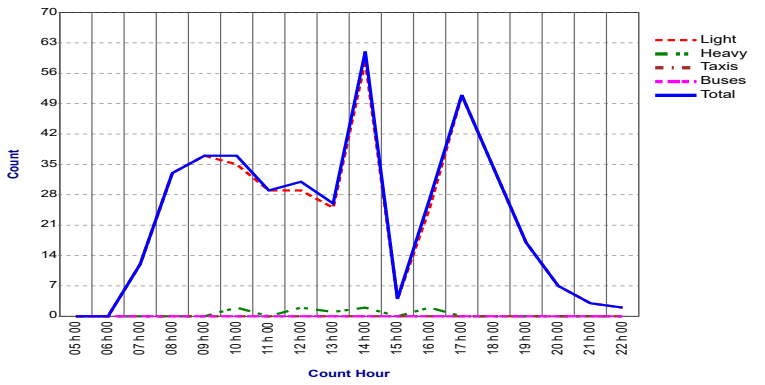
Exit

Station Data

Station Counts Chart

Light Heavy Taxis Buses Total

Stratum Pattern



Traffic Counts

Time	Light	Heavy	Taxis	Buses
00-01h00				
01-02h00				
02-03h00				
03-04h00				
04-05h00	0	0	0	0
05-06h00	0	0	0	0
Sub-Totals	**0**	**0**	**0**	**0**
06-07h00	14	0	0	0
07-08h00	36	0	0	0
08-09h00	26	1	0	0
09-10h00	25	0	0	0
10-11h00	39	1	0	0
11-12h00	5	0	0	0
12-13h00	13	1	0	0
13-14h00	24	0	0	0
14-15h00	26	0	0	0
15-16h00	26	0	0	0
16-17h00	29	0	0	0
17-18h00	26	0	0	0
Sub-Totals	**289**	**3**	**0**	**0**
18-19h00	14	0	0	0
19-20h00	4	0	0	0
20-21h00	1	0	0	0
21-22h00	5	0	0	0
22-23h00				
23-24h00				
Sub-Totals	**24**	**0**	**0**	**0**
Totals	**313**	**3**	**0**	**0**

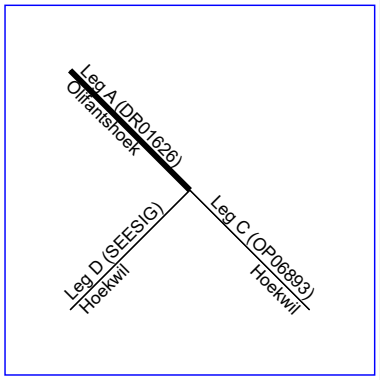
Station AADT's

	Light	Heavy	Taxis	Buses
	344	**3**	**0**	**0**
Total	**347**			

Station Data

Station No	**2617A**
Road No	**DR01626**
Km Distance	**1.52**
Count Date	**16/05/2019**
Hours Counted	**18**
Day Counted	**Thursday**
Counted by	**C**
Expansion Factor	**1.10**
Stratum	**GA**
Peak Hour Ratio	**0.00**
Total AADT	**347**

Sketch (Click on Leg to Display Data)



Print

Print

Intersection

Diagram

Growth Rate

Growth Rate Chart

Historical Data 2 of 6

< 2019/05/16 >

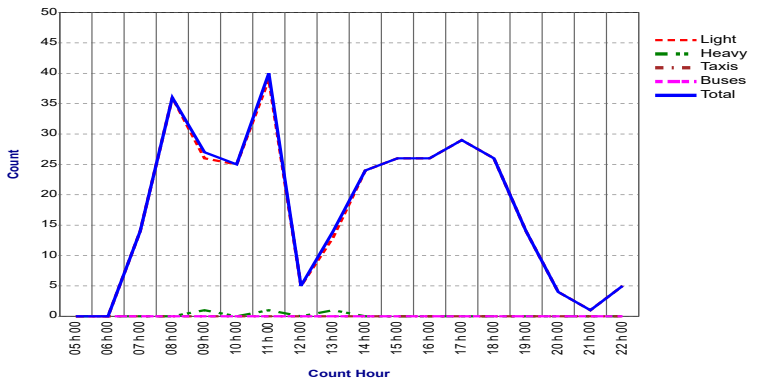
Exit

Station Data

Station Counts Chart

Light Heavy Taxis Buses Total

Stratum Pattern



Traffic Counts

Time	Light	Heavy	Taxis	Buses
00-01h00				
01-02h00				
02-03h00				
03-04h00				
04-05h00	0	0	0	0
05-06h00	0	0	0	0
Sub-Totals	**0**	**0**	**0**	**0**
06-07h00	9	0	0	0
07-08h00	33	0	0	0
08-09h00	27	0	0	0
09-10h00	24	0	0	0
10-11h00	23	0	0	0
11-12h00	27	0	0	0
12-13h00	28	0	0	0
13-14h00	14	0	1	0
14-15h00	23	0	0	0
15-16h00	34	1	0	0
16-17h00	40	2	0	0
17-18h00	22	2	0	0
Sub-Totals	**304**	**5**	**1**	**0**
18-19h00	20	0	0	0
19-20h00	19	0	0	0
20-21h00	11	0	0	0
21-22h00	10	0	0	0
22-23h00				
23-24h00				
Sub-Totals	**60**	**0**	**0**	**0**
Totals	**364**	**5**	**1**	**0**

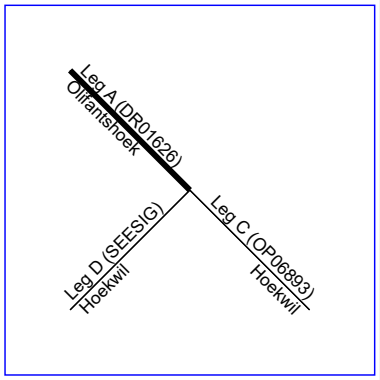
Station AADT's

	Light	Heavy	Taxis	Buses
	331	**5**	**1**	**0**
Total	**337**			

Station Data

Station No	**2617A**
Road No	**DR01626**
Km Distance	**1.52**
Count Date	**02/12/2016**
Hours Counted	**18**
Day Counted	**Friday**
Counted by	**C**
Expansion Factor	**0.91**
Stratum	**GA**
Peak Hour Ratio	**0.00**
Total AADT	**337**

Sketch (Click on Leg to Display Data)



Print

Print

Intersection

Diagram

Growth Rate

Growth Rate Chart

Historical Data 3 of 6

< 2016/12/02 >

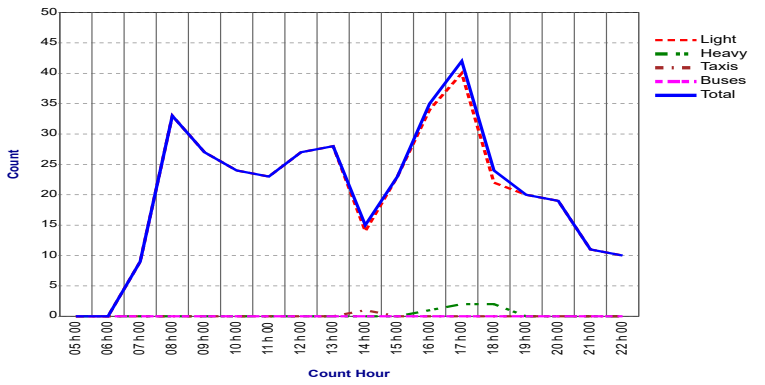
Exit

Station Data

Station Counts Chart

Light Heavy Taxis Buses Total

Stratum Pattern



Western Cape Government

Growth Rate Chart

Station Data

Road Number:	**DR01626**
Km Distance:	**1.52**
Growth Rate: (Based on the last 5 available counts)	**3.28 (E)**
Recalculated Growth Rate: (Based on Selected Counts)	**0.77**
Node:	**2617**
Leg:	**A**

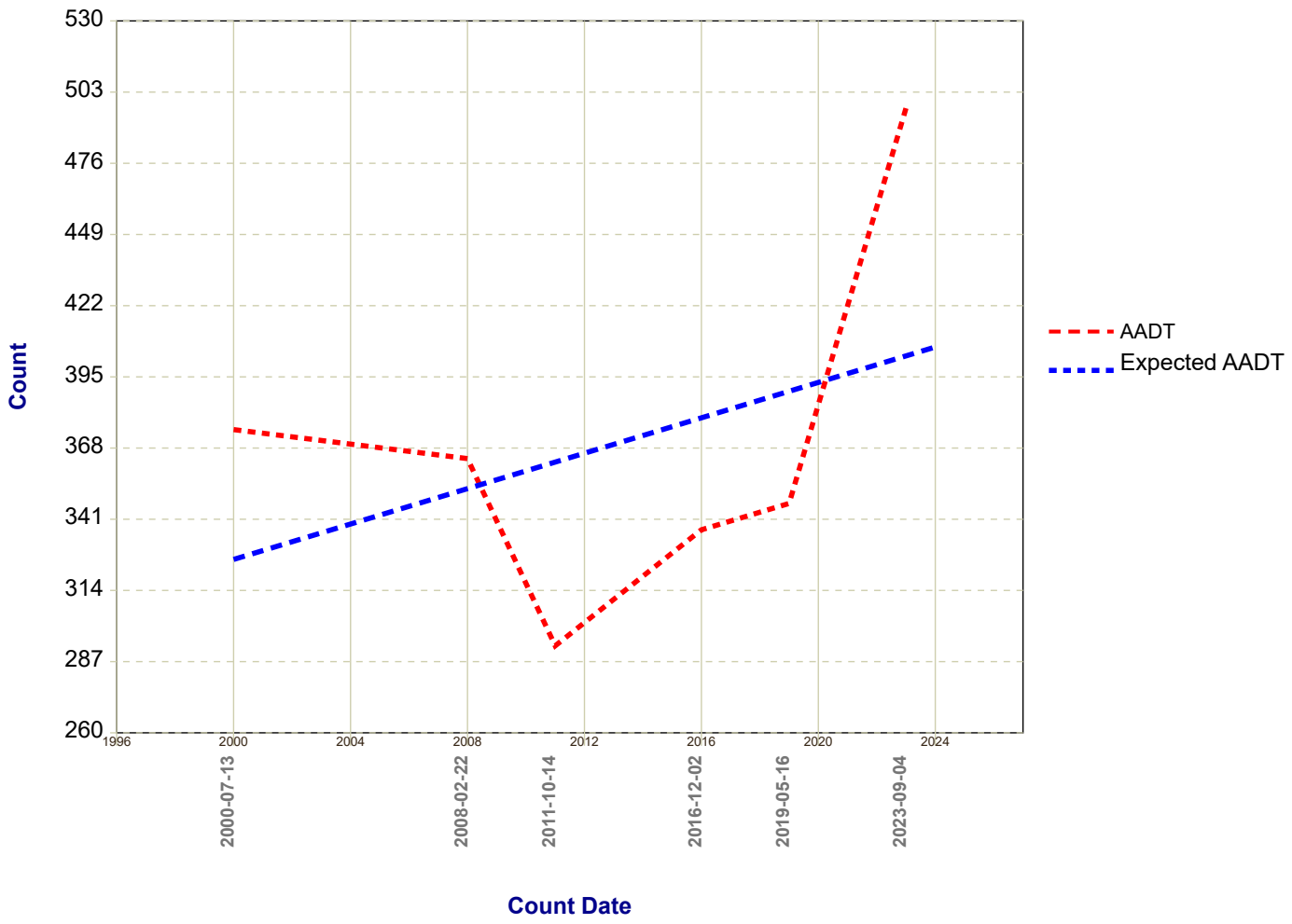
Count Dates

> >
> <
> >>
> <<

2000-07-13
2008-02-22
2011-10-14
2016-12-02
2019-05-16
2023-09-04

Print

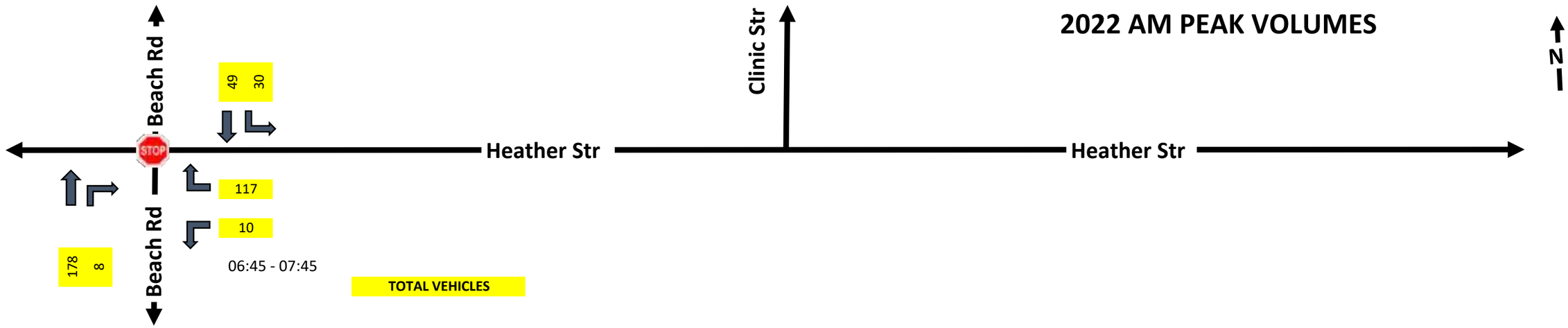
Exit



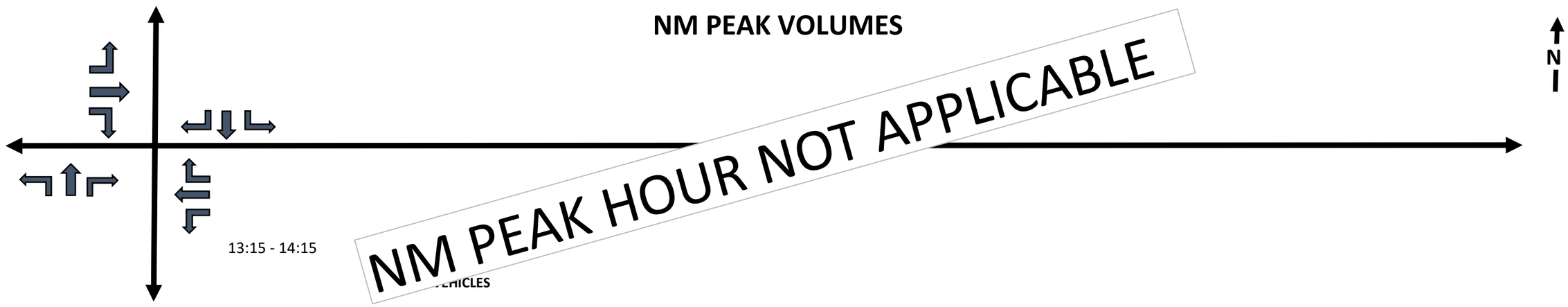
ANNEXURE D

TRAFFIC DISTRIBUTIONS

2022 AM PEAK VOLUMES

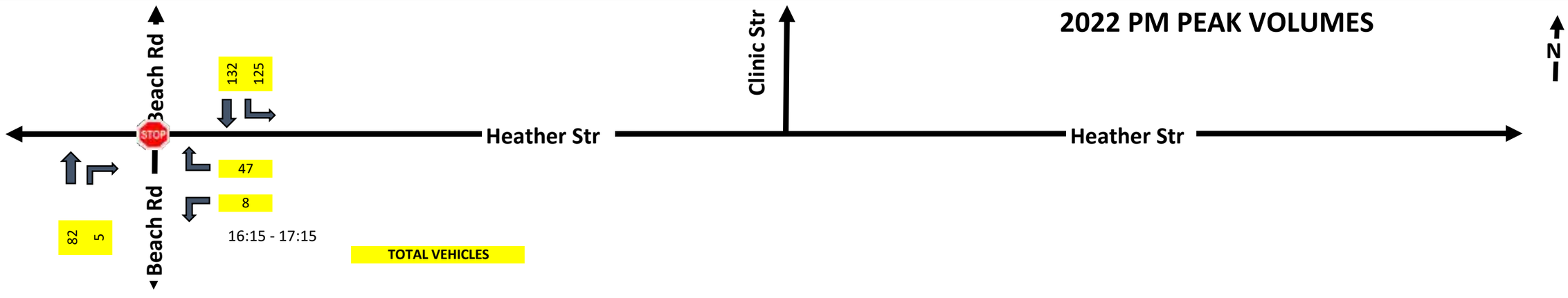


NM PEAK VOLUMES



NM PEAK HOUR NOT APPLICABLE

2022 PM PEAK VOLUMES



URBAN ENGINEERING
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

PROJECT:

24-150 MUNSIDE DEVELOPMENT

DESCRIPTION:

2022 AM & PM PEAK HOUR TRAFFIC VOLUMES (FROM LIEZL STODART TIA)

LEGEND:

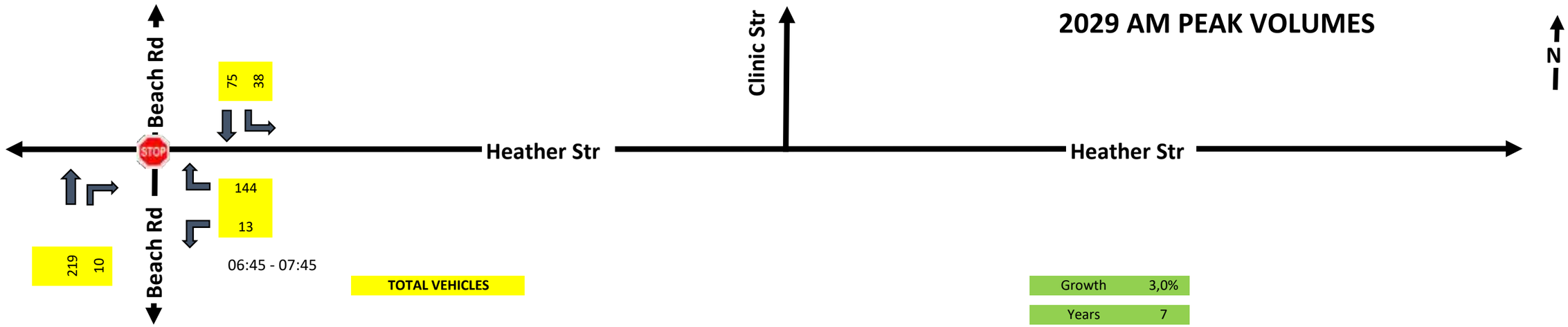
STOP CONTROLLED INTERSECTION

SIGNAL CONTROLLED INTERSECTION

TITLE:

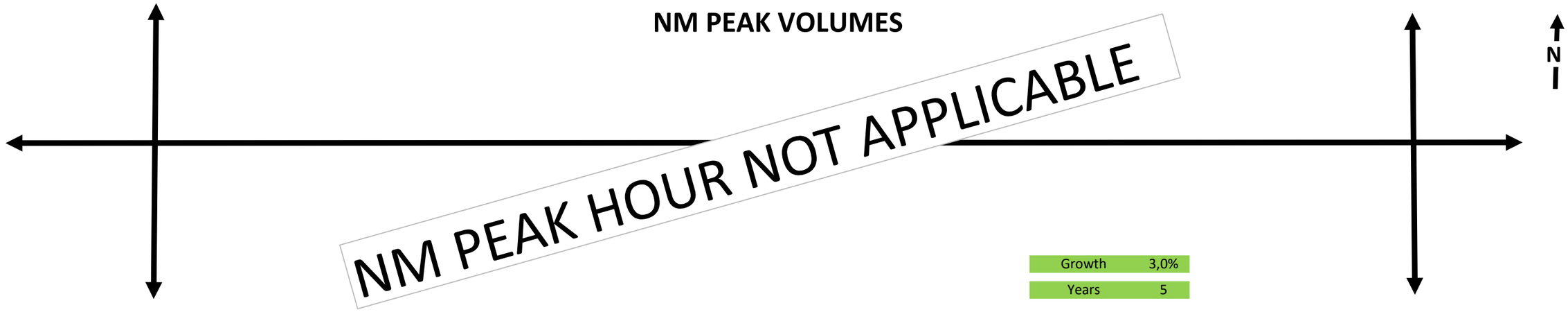
FIGURE A

2029 AM PEAK VOLUMES



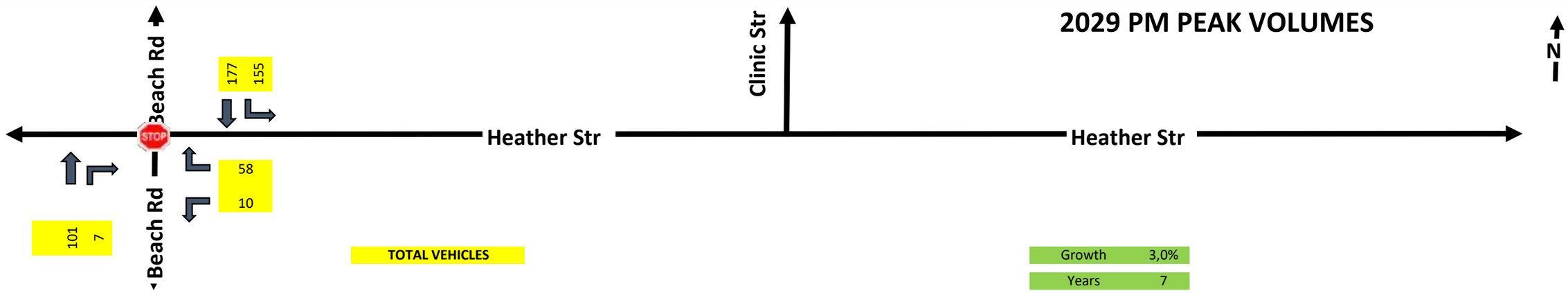
Growth 3,0%
Years 7

NM PEAK VOLUMES



Growth 3,0%
Years 5

2029 PM PEAK VOLUMES



Growth 3,0%
Years 7

URBAN ENGINEERING
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

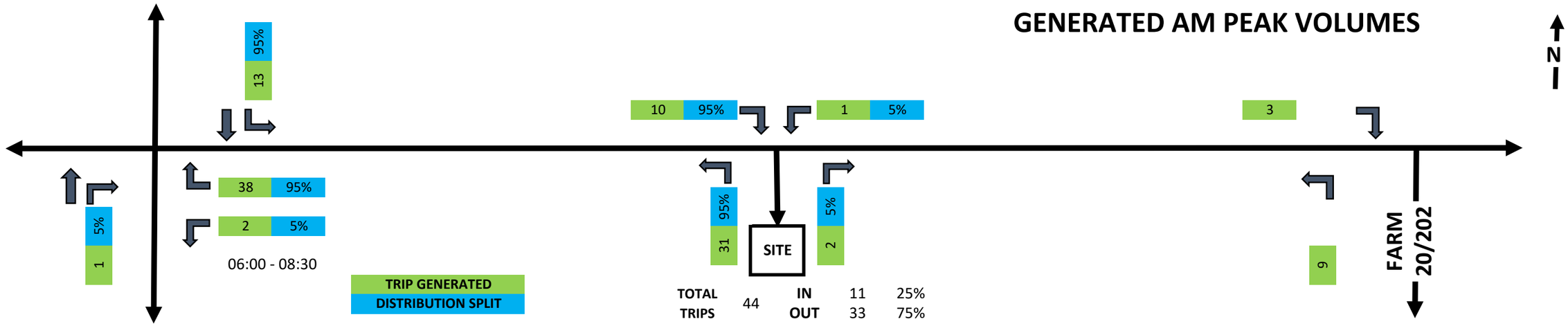
PROJECT:
24-150 MUNSIDE DEVELOPMENT

DESCRIPTION:
2029 (FUTURE) AM, NM AND PM PEAK HOUR TRAFFIC VOLUMES

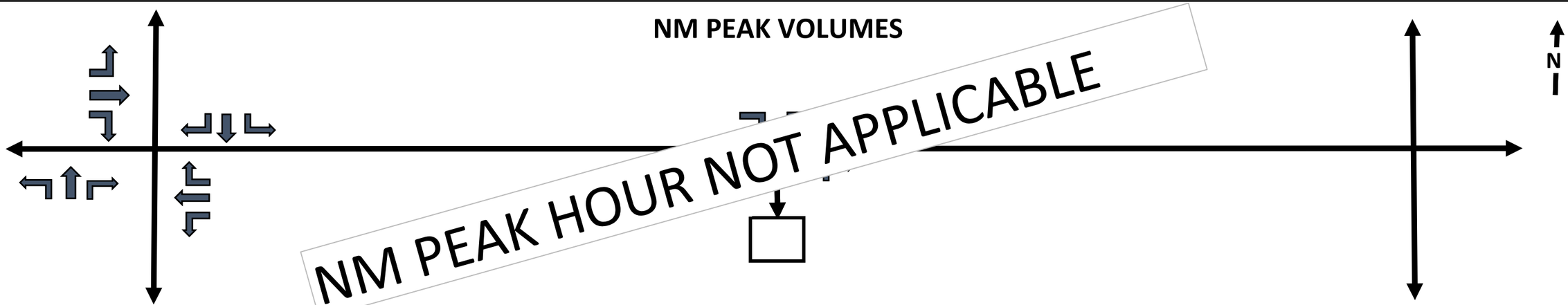
LEGEND:
- STOP CONTROLLED INTERSECTION
- SIGNAL CONTROLLED INTERSECTION

TITLE:
FIGURE B

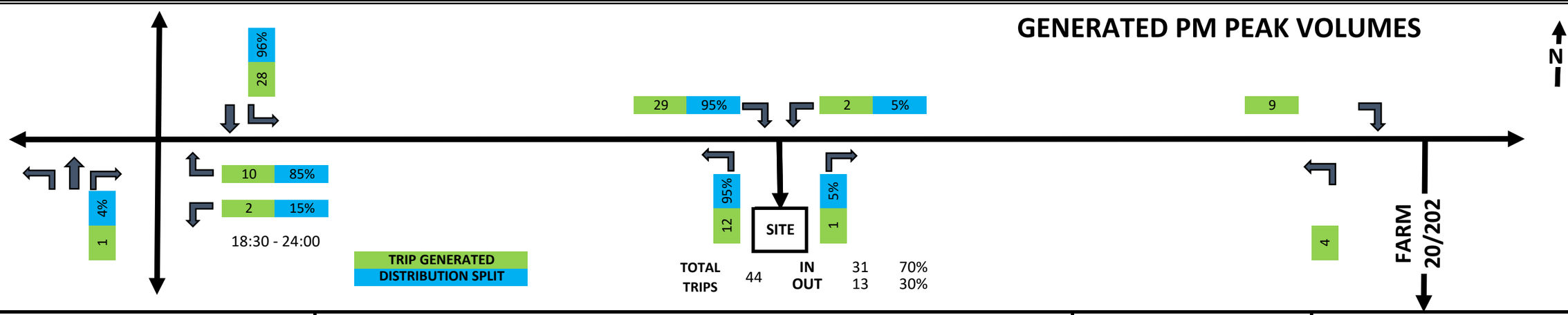
GENERATED AM PEAK VOLUMES



NM PEAK VOLUMES



GENERATED PM PEAK VOLUMES



URBAN ENGINEERING
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

PROJECT:

24-150 MUNSIDE DEVELOPMENT

DESCRIPTION:

TRIP GENERATION AND DISTRIBUTION (INCL FARM 20/202 FROM LIEZL STODARDT TIA)

LEGEND:

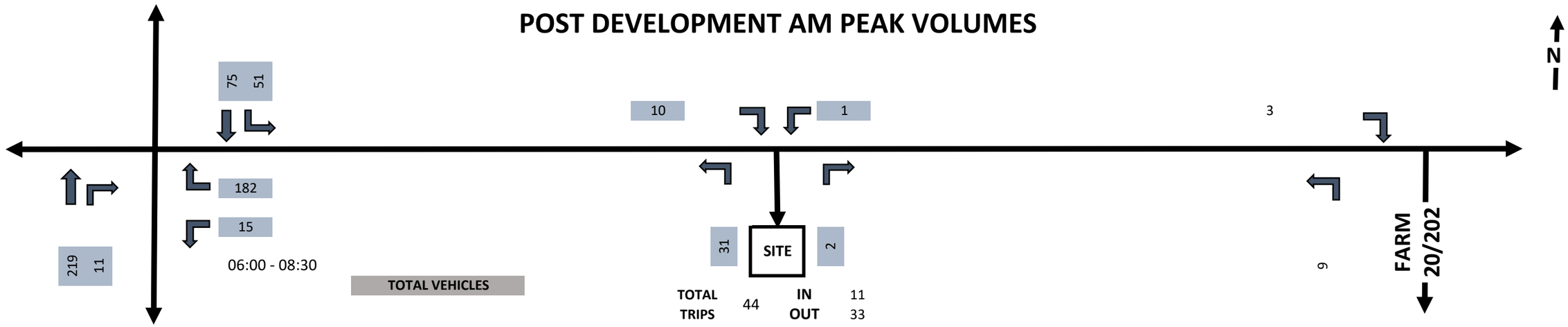
STOP CONTROLLED INTERSECTION

SIGNAL CONTROLLED INTERSECTION

TITLE:

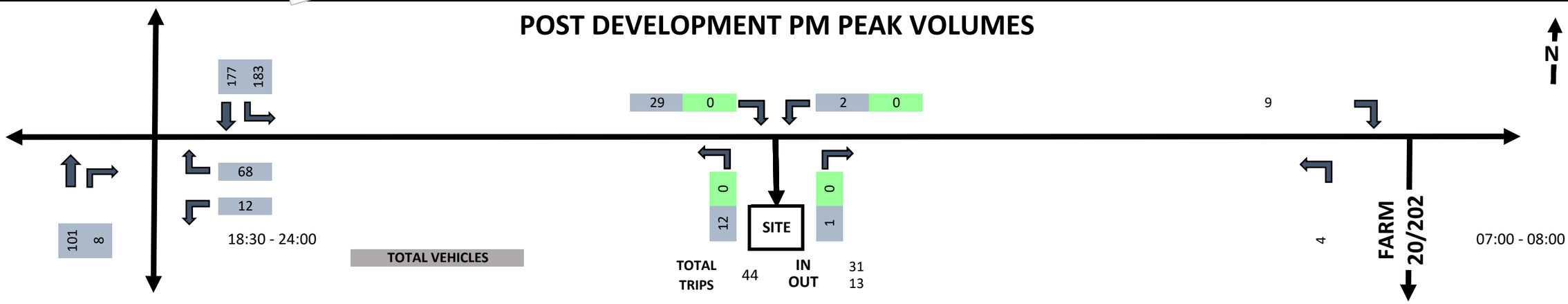
FIGURE C

POST DEVELOPMENT AM PEAK VOLUMES



NM PEAK HOUR NOT APPLICABLE

POST DEVELOPMENT PM PEAK VOLUMES



URBAN ENGINEERING
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

PROJECT:

24-150 MUNSIDE DEVELOPMENT

DESCRIPTION:

2029 (ULTIMATE) AM, NM AND PM PEAK HOUR TRAFFIC VOLUMES (INCL FARM 20/202)

LEGEND:

STOP CONTROLLED INTERSECTION

SIGNAL CONTROLLED INTERSECTION

TITLE:

FIGURE D

ANNEXURE E

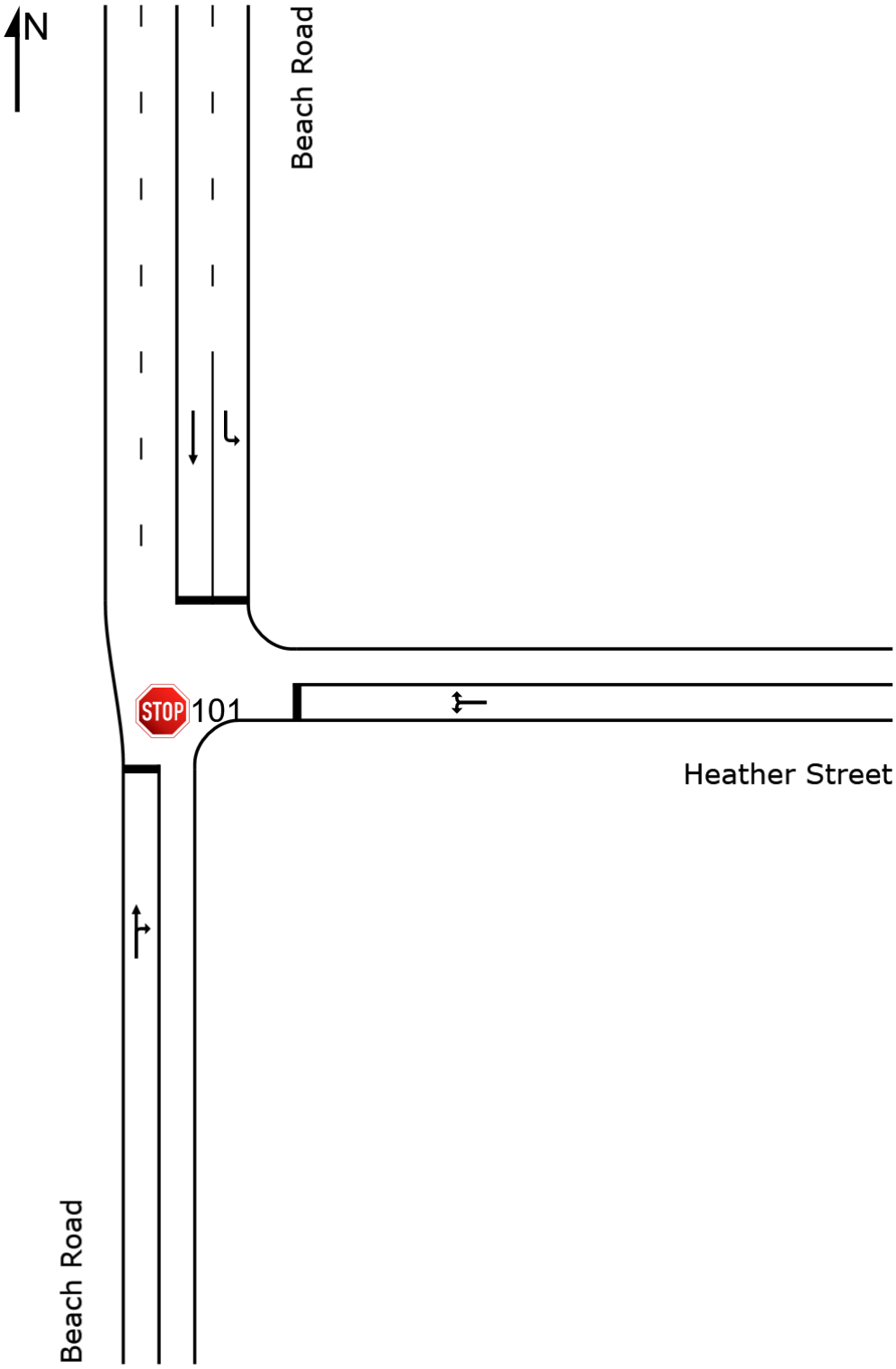
SIDRA RESULTS

SITE LAYOUT

Site: 101 [2024 Beach/Heather AM (Site Folder: General)]

New Site
Site Category: (None)
Stop (All-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [2024 Beach/Heather AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Stop (All-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Beach Road															
2	T1	All MCs	189	0,0	189	0,0	0,458	20,9	LOS C	2,1	14,8	0,94	1,33	2,75	44,4
3	R2	All MCs	9	0,0	9	0,0	0,458	20,7	LOS C	2,1	14,8	0,94	1,33	2,75	44,2
Approach			198	0,0	198	0,0	0,458	20,9	LOS C	2,1	14,8	0,94	1,33	2,75	44,4
East: Heather Street															
4	L2	All MCs	11	0,0	11	0,0	0,253	14,9	LOS B	0,9	6,4	0,83	1,23	2,16	47,7
6	R2	All MCs	125	0,0	125	0,0	0,253	14,7	LOS B	0,9	6,4	0,83	1,23	2,16	47,6
Approach			136	0,0	136	0,0	0,253	14,7	LOS B	0,9	6,4	0,83	1,23	2,16	47,6
North: Beach Road															
7	L2	All MCs	33	0,0	33	0,0	0,120	20,9	LOS C	0,4	2,9	0,95	1,17	2,08	44,3
8	T1	All MCs	66	0,0	66	0,0	0,213	20,4	LOS C	0,8	5,5	0,95	1,20	2,20	44,7
Approach			99	0,0	99	0,0	0,213	20,6	LOS C	0,8	5,5	0,95	1,19	2,16	44,5
All Vehicles			433	0,0	433	0,0	0,458	18,9	LOS C	2,1	14,8	0,91	1,27	2,43	45,4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2029 Beach/Heather PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Stop (All-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Beach Road															
2	T1	All MCs	101	0,0	101	0,0	0,198	13,8	LOS B	0,7	4,8	0,81	1,22	2,05	48,4
3	R2	All MCs	8	0,0	8	0,0	0,198	13,6	LOS B	0,7	4,8	0,81	1,22	2,05	48,2
Approach			109	0,0	109	0,0	0,198	13,8	LOS B	0,7	4,8	0,81	1,22	2,05	48,4
East: Heather Street															
4	L2	All MCs	12	0,0	12	0,0	0,175	15,5	LOS C	0,6	4,2	0,86	1,20	2,06	47,3
6	R2	All MCs	68	0,0	68	0,0	0,175	15,3	LOS C	0,6	4,2	0,86	1,20	2,06	47,2
Approach			80	0,0	80	0,0	0,175	15,3	LOS C	0,6	4,2	0,86	1,20	2,06	47,3
North: Beach Road															
7	L2	All MCs	183	0,0	183	0,0	0,413	19,8	LOS C	1,8	12,6	0,92	1,30	2,61	44,9
8	T1	All MCs	177	0,0	177	0,0	0,422	20,4	LOS C	1,9	13,0	0,94	1,31	2,64	44,7
Approach			360	0,0	360	0,0	0,422	20,1	LOS C	1,9	13,0	0,93	1,30	2,62	44,8
All Vehicles			549	0,0	549	0,0	0,422	18,2	LOS C	1,9	13,0	0,90	1,27	2,43	45,8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2029 Beach/Heather AM NoGo (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Stop (All-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Beach Road															
2	T1	All MCs	219	0,0	219	0,0	0,527	23,0	LOS C	2,7	18,7	0,96	1,39	3,03	43,3
3	R2	All MCs	10	0,0	10	0,0	0,527	22,8	LOS C	2,7	18,7	0,96	1,39	3,03	43,1
Approach			229	0,0	229	0,0	0,527	23,0	LOS C	2,7	18,7	0,96	1,39	3,03	43,3
East: Heather Street															
4	L2	All MCs	13	0,0	13	0,0	0,291	15,4	LOS C	1,1	7,6	0,84	1,24	2,24	47,4
6	R2	All MCs	144	0,0	144	0,0	0,291	15,2	LOS C	1,1	7,6	0,84	1,24	2,24	47,3
Approach			157	0,0	157	0,0	0,291	15,2	LOS C	1,1	7,6	0,84	1,24	2,24	47,3
North: Beach Road															
7	L2	All MCs	38	0,0	38	0,0	0,139	21,2	LOS C	0,5	3,4	0,95	1,17	2,10	44,1
8	T1	All MCs	75	0,0	75	0,0	0,242	20,9	LOS C	0,9	6,4	0,95	1,21	2,25	44,4
Approach			113	0,0	113	0,0	0,242	21,0	LOS C	0,9	6,4	0,95	1,20	2,20	44,3
All Vehicles			499	0,0	499	0,0	0,527	20,1	LOS C	2,7	18,7	0,92	1,30	2,60	44,7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2029 Beach/Heather PM NoGo (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Stop (All-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Beach Road															
2	T1	All MCs	101	0,0	101	0,0	0,196	13,8	LOS B	0,7	4,7	0,81	1,22	2,05	48,4
3	R2	All MCs	7	0,0	7	0,0	0,196	13,6	LOS B	0,7	4,7	0,81	1,22	2,05	48,2
Approach			108	0,0	108	0,0	0,196	13,8	LOS B	0,7	4,7	0,81	1,22	2,05	48,4
East: Heather Street															
4	L2	All MCs	10	0,0	10	0,0	0,156	15,8	LOS C	0,5	3,7	0,87	1,19	2,04	47,2
6	R2	All MCs	58	0,0	58	0,0	0,156	15,6	LOS C	0,5	3,7	0,87	1,19	2,04	47,1
Approach			68	0,0	68	0,0	0,156	15,6	LOS C	0,5	3,7	0,87	1,19	2,04	47,1
North: Beach Road															
7	L2	All MCs	155	0,0	155	0,0	0,366	19,3	LOS C	1,5	10,6	0,92	1,27	2,48	45,1
8	T1	All MCs	177	0,0	177	0,0	0,396	18,9	LOS C	1,7	11,8	0,92	1,30	2,55	45,5
Approach			332	0,0	332	0,0	0,396	19,1	LOS C	1,7	11,8	0,92	1,28	2,52	45,3
All Vehicles			508	0,0	508	0,0	0,396	17,5	LOS C	1,7	11,8	0,89	1,26	2,35	46,2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2029 Beach/Heather AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Stop (All-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Beach Road															
2	T1	All MCs	219	0,0	219	0,0	0,572	26,3	LOS D	3,1	21,8	0,98	1,43	3,26	41,7
3	R2	All MCs	11	0,0	11	0,0	0,572	26,1	LOS D	3,1	21,8	0,98	1,43	3,26	41,5
Approach			230	0,0	230	0,0	0,572	26,3	LOS D	3,1	21,8	0,98	1,43	3,26	41,7
East: Heather Street															
4	L2	All MCs	15	0,0	15	0,0	0,334	15,2	LOS C	1,3	9,1	0,83	1,26	2,32	47,5
6	R2	All MCs	182	0,0	182	0,0	0,334	14,9	LOS B	1,3	9,1	0,83	1,26	2,32	47,5
Approach			197	0,0	197	0,0	0,334	14,9	LOS B	1,3	9,1	0,83	1,26	2,32	47,5
North: Beach Road															
7	L2	All MCs	51	0,0	51	0,0	0,197	23,3	LOS C	0,7	5,1	0,97	1,19	2,20	43,1
8	T1	All MCs	75	0,0	75	0,0	0,257	22,2	LOS C	1,0	6,9	0,96	1,22	2,29	43,7
Approach			126	0,0	126	0,0	0,257	22,7	LOS C	1,0	6,9	0,96	1,21	2,25	43,5
All Vehicles			553	0,0	553	0,0	0,572	21,4	LOS C	3,1	21,8	0,92	1,32	2,69	44,0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [2024 Beach/Heather PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Stop (All-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Beach Road															
2	T1	All MCs	87	0,0	87	0,0	0,168	13,5	LOS B	0,6	3,9	0,80	1,22	2,00	48,6
3	R2	All MCs	6	0,0	6	0,0	0,168	13,3	LOS B	0,6	3,9	0,80	1,22	2,00	48,4
Approach			93	0,0	93	0,0	0,168	13,5	LOS B	0,6	3,9	0,80	1,22	2,00	48,6
East: Heather Street															
4	L2	All MCs	9	0,0	9	0,0	0,136	15,6	LOS C	0,5	3,2	0,86	1,18	2,01	47,3
6	R2	All MCs	50	0,0	50	0,0	0,136	15,4	LOS C	0,5	3,2	0,86	1,18	2,01	47,2
Approach			59	0,0	59	0,0	0,136	15,4	LOS C	0,5	3,2	0,86	1,18	2,01	47,2
North: Beach Road															
7	L2	All MCs	134	0,0	134	0,0	0,315	18,3	LOS C	1,2	8,7	0,91	1,25	2,35	45,7
8	T1	All MCs	155	0,0	155	0,0	0,345	17,9	LOS C	1,4	9,8	0,90	1,27	2,41	46,0
Approach			289	0,0	289	0,0	0,345	18,1	LOS C	1,4	9,8	0,91	1,26	2,39	45,9
All Vehicles			441	0,0	441	0,0	0,345	16,7	LOS C	1,4	9,8	0,88	1,24	2,25	46,6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

ANNEXURE "Z" - CIVIL ENGINEERING SERVICES REPORT

URBAN ENGINEERING CONSULTANTS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

ENGINEERING SERVICES REPORT

PROPOSED DEVELOPMENT OF ERVEN 4645 & 4646 PACALTSDORP, GEORGE

Report Number 24-150_CES

Date: November 2024 Revision 0

QUALITY ASSURANCE DATA

Report Title:	PROPOSED DEVELOPMENT OF ERVEN 4645 & 4646 PACALTSDORP, GEORGE
Client:	Redrock Development
Report Number:	24-150_CES
Revision Number	Revision 0

Revision History

Date	Rev	Written By	Issued to		Distribution	Format
			Name	Institution		
27 Nov 2024	0	Frans v Aardt	Jan Vrolijk	Jan Vrolijk Town Planners	Email	.pdf
			Gerrit Gouws	Redrock Development	Email	.pdf

Written by:

Digitally signed by Frans v Aardt
Date: 2024.11.28 08:20:04 +02'00'

Frans van Aardt (B.Ing, M.Ing, Pr. Eng)
on behalf of Urban Engineering (Pty) Ltd

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LIST OF ABBREVIATIONS

msl	Mean Sea Level
WCG	Western Cape Government
WGS	World Geodetic System
HDPE	High Density Polyethylene
uPVC	Unplasticised Polyvinyl Chloride
SDP	Site Development Plan
Kℓ	Kilo Litre (1,000 litres)
Mℓ	Mega Litre (1,000,000 litres)
NPDG	The Neighbourhood Planning and Design Guide
FAR	Floor Area Ratio

1 INTRODUCTION

Urban Engineering Consultants (Pty) Ltd was appointed by Redrock Development to prepare a Civil Engineering Services Report pertaining to the proposed development of Erven 4645 & 4646 in Pacaltsdorp, George. The purpose of this report is to determine the demand on the municipal infrastructure and to investigate the availability and the capacity of the existing services in close proximity to the proposed development.

2 BACKGROUND

2.1 DESCRIPTION AND LOCALITY

The site currently consists of two erven (4645 and 4646) that will be consolidated to create a new single erf of approximately 16,800m^2 in size. There are currently various structures on the erven and access is via Church Street. The site centre has approximate WGS 84 coordinates of 34°1'24.72"S and 22°27'7.06"E.

Figure 2-1 - Locality Plan

Figure 2-2 - Erven 4645 and 4646

2.2 ZONING

According to George Municipality's GIS Viewer, the site is zoned RZ for Tourist Accommodation.

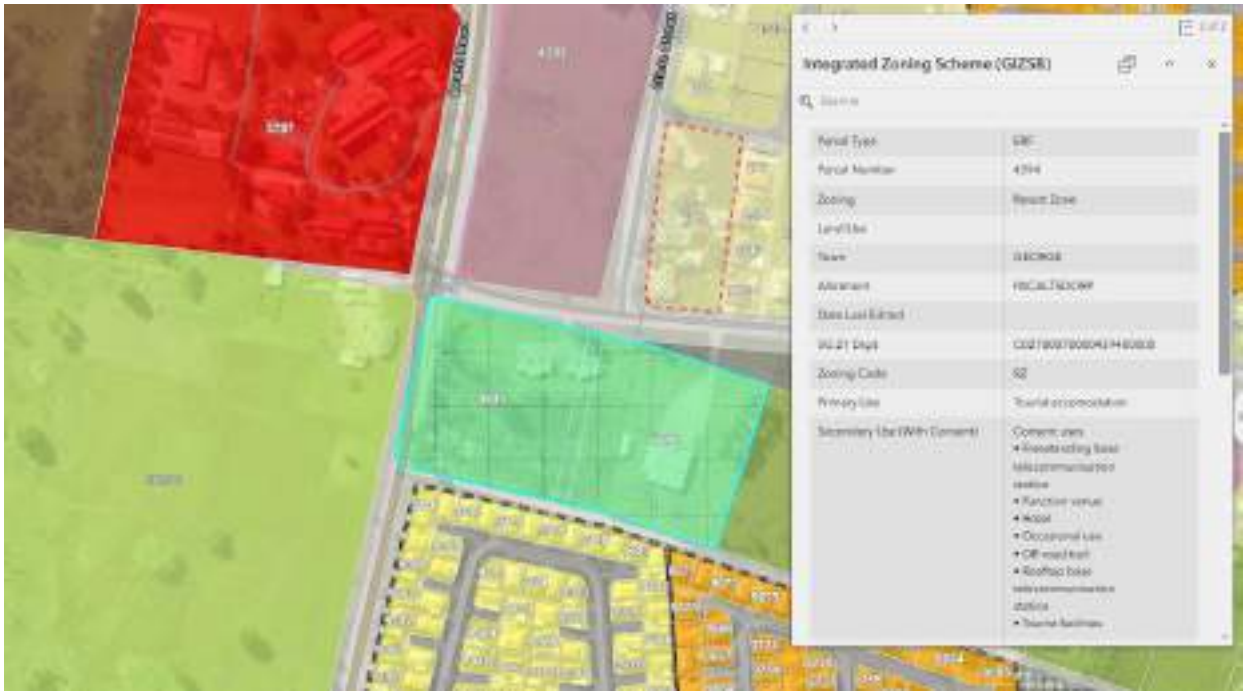


Figure 2-3 - Current Zoning

2.3 BROAD SOIL CLASSIFICATION

Based on the Western Cape Department of Agiculture's online mapping tool, Cape Farm Mapper, the site geology can broadly be defined as mainly gneissic granite and granodiorite, as well as phyllite, schist, grit, hornfels and quartzite of the Kaaimans Group, and quartzitic sandstone of the Table Mountain Group, Cape Supergroup. (refer to Figure 2-4 below)

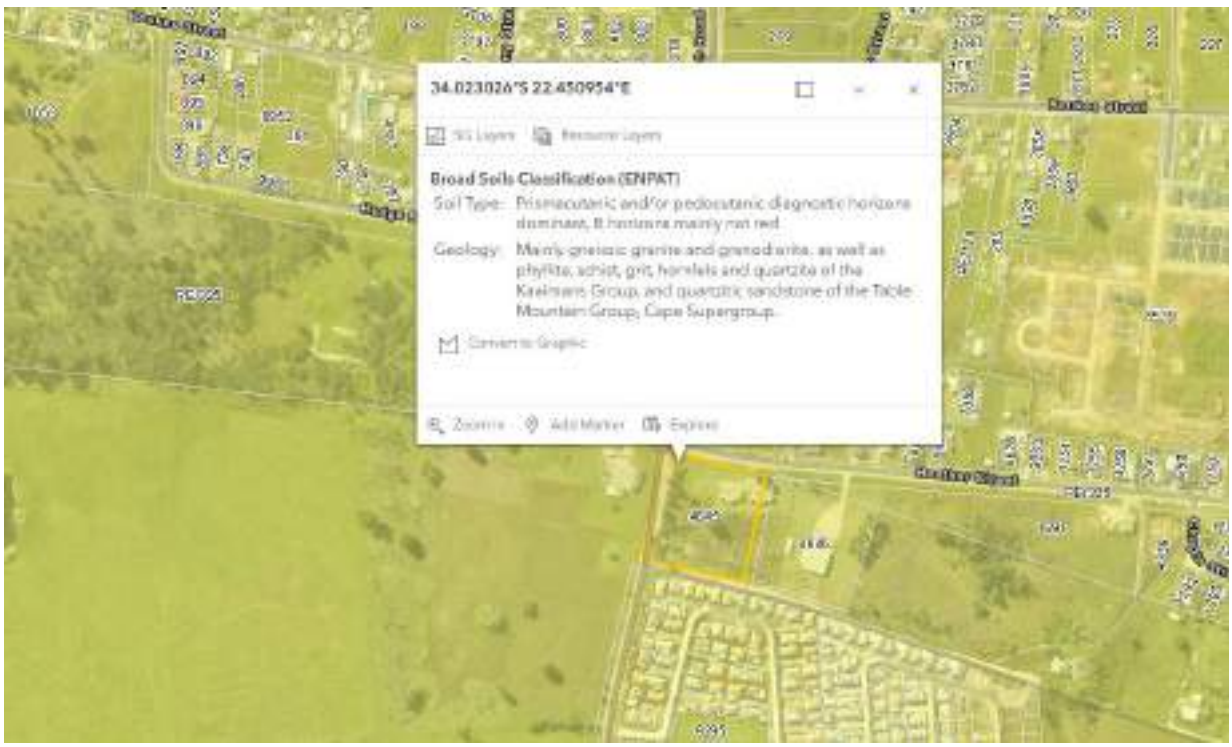


Figure 2-4 - Broad Soil Classification

3 SITE INSPECTION

The site was visited by Frans van Aardt of Urban Engineering on 22 November 2024. Photos taken during the inspection have been attached as **ANNEXURE A** to this report. During the inspection, the upgrade of Heather Street was underway and Heather Street was open for one way traffic only (refer to the photos attached as **ANNEXURE A**).

Figure 3-1 - Site Photo

4 THE DEVELOPMENT PROPOSAL

The developer intends to consolidate erven 4646 and 4645 to enable the development of 54 residential dwellings, as indicated in Table 4-1 below:

LEGEND				
COLOUR CODE	ZONING	AMOUNT	AREA m²	% OF TOTAL AREA
	GENERAL RESIDENTIAL ZONE II - GROUP HOUSING (100m² - 249m²)	43	9516.78m²	56.4%
	GENERAL RESIDENTIAL ZONE II - GROUP HOUSING (250m² - 300m²)	9	2485.83m²	14.72%
	OPEN SPACE ZONE II	2	454.14m²	2.68%

Table 4-1 - Proposed Zonings

A conceptual Site Development Plan (SDP) was prepared by Jan Vrolijk Town Planners and has been attached as **ANNEXURE B** to this report. For ease of reference an extract of the proposed SDP has been included as Figure 4-1 below.

Figure 4-1 - Extract of SDP

It is the owners intention to develop the site in two distinct phases as indicated in Figure 4-2.

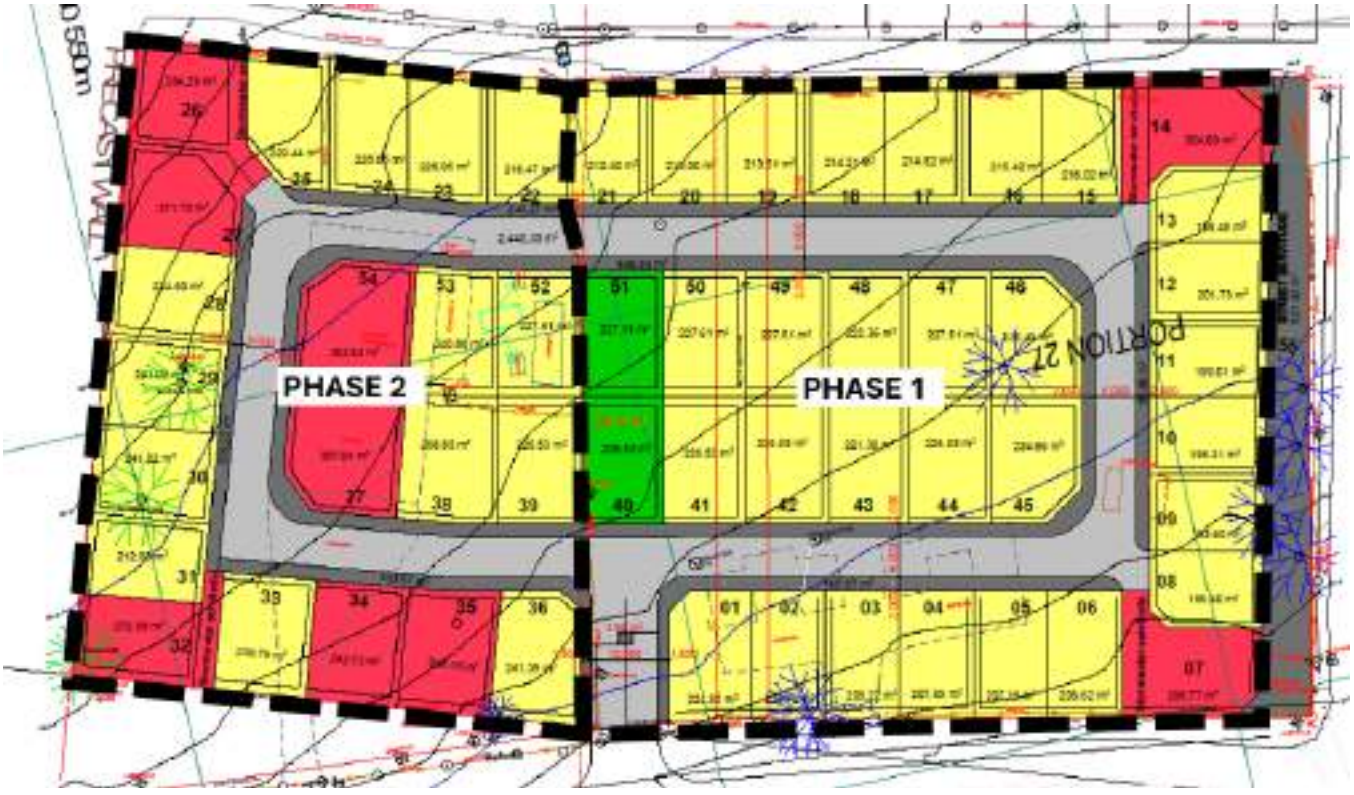


Figure 4-2 - Proposed Development Phasing

5 EXISTING ENGINEERING SERVICES

For this report, existing services information was extracted from the George Municipality's IMQS system. The existing infrastructure in the area is indicated on the drawings attached as **ANNEXURE C**, with a brief explanation of the status quo below.

5.1 WATER

An existing 110mm diameter pipe that runs within the Heather Street road reserve (parallel to the site), provides potable water to the site. The section of water pipe adjacent to the proposed development has an average static head of 33m and flow rate of 2.98 L/s.

Figure 5-1 - Existing Water Infrastructure

5.2 SEWER

An existing 150mm sewer line runs parallel to the site boundary, within the Heather Street road reserve. Unfortunately, this sewer line is positioned on the high side of the site and therefore effluent will not be able to gravity feed towards this pipe.

Figure 5-2 – Existing Sewer Infrastructure.

5.3 STORMWATER

According to the George IMQS, no suitable stormwater infrastructure is situated in the vicinity of the site.

Figure 5-3 - Existing Stormwater Infrastructure

6 INTEGRATION WITH GLS MASTER PLANNING

GLS Consulting was appointed by George Municipality for the updating of the master plans for the water and sewer distribution system of the George Municipality (GLM). The reports were compiled with data from existing and future models of the December 2022 master plan.

6.1 WATER MASTER PLANNING

The GLS Master plan for the area indicates expansion of the current water network towards the undeveloped areas situated Southeast of the site.

Figure 6-1 - GLS Consulting Existing and Proposed Future Water system

6.2 SEWER MASTER PLANNING

The GLS Master plan for the area indicates expansion of the current sewer network towards the undeveloped areas situated east and Southeast of the site. These new sewer networks seem to tie-in to the existing sewer manhole outside (East) of the Mooikloof development.

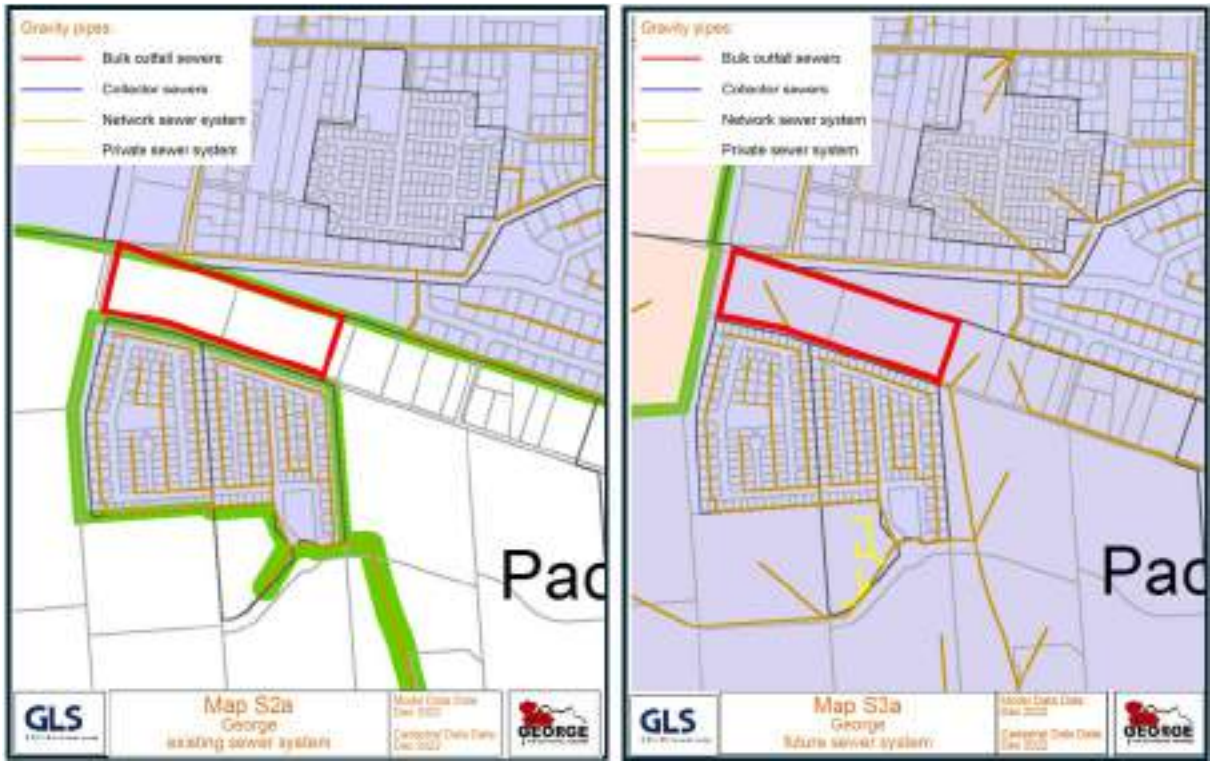


Figure 6-2 - GLS Consulting Existing and Proposed Future Sewer system

7 WATER DEMAND CALCULATIONS

The Neighbourhood Planning and Design Guide (NPDG), issued by the Department of Human Settlements, was used for the demand calculations.

7.1 DOMESTIC WATER

The water demand in accordance with the NPDG is based on Table 7-1:

Land use		Density [#1] units/ha	Stand size [#1] m²	Unit of measure	Water demand (AADD)	
					kL/ha/d [#]	kL/unit/d [#]
Residential stands	High density, small sized	20 to 12	400 to 670	kL/unit	11	0,60 to 0,80
	Medium density, medium sized	12 to 8	670 to 1 000	kL/unit	9	0,80 to 1,00
	Low density, large sized	8 to 5	1 000 to 1 600	kL/unit	8	1,00 to 1,30
	Very low density, extra large sized	5 to 3	1 600 to 2 670	kL/unit	7	1,30 to 2,00
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

Table 7-1 - Recommended Unit Average Annual Daily Demands (AADD)

The total site area is 1,6ha and there are 52 units which results in a density of 32,5 du/ha. Since the stand sizes range between 186.40m^2 and 307.04m^2 the domestic water demand can be calculated as follows:

Land Use		Density	Min Stand Size	Max Stand Size	No. of units	Demand /unit	Total (kL/d)
Group/cluster Housing	Medium Density	32,5du/ha	186,4	307,04	52	0,5	26
Total					**52**		**26**

Table 7-2 - AADD Calculation

The water demand figures, operating pressures and required storage capacity for the total proposed development are set out in Table 7-3 below:

Annual Average Daily Demand (AADD) ** Water for the grounds to be from rainwater collection*	**26 kℓ***
Peak factor (Average)	3,6
Instantaneous peak flow	1,08 ℓ/s
Maximum operating pressure	90 m
Min operating pressure (plus height difference between main and highest ground level)	24 m
Storage capacity required (48 hours of AADD)	52 kℓ

Table 7-3 - Water Demand for the Proposed Development

Hydraulic Considerations

As stipulated in the NPDG, the following hydraulic considerations should be adhered to as far as possible:

- The pressure should be kept as low as possible to minimize real losses.
- The number of low and high points on pipes should be kept to a minimum to reduce the number of scour and air valves respectively.
- The velocities in the pipeline should be kept between 0.6 m/s and 1.2 m/s.
- Velocities through special fittings should not exceed 6 m/s or as per manufacturer's specifications.
- Pipelines should be designed to be protected against water hammer/surge pressures.
- Using 110mm as the minimum pipe size for ring mains in urban areas should be considered where the provision of fire flow is required.

7.2 WATER FOR FIRE FIGHTING

Firefighting water provision must comply with the requirements as specified in the NPDG as well as the SANS 10400 (National Building Codes).

According to the NPDG guidelines, single residential housing are classified as Low Risk 1 for which fire hydrants should provide a Minimum Design Fire Flow of 15 ℓ/s per hydrant, minimum pressure at the fire node of 15 m and a minimum residual head of 10 m. This fire flow must be sustained for a period of at least 1 hour, by all hydrants with a 120m maximum spacing between hydrants. The proposed Site Layout will require 4 hydrants as indicated in **ANNEXURE D**.

The resultant reservoir capacity required to satisfy the firefighting needs are calculated as follows:

- 4 x Hydrants @ 1500 ℓ/min/hydrant x 60 minutes = 360 kℓ/h
- 4 Hour Storage = 1.44 Mℓ

NPDG specifies the following with regards to Firefighting:

- Hydrants should not be provided off mains smaller than 75 mm diameter.
- Hydrants should be located in vehicular thoroughfares and opposite stand boundary pegs, and at a maximum spacing of 200 m (or as required by the local Fire Department).
- 75 mm diameter sluice-valve hydrants should be used for the high-risk and moderate-risk categories. For the low-risk category, the hydrant may be the screw-down type.
- The location of hydrants should be indicated by using permanent marker posts on the verge opposite the fitting or painted symbols on road or kerb surfaces.
- Symbols on markers should be durable.
- The hydrants' flow rate should be serviced and checked for conformity requirements at intervals not exceeding one year.
- Where possible, fire hydrants should be positioned to also serve as a scour valve

7.3 WATER STORAGE

The purpose of storing water is to meet balancing requirements and cater for emergencies (e.g. firefighting) or planned shutdowns. The balancing volume is required to cater for peak outflows while a constant (or variable) inlet flow is being received. Where water is obtained from a Municipal Authority, the storage capacity provided should comply with the requirements of the authority. For domestic use, a storage capacity of 48 hours of annual average daily demand is suggested, although there may be situations where 24 hours will suffice.

Since the annual average daily (24 hours) demand has been estimated as 26 kℓ, a reservoir spare capacity of at least 52 kℓ is required to satisfy the Domestic Water Use Requirement.

Combining the domestic requirement (52 kℓ) and the firefighting requirement (1.44 Mℓ) it follows that a total reservoir spare capacity for the proposed development of approximately **1.492 Mℓ** is required. The municipality's current storage capacity is considered sufficient to address the additional requirements.

7.4 DESIGN PARAMETERS

The following specifications as reflected in the George Municipality's Civil Engineering Standards & Requirements for Service (GMCESR), (**ANNEXURE D**) shall be applicable:

VALVES

All valves shall be in accordance with SABS 1200 I SABS 664/1974 and approved by the relevant Department Head.

- Valves to be approved and to exceed the specification of AVK resilient seal type.
- Valves shall be clockwise opening / left hand closing.
- Direction of opening to be clearly marked on the valve body or spindle cap.
- All valves shall be heavy duty, class 16 with non-rising spindles.
- All valves shall be fitted with cast iron cap, secured with retaining bolts.
- All valves Belltobies shall be polymer concrete as per AV Moulding, concrete, recycled plastic or cast iron depending on area and relevant condition.
- Valve chambers and chamber markers shall be constructed in accordance with GMCESR.
- All valves to have a minimum thickness of 225 micron Copon EP 2300 epoxy paint applied to all internal surfaces after it has been thoroughly cleaned by grit blasting to SA 1/2. Finishes in compliance with the requirements of SIS 05 09 00 (or similar approved coatings)

FIRE HYDRANTS

All fire hydrant types shall be in accordance with SANS 1200, comply with the local Fire Department Standard Regulations and be approved by the relevant Department Head:

- All fire hydrants shall be 63 mm diameter (internal), clockwise opening / left hand closing.
- Outlets shall be London round thread with cast iron cap and securing chain.
- Hydrant covers shall be polymer concrete as per AV Moulding, concrete, recycled plastic or cast iron depending on area and relevant conditions.
- Hydrant covers shall be painted with a minimum of two coats oil paint, "Yellow".
- All hydrants shall be supplied and installed complete with flanged Cl extension piece complete with cadmium plated nuts and bolts to ensure depth not greater than 400 mm.
- Hydrants chambers to be constructed in accordance with drawing as per GMCESR

7.5 WATER SAVING

The following general water saving practices are proposed:

- Dual Flush Toilets
- Low flow shower heads which make use of either aerators or pulse systems to reduce the flow without compromising the quality of the shower. The choice of shower heads are up to the developer but must have a flow of less than 7 ℓ/min.
- The faucets in bathrooms should be the low flow type with a peak flow of less than 10ℓ/min.
- The development should be fitted with rainwater collection tanks for landscaping.
- Consideration should be given to provide solar pumps at all rainwater tanks. The overflow from tanks should be directed into landscaping from where a SUDS approach to stormwater management should be followed. All water sources situated externally on buildings should be fed from these rainwater tanks.
- Geyser and pipe insulation should be allowed for as part of the development plans.

7.6 PROPOSED RETICULATION

A schematic layout of the proposed Water Reticulation has been attached as **ANNEXURE D.**

8 SEWERAGE DEMAND CALCULATIONS

The master plan of GLS indicates a future sewer network that will connect the site to the Outeniqua WWTW zone by means of various Pumps Stations.

The proposed development area will be approximately 1.687 ha when fully developed and will generate a design peak flow as detailed in the following sections. A gravity fed connection to the existing sewerage reticulation network next to Mooikloof is proposed.

8.1 DEMAND CALCULATIONS

The expected sewer flow is calculated in accordance with the recommendations published in the Neighbourhood Planning and Design Guide (NPDG), of which an extract has been included as Table 8-1 below.

Land use		Density #1 units/ha	Stand size #2 m²	Unit of measure	Water demand (AADD)		Sewer flow (excl. infiltration) (Unit PDDWF) #4		
					kl/ ha/d	kl/ unit/d #3	% AADD	kl/ unit/d #3	Unit Hydro-graph (UH)
Group/ cluster housing	High density	60 to 40	130 to 200	kl/unit	21	0.40 to 0.45	95% to 90%	0.38 to 0.41	UH5
	Medium density	40 to 30	200 to 270	kl/unit	17	0.45 to 0.50	90% to 85%	0.41 to 0.43	UH5
	Low density	30 to 20	270 to 400	kl/unit	14	0.50 to 0.60	85% to 80%	0.43 to 0.48	UH5

Table 8-1 - Demands and Hydrographs for Different Land Use Categories (NPDG)

The calculations are based on "The Neighbourhood Planning and Design Guide"

As calculated in Table 7-3, the proposed development has an Annual Average Daily Water Demand of 26 kℓ. The Sewerage Demand can therefore be estimated as indicated in Table 8-2.

Water Demand (Annual Average Daily Demand - AADD) ** Water for the grounds to be from rainwater collection*	**26 kℓ***
Sewer Flow % (Excluding Infiltration)	85%
Peak Factor	1,90
Peak Dry Weather Flow (PDWF)	0,49 ℓ/s
Infiltration	15%
Peak Wet Weather Flow (PWWF)	0,56 ℓ/s

Table 8-2 - Sewage Demand Calculation

From Table 8-2, it follows that the fully Developed Design Peak Flow is approximately **0.56 ℓ/s**.

8.2 DESIGN PARAMETERS AND STANDARDS

The following design criteria must be followed:

- George Municipality's Standard Details shall be used (**ANNEXURE E**)
- A minimum self-cleansing velocity of 0,7m/s
- A minimum pipe diameter of 110mm for connections to individual dwellings
- A maximum velocity of 3.5m/s to prevent segregation of solid and liquids.
- All sewer pipes to be heavy duty solid wall type,
- All sewer mains to be 160mm diameter, all house connection to be 110mm diameter
- All design slopes of gravity mains must be in line with applicable design standards
- Manhole covers to be Polymer concrete or similar approved.

8.3 PROPOSED RETICULATION

A schematic layout of the proposed Sewer Reticulation has been attached as **ANNEXURE D.**

9 INTERNAL ROADS

Internal Roads will consist of interlocking paving blocks. In order to determine the pavement design, the number of E80's was estimated as follows:

Construction Phase	Construction Period	0,3 year
	Average Weight of Construction Vehicle	12000 kg
	Number of trips per day	20
	Days per year	260
	Number of E80's generated	2 340 E80's
Operational Phase	Number of Units	52
	Number of vehicles per unit	2,5
	Number of trips per vehicle	8 (4xIN + 4xOUT)
	Average weight of vehicle	1500 kg
	Days per year	365
	Design Period	20 years
	Number of E80's generated	1 423 500 E80's
Total E80's over 20 year period		1 425 840

Figure 9-1 - E80 Estimation

Since George is situated in a Wet Climatic Region (Weinert N Value = 2), the corresponding UTG 2 catalogue design has been indicated in Figure 9-2.

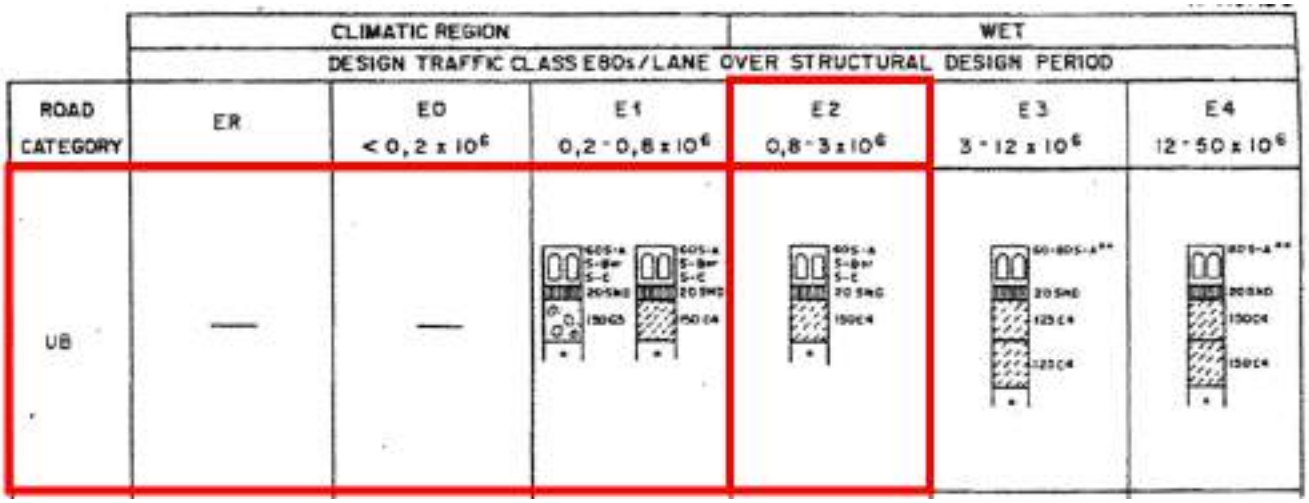


Figure 9-2 - Catalogue Road Layerworks Design

Based on the poor in-situ material generally encountered throughout George, the recommended pavement design is therefore as follows:

- 60mm interlocking paving blocks on 20mm bedding sand
- 150mm cement Stabilised C4 Layer
- 2 x 150mm Thick G7 Gravel Layers
- Roadbed, compacted 150mm deep

10 TRAFFIC IMPACT

The proposed access to the development is via Heather Street. A detailed Traffic Impact Statement (TIA) was prepared by Urban Engineering. Based on the TIS the development is supported from a traffic engineering perspective.

11 FLOOD LINES

This proposed development is not directly affected by flood lines.

12 STORMWATER

Conventional Stormwater Management has focused on quantity (flow) management, by collecting runoff and channeling it to the closest watercourse. This has had a significant impact on the environment through the erosion of natural channels, siltation of water bodies and pollution resulting in environmental degradation. It is clear that an alternative approach is required. Sustainable Urban Drainage Systems (SUDS) offer such alternatives.

Stormwater will generally drain via the proposed development's internal road network, towards the existing gravel road separating the site from the Mooikloof development. The SDP makes provision for various Stormwater servitudes, placed in strategic points at the site low points. Concentrating water in piped systems will be avoided as far as possible and rainwater will surface flow towards the lowest points of the development, as indicated in **ANNEXURE D**, from where it will discharge along the existing gravel road situated south of the site. From here stormwater will surface flow towards the natural swales and streams situated on Farm RE/21/202.

This approach aims to mimic the natural hydrological cycles while the key objectives is the effective management of stormwater runoff quantity, quality, associated amenities, and biodiversity of the urban drainage system.

13 SOLID WASTE MANAGEMENT

The existing Municipal landfill site will be used for solid waste disposal. Removal of waste and management thereof will be handled by George Municipality according to a Service Level Agreement to be drafted between George Municipality and the Developer.

It is assumed that refuse removal will be dealt with once a week as applicable to all the current residential areas in the George Municipal Area.

Solid waste is based on an estimated 0.85 kg/person/day at an uncompacted density of 200kg/m^3.

Solid Waste Calculation = 52 Units x 4 people/unit x 0,85 kg/day
= 176,8 kg/day
= 0,1768 ton/day
= 0,884 m^3/day (uncompacted)
= 26,52 m^3/month (uncompacted)
= 10,608 m^3/month (Compacted in rear-end loader)

The existing landfill site, in combination with the new proposed regional landfill site next to PetroSA in Mossel Bay, will be able to accommodate the additional solid waste generated by the development.

14 SUMMARY

The findings of this report are summarized below:

1. It is the developer's intention to consolidate and subdivide erven 4645 and 4646 into 52 group housing erven.
2. The site has access to potable municipal water but the existing municipal bulk sewer line in Heather Street is situated along the high side of the site and the bulk of the site will not be able to drain towards the sewer line. A new bulk sewer line will therefore have to be installed to service the site. It is proposed that the new bulk line follows the GLS Master Plan and connects to the existing "Mooikloof" sewer manhole as indicated in **ANNEXURE D**.
3. Site access and the impact of the generated traffic on the public road network is addressed in a separate Traffic Impact Assessment.
4. Proposed internal reticulation plans have been attached as **ANNEXURE D**
5. Proposed George Municipality typical detail plans have been attached as **ANNEXURE E**

ANNEXURE A

SITE PHOTOS









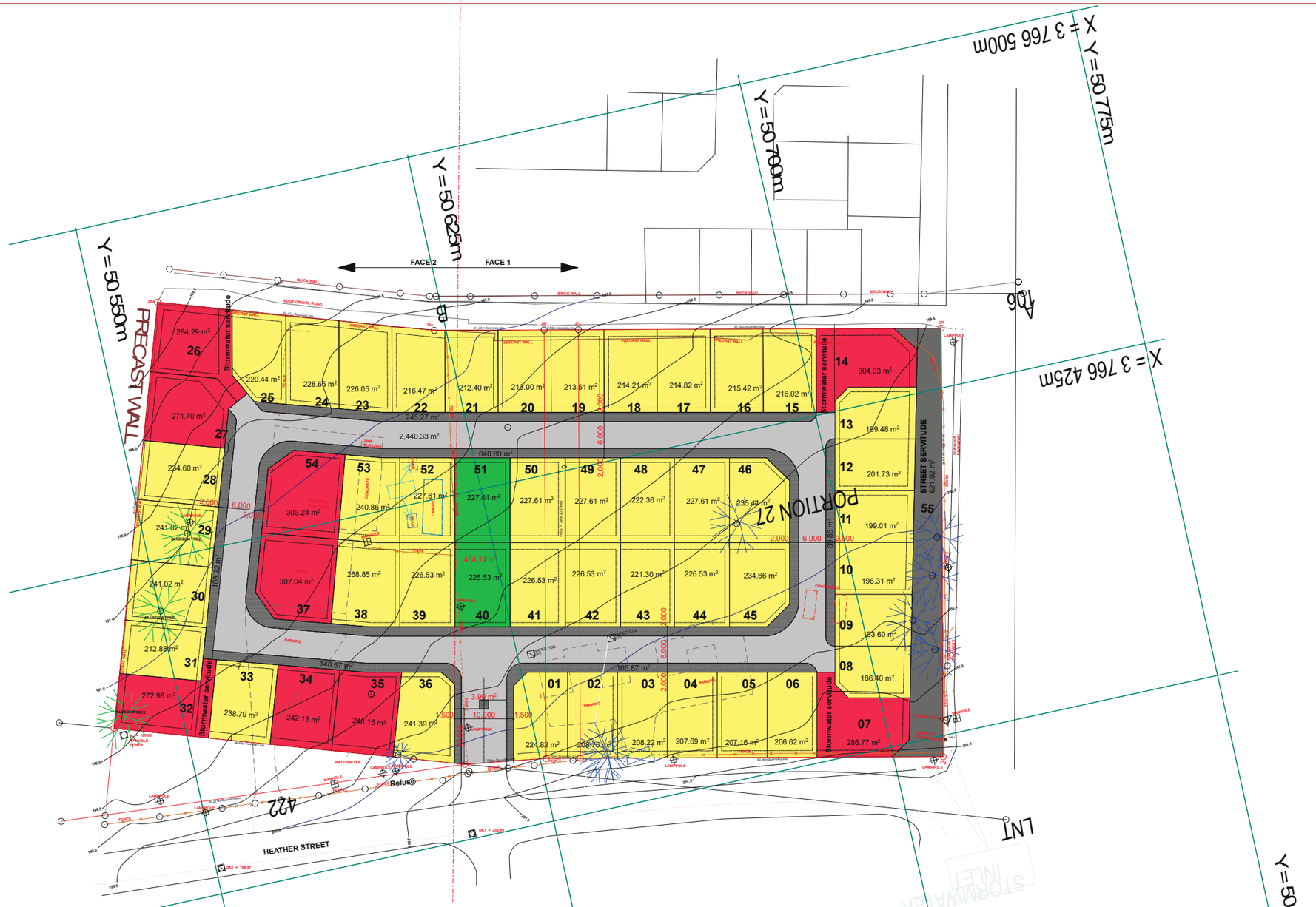
CLINIC STR


HEATHER STR


MUNSIDE CHALETS
Self Catering
HEATHER ROAD
PACALTSDORP
076 953 4879

ANNEXURE B

SITE DEVELOPMENT PLAN



LEGEND

COLOUR CODE	ZONING	AMOUNT	AREA m²	% OF TOTAL AREA
	GENERAL RESIDENTIAL ZONE II - GROUP HOUSING (100m² - 249m²)	43	9516.78m²	56.4%
	GENERAL RESIDENTIAL ZONE II - GROUP HOUSING (250m² - 300m²)	9	2485.83m²	14.72%
	OPEN SPACE ZONE II	2	454.14m²	2.68%

SITE DEVELOPMENT PLAN

SCALE 1:500

GENERAL RESIDENTIAL
ZONE II - GROUP HOUSING
USED

SITE AREA = 16 877.67m²
ROAD AREA = 2 408.44m²
PAVEMENT AREA = 1 390.59m²
OPEN SPACE ZONE II = 454.14m²
TRANSPORT ZONE 11 = 621.92m²

BUILDING LINES OF INDIVIDUAL ERVENS.
STREET = 1m
SIDES = 1 SIDE 1m AND 1 = 0m
REAR = 1.5m

SIGNATURE OF OWNER/ CLIENT: | DATE:

SIGNATURE OF ARCHITECT: | DATE:

REVISIONS

PROJECT TITLE

SUBDIVISION LAYOUT DESIGN ON ERF 4645, 4646 & 1291 PACALTSDORP

DRAWING DESCRIPTION

NEW PROPOSED HOUSING DEVELOPMENT

DESIGNED BY:

JV TOWN PLANNERS
TEL: 044 873 3011 FAX: 086 510 4383 EMAIL: janvrolijk@jvtownplanner.co.za
CELL:082 464 7671 PO Box 710 George 6530
OFFICE: Millwood Building corner of York and Victoria Street, George
SACPLAN REG No. A/1386/2010

A4 ARCHITECTURE

PROJECT NO:	DRAWING NO:	REVISION
2024/06/015	001	

ANNEXURE C

INFORMATION RECEIVED FROM GEORGE IMQS SYSTEM

N

Water: System Type

2024-11-22 14:45

GEORGE
THE CITY FOR ALL REASONS

0 100m
Scale 1:3289

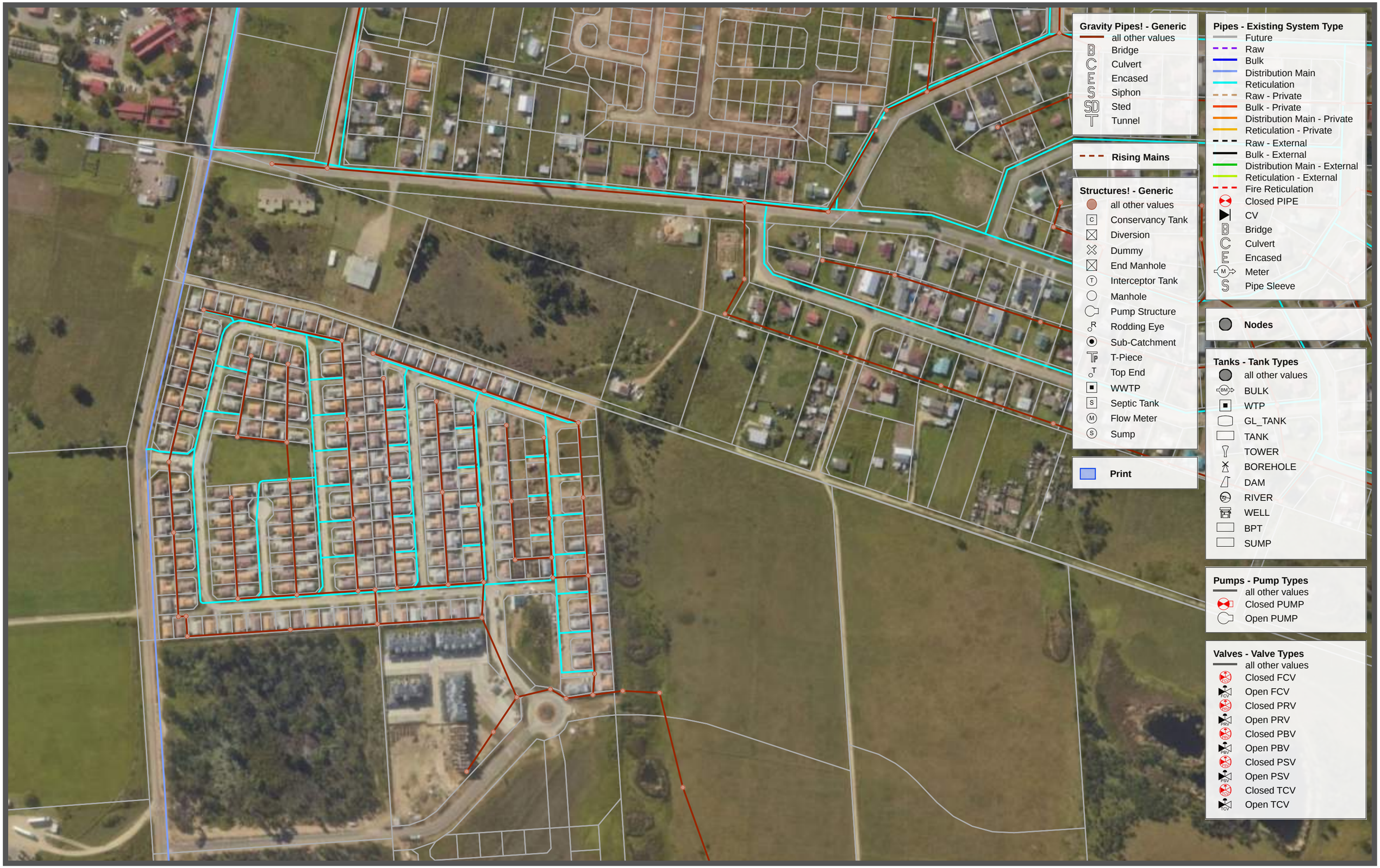
N

Sewer: System Type

2024-11-22 14:54

GEORGE
THE CITY FOR ALL REASONS

0 100m
Scale 1:3289



N

Water: System Type

2024-11-22 14:54

GEORGE
THE CITY FOR ALL REASONS

0 100m
Scale 1:3289

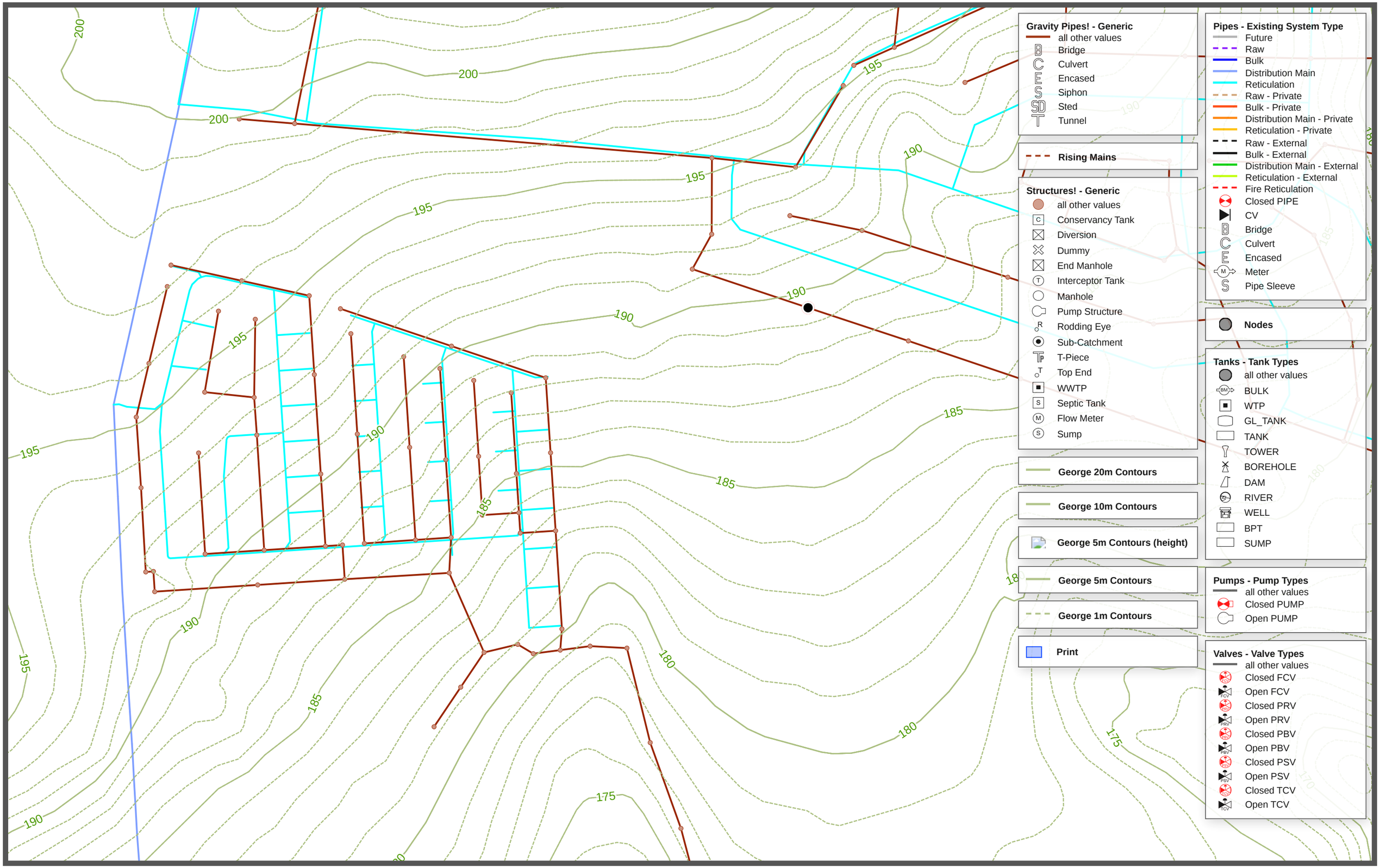
N

Stormwater: Diameter

2024-11-22 14:55

GEORGE
THE CITY FOR ALL REASONS

0 100m
Scale 1:3289



N

Water: System Type

2024-11-22 14:43

GEORGE
THE CITY FOR ALL REASONS

0 100m
Scale 1:3289

ANNEXURE D

SCHEMATIC LAYOUTS

PHASE 1 WATER PIPE

PHASE 2 WATER PIPE

NEW 110mmØ CLASS 12, INTERNAL uPVC DOMESTIC WATER PIPE (PHASE 2)

NEW 110mmØ CLASS 12, INTERNAL uPVC DOMESTIC WATER PIPE (PHASE 1)

NEW 110mmØ CLASS 12, INTERNAL uPVC DOMESTIC WATER PIPE (PHASE 1)

NEW 110mmØ CLASS 12, INTERNAL uPVC DOMESTIC WATER PIPE (PHASE 1)

TIE INTO EXISTING MUNICIPAL 110mm uPVC WATER PIPE

EXISTING 110mmØ MUNICIPAL uPVC WATER PIPE

FOR PLANNING PURPOSES ONLY

Revisions	No.	Date	Description	Initial

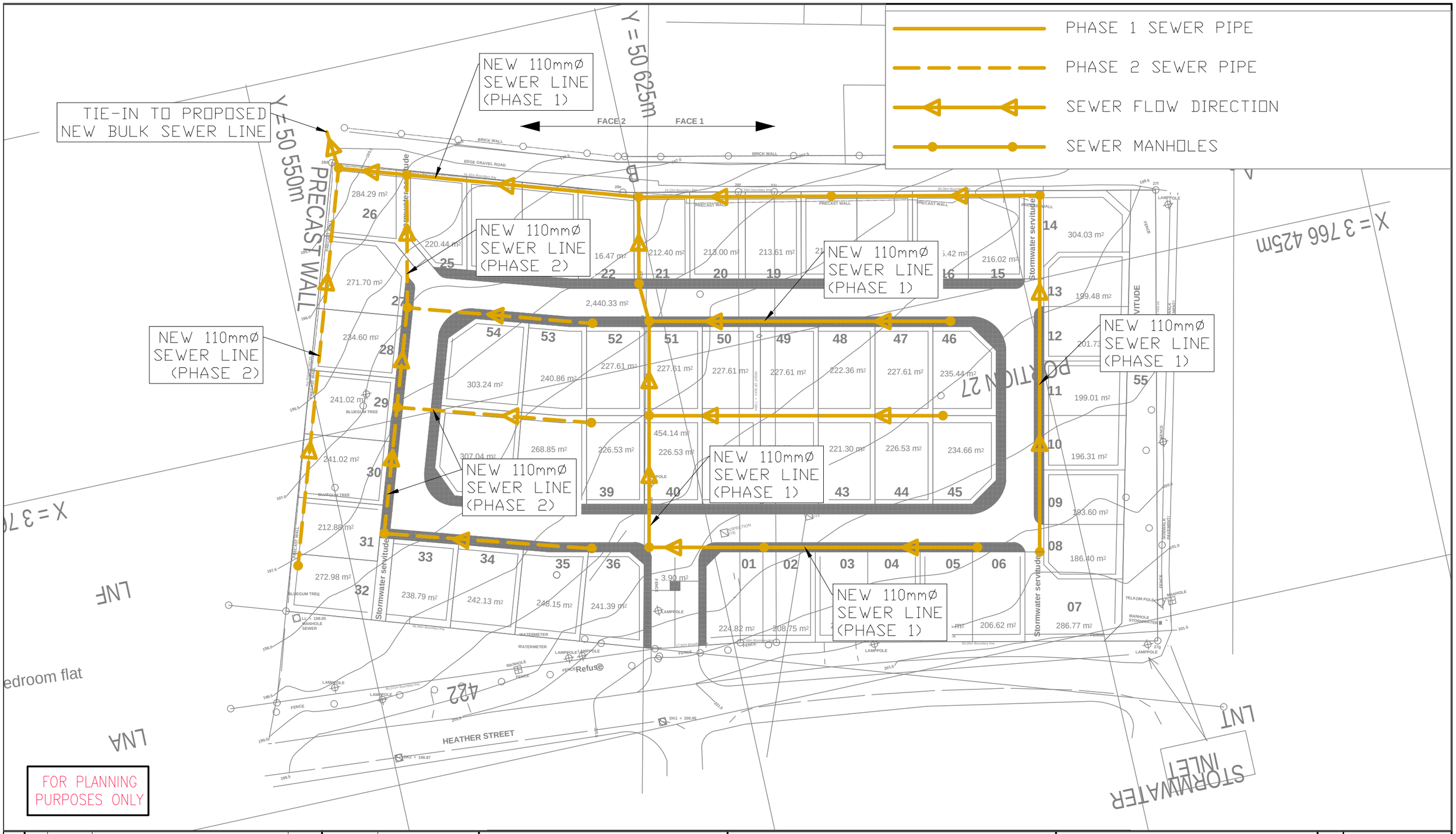
Designed	F van AARDT (Pr Eng)	
Checked	F van AARDT (Pr Eng)	
Drawn	F van AARDT (Pr Eng)	
Checked	F van AARDT (Pr Eng)	

URBAN ENGINEERING CONSULTANTS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

REDROCK DEVELOPMENT
27 NETTLETON STREET, BRANDWAG
BLOEMFONTEIN 9301
FREE STATE

PACALTSDORP
ERVEN 4645 & 4646
PROPOSED WATER RETICULATION

A3	Scale	NTS
Drawing No.	24–150–01	
Rev No.	00	



Revisions	No.	Date	Description	Initial

Designed	F van AARDT (Pr Eng)
Checked	F van AARDT (Pr Eng)
Drawn	F van AARDT (Pr Eng)
Checked	F van AARDT (Pr Eng)

URBAN ENGINEERING CONSULTANTS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

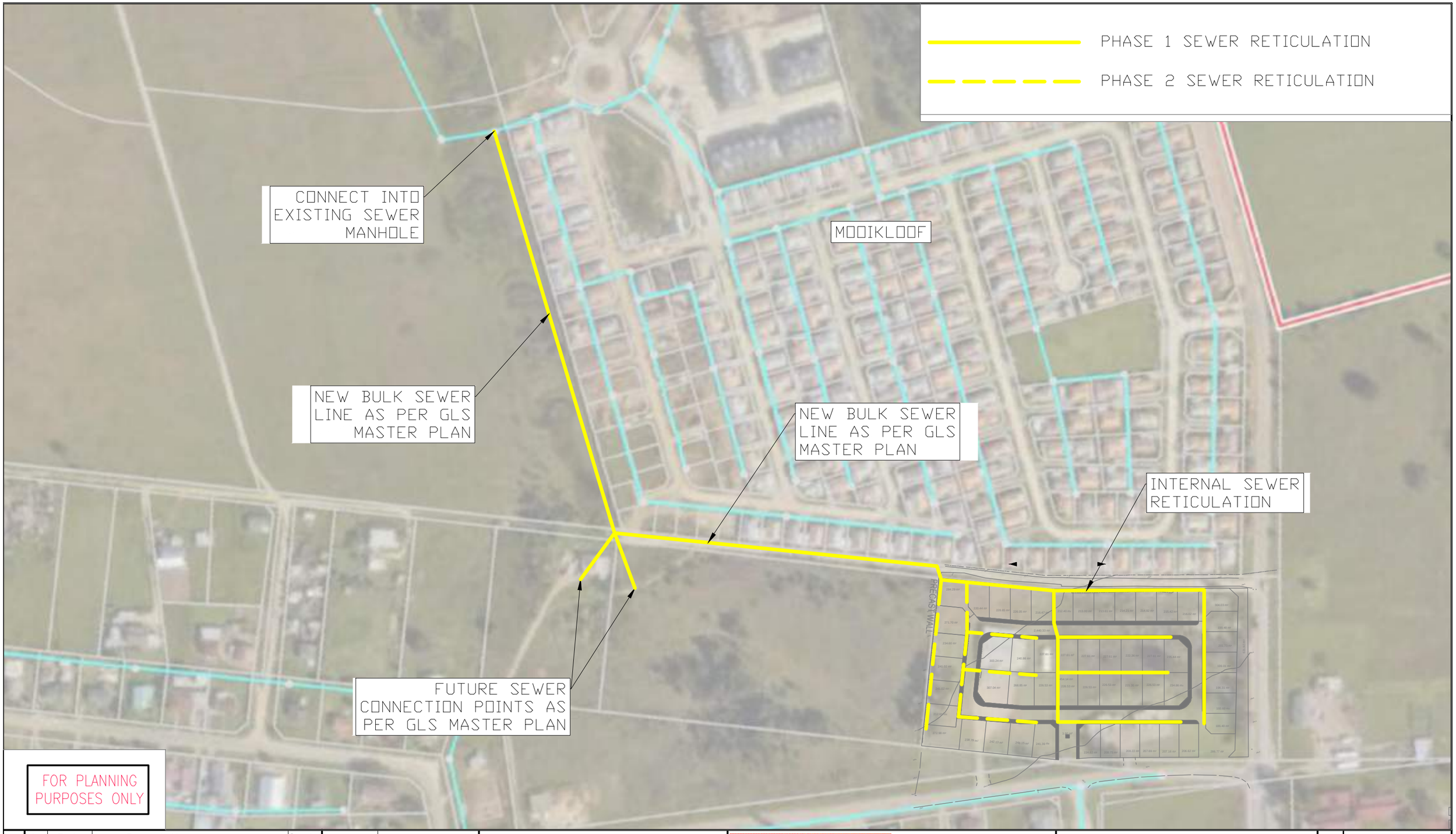
REDROCK DEVELOPMENT
27 NETTLETON STREET, BRANDWAG
BLOEMFONTEIN 9301
FREE STATE

PACALTSDORP
ERVEN 4645 & 4646
PROPOSED INTERNAL SEWER LAYOUT

A3 | Scale NTS

Drawing No. 24-150-03

Rev No. 00



FOR PLANNING PURPOSES ONLY

Revisions	No.	Date	Description	Initial

Designed	F van AARDT (Pr Eng)
Checked	F van AARDT (Pr Eng)
Drawn	F van AARDT (Pr Eng)
Checked	F van AARDT (Pr Eng)

URBAN ENGINEERING CONSULTANTS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

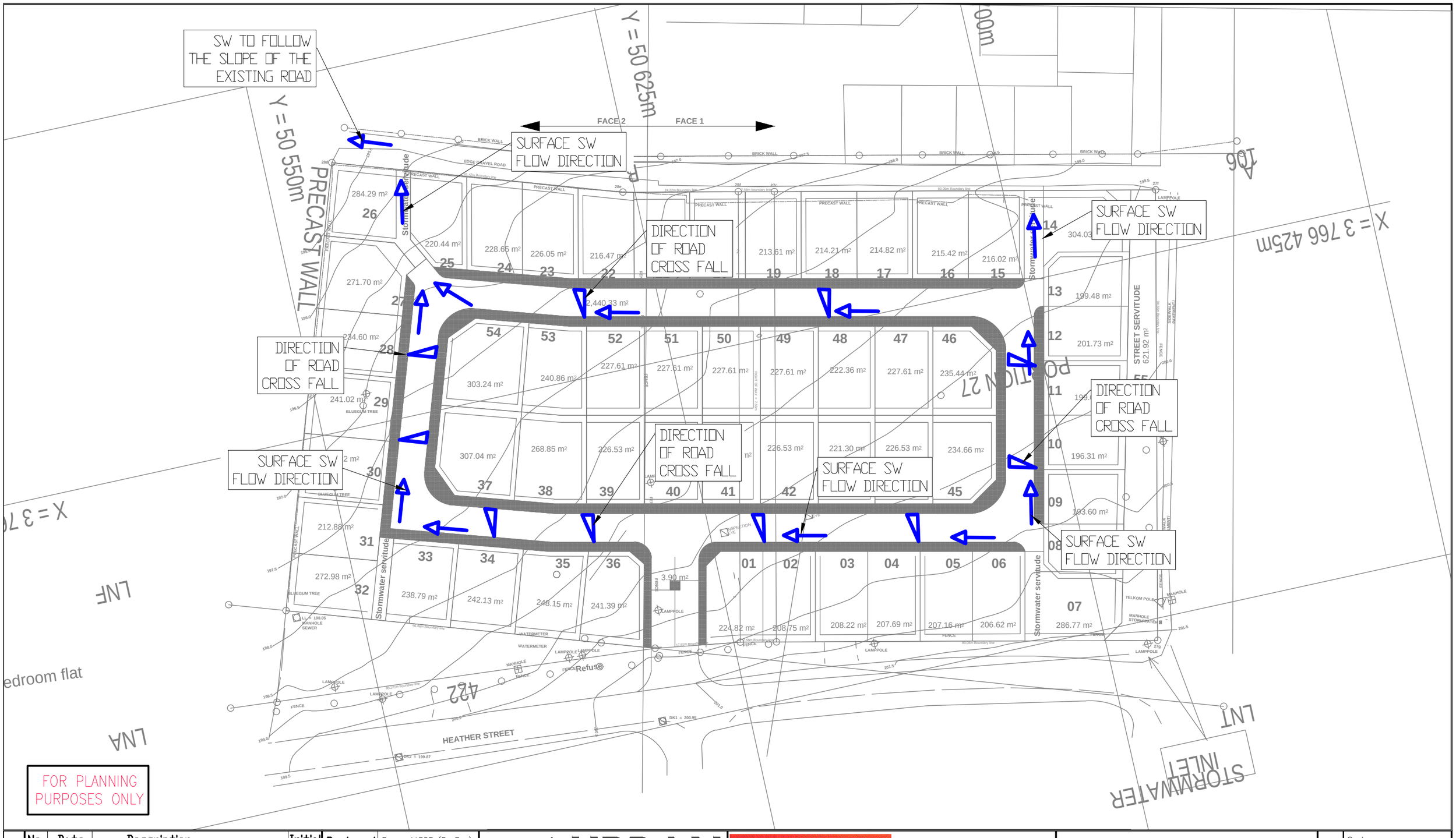
REDROCK DEVELOPMENT
27 NETTLETON STREET, BRANDWAG
BLOEMFONTEIN 9301
FREE STATE

PACALTSDORP
ERVEN 4645 & 4646
PROPOSED BULK SEWER LAYOUT

A3 | Scale NTS

Drawing No. 24-150-04

Rev No. 00



Revisions	No.	Date	Description	Initial

Designed	F van AARDT (Pr Eng)
Checked	F van AARDT (Pr Eng)
Drawn	F van AARDT (Pr Eng)
Checked	F van AARDT (Pr Eng)

URBAN ENGINEERING CONSULTANTS
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

REDROCK DEVELOPMENT
27 NETTLETON STREET, BRANDWAG
BLOEMFONTEIN 9301
FREE STATE

PACALTSDORP
ERVEN 4645 & 4646
PROPOSED ROAD CROSS FALL AND STORMWATER DRAINAGE

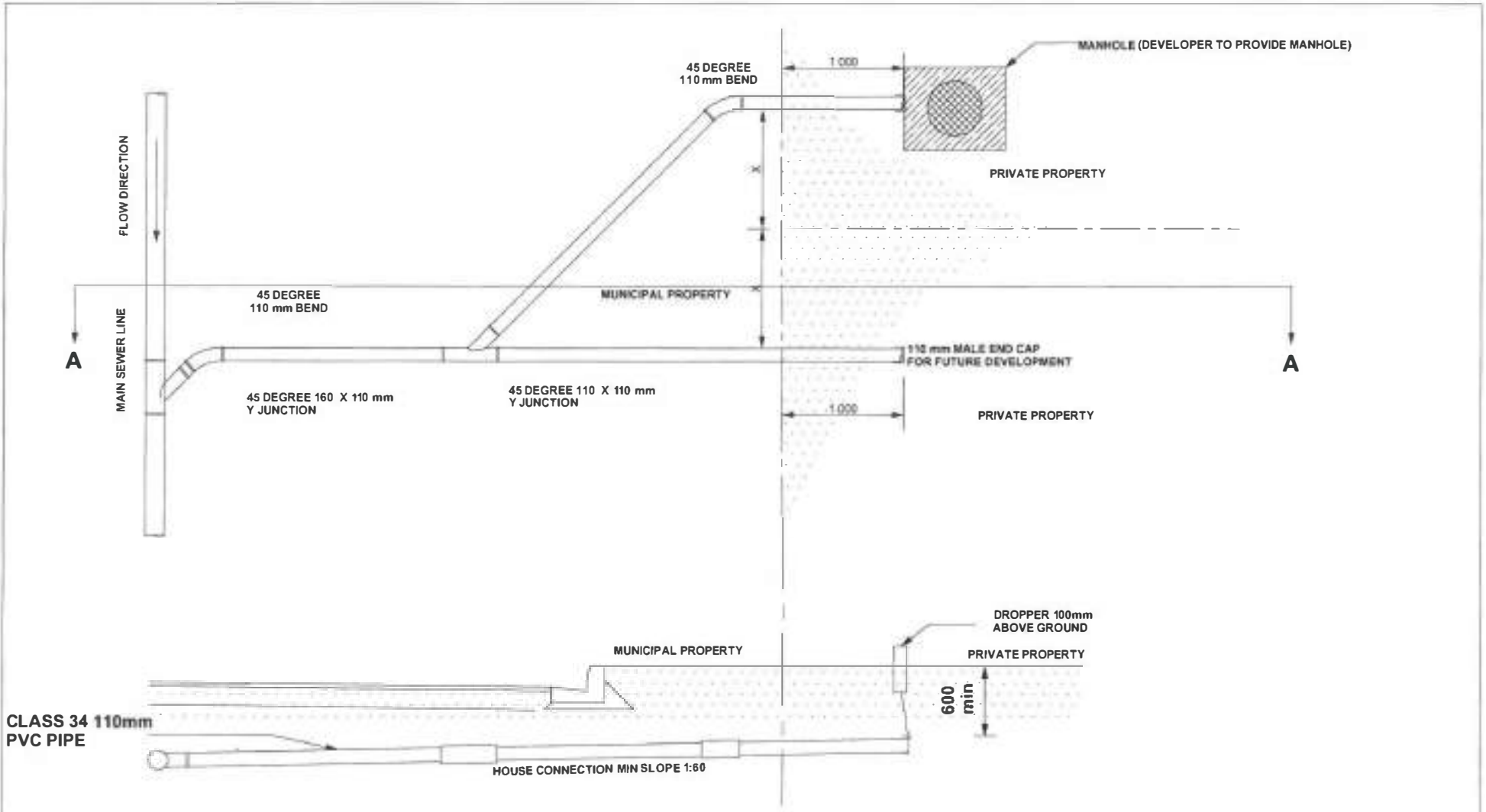
A3 | Scale NTS

Drawing No. 24-150-03

Rev No. 00

ANNEXURE E

RELEVANT GEORGE MUNICIPALITY STANDARD DETAILS



GEORGE
THE CITY FOR ALL REASONS
DEPARTMENT CIVIL ENGINEERING SERVICES

STANDARDS
TYPICAL SEWER CONNECTION

DATE:	AUG 2012
SCALE:	NTS
PLAN NO:	CES/S/3

PRECAST CONCRETE COVER
WITH LOCKABLE POLYMER LID
(ROCLA OR SIMILAR APPROVED)

MANHOLE COVER LEVEL 100 mm
HIGHER THAT NGL, AND LEVEL
WITH HARDENED SURFACES

BACKFILLING IN
LAYERS OF 150 mm

JOINTING - SEE NOTES

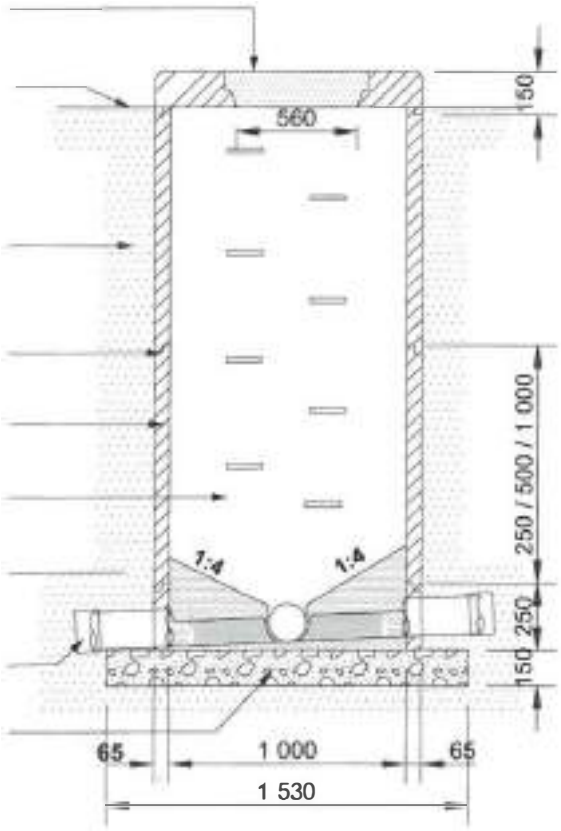
PRECAST CONCRETE RINGS
(250, 500, 1000 mm HIGH)

CALCAMITE STEP IRON
STAGGERED @ 300 c/c

CONCRETE BENCHING
GRADE 20/19

FUTHER SEWER CONNECTIONS
TO PIPE TO BE SUPPLIED WITH END CAP

CONCRETE FOUNDATIONS
GRADE 20/19



NOTES

1. 30 mm COVER TO WALL REINFORCEMENT
2. WALL SECTION: 5.6 mm HD WIRE @ 120 mm PITCH
3. ALL JOINTS TO BE SEALED WATERTIGHT USING DENSO JOINT SEALER OR SIMILAR APPROVED PRODUCT WITH AN APPROVED HEAVY DUTY PVC BASED SEALING TAPE 100 mm WIDE APPLIED UNDER TENSION ONTO A PRIMED SURFACE
4. IF AVAILABLE VITREOUS CLAY SPLITS TO BE USED IN CONJUNCTION WITH CLAY OR PVC PIPE FITTINGS
5. MANHOLE MUST BE PLASTERED ON THE INSIDE
6. FC SPLITS TO BE USED IN CONJUNCTION WITH FC PIPES

GEORGE
THE CITY FOR ALL REASONS
DEPARTMENT:CIVIL ENGINEERING SERVICES

STANDARDS
SEWER MANHOLE 0 - 4m HEIGHT

DATE:	AUG2012
SCALE	NTS
PLAN NO.	CES/S/1A

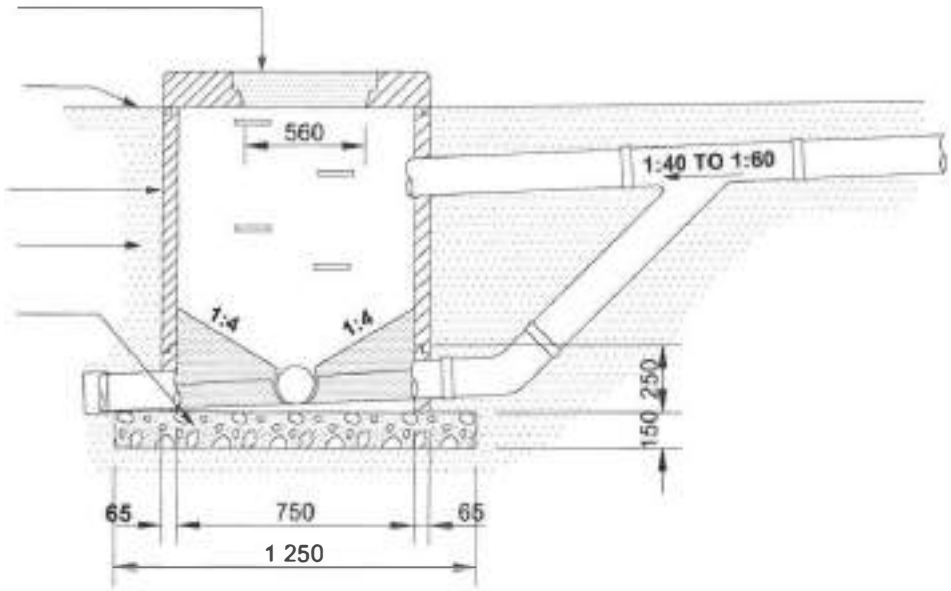
PRECAST CONCRETE COVER
WITH LOCKABLE POLYMER LID
(ROCLA OR SIMILAR APPROVED)

MANHOLE COVER LEVEL 100 mm
HIGHER THAT NGL, AND LEVEL
WITH HARDED SURFACES

PRECAST CONCRETE RINGS
(250, 500, 1000 mm HIGH)

BACKFILLING IN
LAYERS OF 150 mm

CONCRETE BENCHING
GRADE 20/19



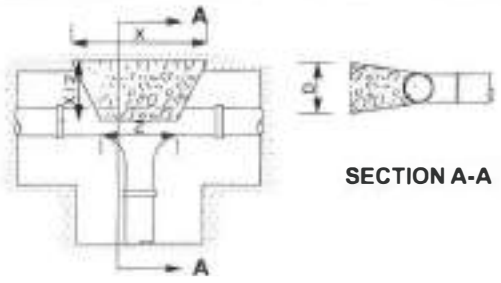
NOTES

1. 30 mm COVER TO WALL REINFORCEMENT
2. WALL SECTION - 5.6 mm HD WIRE @ 120 mm PITCH
3. ALL JOINTS TO BE SEALED WATERTIGHT USING DENSO JOINT SEALER OR SIMILAR APPROVED PRODUCT WITH AN APPROVED HEAVY DUTY PVC BASED SEALING TAPE 100 mm WIDE APPLIED UNDER TENSION ONTO A PRIMED SURFACE
4. IF AVAILIBALE VITREOUS CLAY SPLITS TO BE USED IN CONJUNCTION WITH CLAY OR PVC PIPE FITTINGS
5. MANHOLE MUST BE PLASTERED ON THE INSIDE
6. FC SPLITS TO BE USED IN CONJUNCTION WITH FC PIPES

GEORGE
THE CITY FOR ALL REASONS
DEPARTMENT:CIVIL ENGINEERING SERVICES

STANDARDS
SEWER DROP MANHOLE

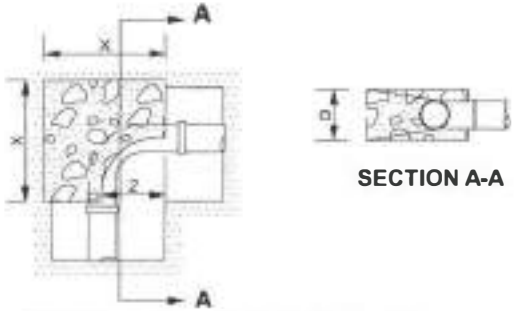
DATE:	APR 2011
SCALE:	NTS
PLAN NO.	CES/S/18



SECTION A-A

T-PIECE THRUST BLOCK

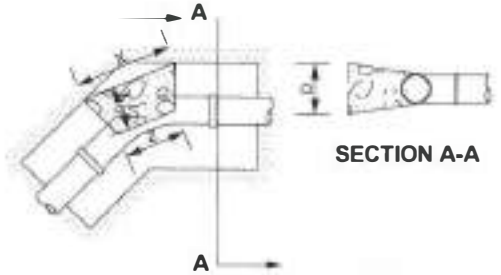
PIPE DIA mm	X mm	D mm	Z mm
75	410	300	150
110	530	400	200
150	950	500	280
200	1 250	650	350
250	1 600	800	450
300	1 850	1 000	550
350	2 150	1 300	550



SECTION A-A

90 DEGREE BEND THRUST BLOCK

PIPE DIA mm	X mm	D mm	Z mm
75	410	300	180
110	480	450	250
150	800	600	400
200	1 100	750	480
250	1 400	900	530
300	1 700	1 100	580
350	2 080	1 350	630



SECTION A-A

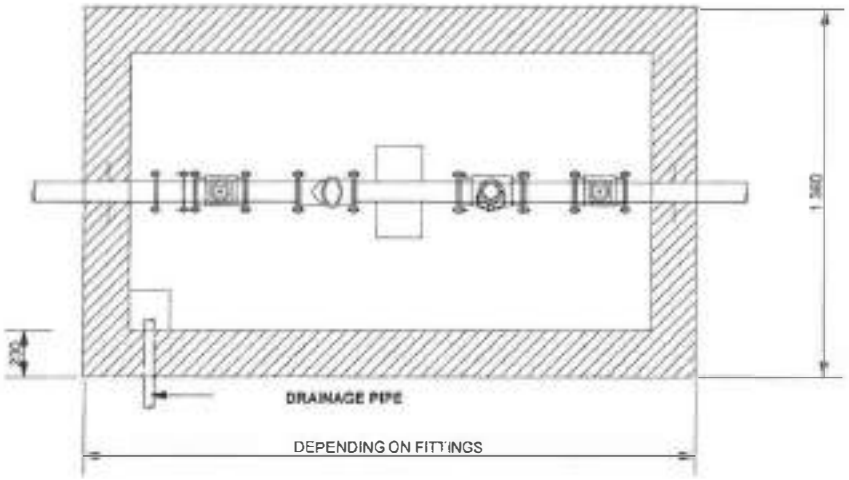
< 90 DEGREE BEND THRUST BLOCK

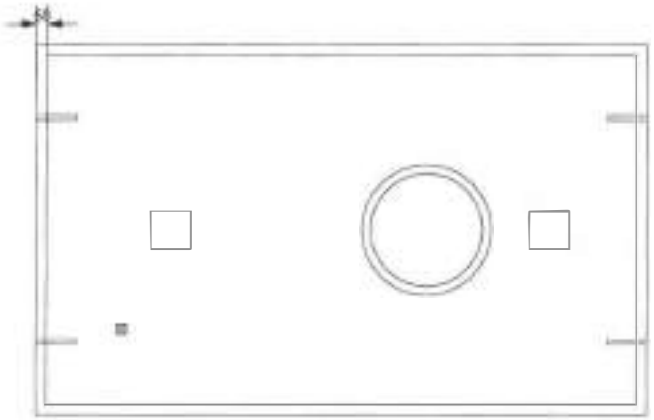
	11.25 DEGREE BEND			22.5 DEGREE BEND			45 DEGREE BEND		
PIPE DIA mm	X mm	D mm	Z mm	X mm	D mm	Z mm	X mm	D mm	Z mm
75	200	150	120	250	200	150	350	300	150
110	250	200	150	350	250	200	500	400	200
150	350	300	250	500	400	350	700	550	400
200	500	350	350	650	500	400	900	700	450
250	600	450	350	800	650	400	1 100	900	500
300	700	550	400	950	750	450	1 300	1 100	550
350	850	700	400	1 200	900	500	1 700	1 300	600

GEORGE
THE CITY FOR ALL REASONS
DEPARTMENT CIVIL ENGINEERING SERVICES

STANDARDS
TYPICAL THRUST BLOCK DETAILS

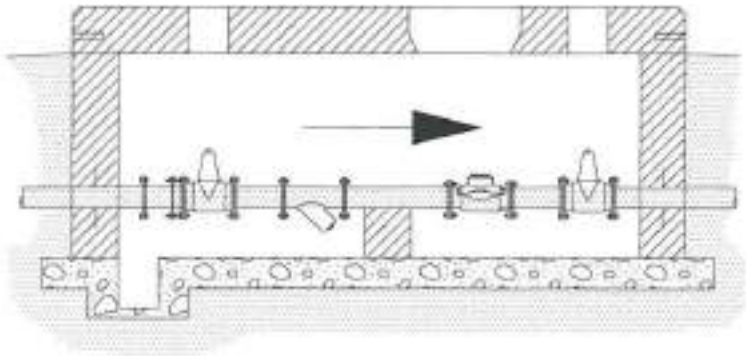
DATE:	JAN 2009
SCALE:	NTS
PLAN NO:	CES/ W / 5





RESTRAINING FLANGES, TO BE INBEDDED INTO CONCRETE

opening for valve key



NOTES

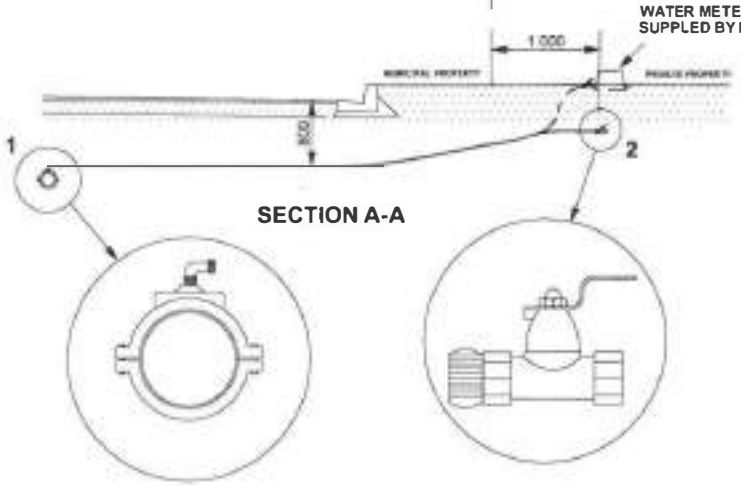
1. PUDDLE FLANGE TO BE BUILT INTO CHAMBER WALLS
2. 300 X 300 X 75 mm SUMP TO BE CONSTRUCTED IN CHAMBER FLOOR
3. WATER CHAMBER PIPE WORK TO BE SUPPORTED WITH SMALL BRICK SUPPORTS
4. CONCRETE, CLASS 25/19 TO BE USED
5. CHAMBER TO BE BAGGED EXTERNALLY AND INTERNALLY TO PREVENT GROUND WATER SEEPAGE INTO MANHOLE
6. CHAMBER FITTINGS TO INCLUDE 2 FLANGED VALVES
7. AVOID BUILDING CHAMBER INSIDE ROAD AREA

DIA METER	[illegible]	VJ	Valve	[illegible]	S RAINER	[illegible] PIECE	[illegible] ME ER	[illegible] PIECE	Valve	[illegible]
80	250	200	203	400	225	400	300	400	203	250
100	250	200	229	500	250	500	350	500	229	250
160	250	200	267	750	300	750	500	750	267	250

GEORGE
THE CITY FOR ALL REASONS
DEPARTMENT CIVIL ENGINEERING SERVICES

STANDARDS
TYPICAL BULK WATER METER CHAMBER

DATE:	JAN 2009
SCALE:	NTS
PLAN NO:	CES/ W / 4



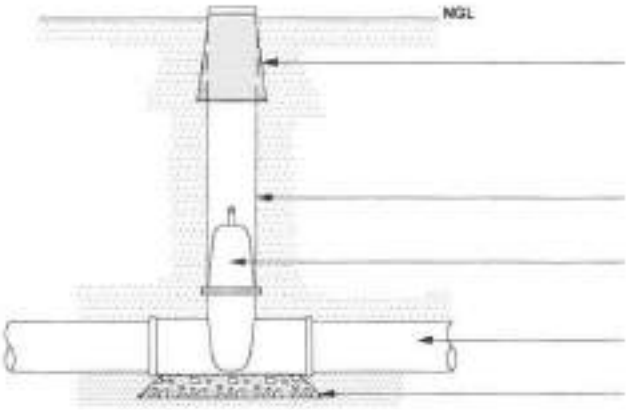
DESCRIBTION

	SINGLE HOUSE CONNECTION		DOUBLE HOUSE CONNECTION	
	INCOME GROUP			
	HIGH - MEDIUM	LOW	HIGH - MEDIUM	LOW
1. CAST IRON OR PN16 BAR JASWIC APPROVED POLYPROPYLENE SADDLE WITH THREADED OUTLET AND SECURED WITH STAINLESS STEEL BOLTS AND NUTS				
2. MALE THREADED 90 DEGREE ELBOW	25 X 3/4"	20 X 3/4"	40 X 1"	25 X 3/4"
3. BRASS BALL VALVE OR BRASS FERULE	3/4"	3/4"	1"	3/4"
4. FEMALE THREADED TEE PIECE	-	-	25 X 1"	20 X 3/4"
5. END CAP	25	20	25	20
6. HDPE PIPE TYPE 5 CLASS 16 (SABS 533 PART 3)	-	-	40	25
7. HDPE PIPE TYPE 5 CLASS 16 (SABS 533 PART 3)	25	-	25	-
8. HDPE PIPE TYPE 4 CLASS 16 (SABS 533 PART 2)	-	20	-	20
9. THREADED MALE ADAPTOR	-	-	40X 1"	25X 3/4"

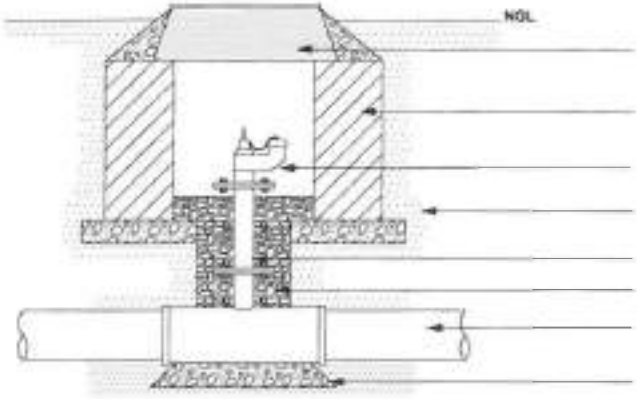
GEORGE
THE CITY FOR ALL REASONS
DEPARTMENT: CIVIL ENGINEERING SERVICES

STANDARDS
TYPICAL WATER CONNECTION

DATE:	JAN 2009
SCALE	NTS
PLAN NO:	CES/ W / 3



VALVE CHAMBER



HYDRANT CHAMBER

GEORGE
THE CITY FOR ALL REASONS
DEPARTMENT CIVIL ENGINEERING SERVICES

STANDARDS
VALVE AND HYDRANT CHAMBERS

DATE:	AUG2012
SCALE:	NTS
PLAN NO:	CES/W/1

ANNEXURE "AA" – ELECTROTECHNICAL SERVICES REPORT

de villiers & moore
CONSULTING ENGINEERS
Electrical, Mechanical, Fire

Our Ref: R5200W/L004 Your Ref:
Date: 2025-01-27

Jan Vrolijk Town Planner
P O Box 710
GEORGE
6530

Attention: Mr J Vrolijk

Sir

GEORGE: PACALTSDORP: MUNSIDE GARDENS: ERVEN 4645, 4646 & 1291
PROPOSED RESIDENTIAL GROUP HOSUING DEVELOPMENT
ELECTRICAL RETICULATION BULK SERVICES: REV 000

This report has been compiled by de Villiers & Moore Consulting Engineers, having been instructed our Client with purpose of informing the team of the extent of the electrical bulk services required to be put into place to provide the electrical supply to the Development.

LOCATION

The Development is situated on erven 4645, 4646 and 1291 in Pacaltsdorp in the administrative district of George Municipality.

SUPPLY AUTHORITY

The Development is situated in the electrical supply area of George Municipality.

DRAWINGS

Attached to this report is drawing R5200W/1_Rev A which details the electrical point of supply and the point of supply to the Development.
Also attached is the Town Planners SDP, reference 2024/06/015, 001Skf dated June 2024.

PHASING OF THE DEVELOPMENT

The Development will be done in one phase.

Windsor Park, Suite 3E, Varing Lane, P O Box 1412, GEORGE, 6530
Tel: (044) 874 4496
Reg No. 1999/006693/07
Branch Offices: Durbanville & Stellenbosch
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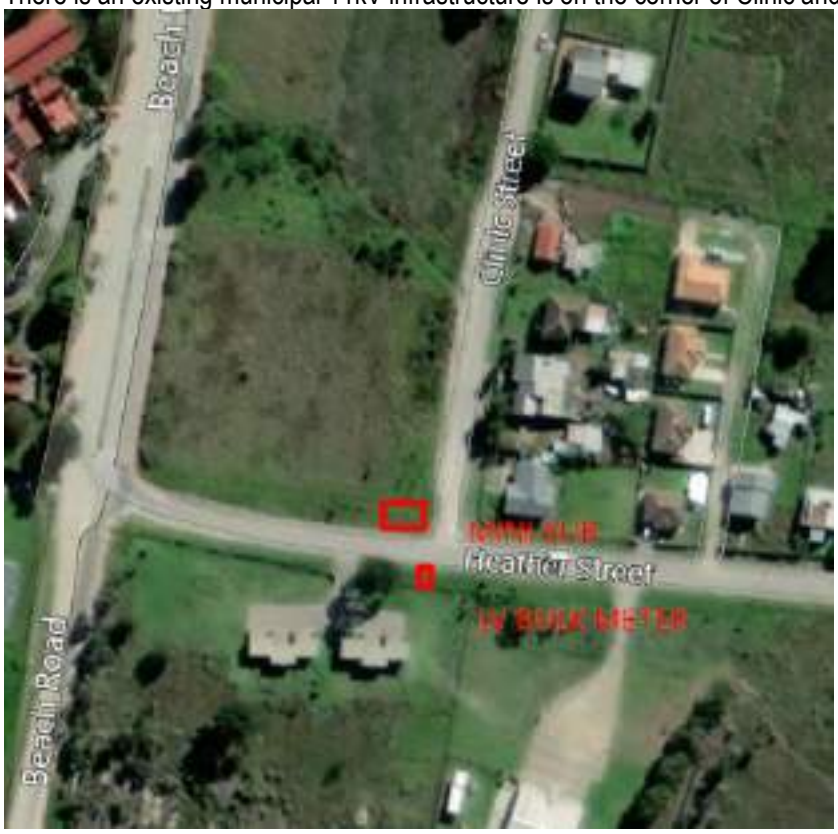
Certified BEE Level 2 Contributor
Registered Member: Consulting Engineers South Africa (Cesa)
Directors: R.G HALL Pr Eng B.Sc Eng, C.H. KOCH Pr Eng B.Eng, T.H. HEYNS Pr Tech Eng, W.J. BADENHORST Pr Tech Eng
Associate: G.F. ARENDSE Pr Tech Eng

EXISTING ELECTRICAL DISTRIBUTION NETWORK

There is an existing municipal 11kV infrastructure is on the corner of Clinic and Heather Street.



The Municipality confirmed by email that there is capacity on this network to supply the required demand.
Extract from email received from the George Electrical Planning Department.

DEMAND REQUIREMENTS

The demand calculated for the Development is as follows and this will be taken into account when calculating the Development Charges as well as the capacity on the existing network.

R5200W_Load Calcs

GEORGE: PACALTSDORP: ERVEN 4645, 4646, 1291
GROUP HOUSING DEVELOPMENT
ELECTRICAL MAIN SUPPLY LOAD SCHEDULE

Type	m^2	Number	ADMD	TOTAL
Group Housing Erven	200-300	52	2,90	151
				0
TOTAL ADMD				151

PROPOSED ELECTRICAL MV DISTRIBUTION NETWORK

The 11kV network currently in place is sufficient to supply the intended Development.

Point of Connection

A new 500kVA mini-substation will be installed adjacent to erf 268 in Clinic Street. The mini-substation will be cut into the existing MV cable in the area.
From this point a LV Bulk Metering Kiosk will be installed at the entrance to the Development.
From the LV Bulk Metering Kiosk the low voltage reticulation will be installed to supply the individual erven.

Detailed design drawings will be submitted to the George Municipality prior to final approval for comment and subsequent approval.

It has been agreed that the Developer will pay the calculated Development Charges after which the George Municipality will supply a mini-substation and the required MV cable free of charge to the Developer. The Developer will be responsible for the installation of the mini-substation.

METERING AND RESPONSIBILITY

On completion of the installation and after the one year guarantee period, the responsibilities will be as follows:
The George Municipality will be responsible for the maintenance of the mini-substation and the LV Bulk Metering Kiosk.
The low voltage network including the low voltage cables, metering kiosks, service connections, street lighting and earthing network will be the responsibility of the Developer/HOA.
The Development will receive one electrical account from the George Municipality and the metering of the individual erven will be the responsibility of the Developer/HOA. To this end there are private metering companies who can assist with setting up the infrastructure and accounting systems.

ENERGY SAVING MEASURES

The use of the following equipment will be made mandatory
Water and sewage pumps to be supplied with energy efficient motors and vsd motor control.
Water heating to be done using gas or heat pumps.
Lighting to make use of LED lamps only.
Use of motion sensor lighting control.
Photovoltaic Systems will be encouraged.

COST ESTIMATE AND ELECTRICAL DEVELOPMENT CHARGES

The Developer will be responsible for all costs associated with the supply and installation of the electrical infrastructure required to service the Development.
A detailed design of the proposed medium voltage, low voltage and earthing will be submitted to George Municipality for approval prior to construction commencing on site.
A detailed cost estimate will be submitted as part of a different reporting process.

The Development will attract Development Charges as published in the Municipal Tariff Structure.
It is noted that the amount is adjusted each year at the end of June.
The Development Charges calculations as received from the George Municipality amount to R867 535-48 exclusive of VAT and applicable until end June 2025.
The George Municipality have undertaken to supply the mini-substation and the required MV cable free of charge as part of this payment of the Development Charges

IMPACT

1. Impact on Existing Electricity Consumers
   The development will have no detrimental effect on the quality of supply to the existing consumers due to the fact that the development will be supplied by its own mini-substation which in turn will be supplied from the 11kV system.

2) Impact on Distribution Authority Operating Costs
   The development will have no negative effect on the electrical costs of the distribution authority, due to the fact that the complete electrical infrastructure required for the development will be supplied and installed by the Developer.

3) Impact on the Environment
   Services will be located within the road reserves to prevent additional disturbances of vegetation.
   The internal electrical infrastructure design will take into account energy saving technologies which may include load control, the use of energy efficient lighting, the use of alternative means of water heating and inverter type HVAC equipment

CONCLUSION

We trust the information provided is of sufficient detail to allow for an informed decision to be made. Please do not hesitate to contact the undersigned should additional information be required.

Yours faithfully

R G HALL Pr Eng
DE VILLIERS & MOORE (PTY) LTD

FOR INFORMATION

GENERAL SPECIFICATIONS

1. POSITION OF ELECTRICAL EQUIPMENT ON DRAWINGS IS TO BE CONFIRMED WITH THE ARCHITECT BEFORE INSTALLATION.
2. ALL MATERIAL SHALL BE SUITABLE FOR THE CONDITIONS ON SITE AND WHERE REQUIRED SHALL BEAR THE APPROPRIATE SABS MARK OF APPROVAL.
3. THE CONTRACTOR IS TO MAKE ARRANGEMENTS WITH LOCAL SUPPLY AUTHORITY FOR THE MAIN SUPPLY.
4. CONDUITING SHALL COMPLY WITH SABS 950 AND INSTALLED IN ACCORDANCE WITH SANS 10142-1:2003
5. PVC INSULATED COPPER CONDUCTORS SHALL BE USED EXCLUSIVELY AND IN ACCORDANCE WITH THE DISTRIBUTION BOARD SCHEMATIC DIAGRAMS.
6. WIRING SHALL BE EXECUTED ACCORDING TO THE LOOP-IN SYSTEM UTILISING CONDUIT.
7. ALL SWITCHES AND SOCKET OUTLETS SHALL COMPLY WITH SABS 164 AND SHALL BEAR THE SABS MARK.
8. THE DISTRIBUTION BOARD SHALL BE MOUNTED ACCORDING TO REGULATIONS WITH BAKED ENAMELWITH DOORS. EQUIPMENT SHALL BE IN ACCORDANCE WITH THE DB SCHEMATIC DIAGRAM.
9. THE CIRCUIT BREAKERS SHALL COMPLY WITH SABS 156 AND BEAR THE SABS MARK.
9. THE CIRCUIT BREAKERS SHALL COMPLY WITH SABS 156 AND BEAR THE SABS MARK.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BALANCING THE LOAD ACROSS THE THREE PHASES (WHERE APPLICABLE).
11. THE COMPLETE INSTALLATION SHALL BE EFFECTIVELY EARTHED IN ACCORDANCE WITH SABS 10142 - 2008 THE SPECIFIC REQUIREMENTS OF THE LOCAL SUPPLY AUTHORITY.
12. ON COMPLETION OF THE INSTALLATION A CERTIFICATE OF COMPLIANCE SHALL BE ISSUED TO THE RELEVANT PARTIES
13. ALL QUERIES REGARDING THE DRAWINGS AND INSTALLATION SHALL BE ADDRESSED TO THE ELECTRICAL ENGINEER IN WRITING/FAX/EMAIL.
14. THE CONTRACTOR WILL BE REQUIRED TO FAMILIARIZE HIMMERSELF WITH THE ELECTRICAL AND ARCHITECTURAL DRAWINGS (E.G. CEILING HEIGHTS, WALL STRUCTURERS, EXPANSION JOINTS, NEW OR EXISTING SERVICES, BUILDING FINISHES ETC.)

REVISIONS/HERSIENINGS

REV	DETAIL	DATE DATUM
A	FOR INFORMATION	2025-01-27

de villiers & moore
CONSULTING ENGINEERS
Electrical, Mechanical, Fire
Head Office: P O Box 472 Durbanville 7551 Tel:(021)9763087 Fax:(021)9762719 E-Mail: admin@dvmoore.co.za
Branch Office: 5 Victoria Street George 6530 Tel:(044)874-4490/7571 Fax:(044)874-4491 E-Mail: rob@dvmpm.co.za
P O Box 1175 Stellenbosch 7600 Tel:(021)887-1555 Fax:(021)887-1556 E-Mail: admin@dvmoore.co.za
Signed . . . . . Pr.Eng.

Client / Klient: Mr G Gouws

Project Title: GEORGE: PACALTSDORP ERVAN 4645, 4646 + 1291 52 GROUP HOUSING UNITS

Scale / Skaal	Date / Datum	Drawn / Geteken	Designed / Ontwerp
1 : 300 (A1)	2024-11-08	R.R.	R.H.

Drawing Title: ELECTRICAL INSTALLATION BULK SERVICES LAYOUT

Client Drawing Number / Klient Tekeningnommer:

Drawing Number / Tekeningnommer: R5200W-1

Revision No. / Hersiening Nr.: A