



BID NOTICE

STELLENBOSCH MUNICIPALITY HEREBY INVITES YOU TO TENDER FOR B/SM 128/26 CALL FOR PROPOSAL FOR PRIVATE DEVELOPERS TO PARTNER WITH STELLENBOSCH MUNICIPALITY IN THE DEVELOPMENT OF GAP HOUSING ON ERF 7001, CLOETESVILLE, STELLENBOSCH

TENDER NUMBER: B/SM 128/26
DESCRIPTION: CALL FOR PROPOSALS FROM PRIVATE DEVELOPERS TO PARTNER WITH STELLENBOSCH MUNICIPALITY IN THE DEVELOPMENT OF GAP HOUSING ON ERF 7001, CLOETESVILLE, STELLENBOSCH
CLOSING DATE: 19 October 2026
CLOSING TIME: 12h00: Bids will be opened in the **Council Chambers or Supply Chain Management Boardroom.**

INFORMATION:

Tender Specifications: Bonga Ndzuzo at 021 808 8733: e-mail: Bonga.Ndzuzo@ Stellenbosch.gov.za

SCM Requirements: Renae Bergstedt at 021 808 8588: e-mail: Renae.Bergstedt@ Stellenbosch.gov.za

Office hours for collection: 08h00-15h30

A Compulsory Clarification Meeting via Microsoft Teams will be held on **29 September 2026** at **10h00**. Prospective bidders must submit their contact details (company name, telephone, and email address (es)) by **16h00** on the **27 September 2026**. Contact details must be entered in the online MS forms report available from this link: [B/SM 128/26 CALL FOR PROPOSAL FOR THE DEVELOPMENT OF GAP HOUSING IN CLOETESVILLE – Fill out form](#). *Tenderers who fail to forward their details in the time frame will not attend the briefing session. Tenderers who fail to attend the compulsory information session will be regarded as non-compliant.*

Tenders may only be submitted on the Tender document issued by Stellenbosch Municipality and must be valid for **180 days** after tender closing. Late, electronic format, telephonic, or faxed Tenders will not be considered, and Stellenbosch Municipality does not bind itself to accept the lowest bid or any of the tenders that have been submitted.

Sealed Tenders, with “**B/SM 128/26 CALL FOR PROPOSALS FROM PRIVATE DEVELOPERS TO PARTNER WITH STELLENBOSCH MUNICIPALITY IN THE DEVELOPMENT OF GAP HOUSING ON ERF 7001, CLOETESVILLE, STELLENBOSCH**” clearly endorsed on the envelope, must be deposited in the Tender box at the offices of the Stellenbosch Municipality, Town House Complex (Main Building between Town Hall and Municipal Library), Plein Street, Stellenbosch. The Tender box is accessible 24 hours a day, and Tenders must be accompanied by the completed Tender documents. Tenders not accompanied by a complete Tender document will not be considered.

NOTE: This tender will be evaluated in terms of the General Conditions of Contract (General), Supply Chain Management Policy, and relevant specification as depicted in the document, and also the Stellenbosch Preferential Procurement Policy effective from 16 January 2023 in accordance with the Preferential Procurement Regulations that were promulgated by the Minister of Finance on 04 November 2022 in Government Gazette No 47452.

The preferential points system applied is as follows: 90/10 in terms of the approved policy.

Price	90
B-BBEE status level of contribution	5
Locality	5
Total points for Price, B-BBEE and locality	100



The following conditions to Tender exist (failure to comply may result in your Tender being disqualified):

1. This Tender is subject to the General Conditions of Contract (General), and special conditions for Tendering.
2. Relevant terms of reference.
3. Tenderers must be registered on the Central Supplier Database (CSD) if they wish to conduct business with the municipality.
4. No award will be made to tenderers whose tax status is non-compliant.
5. Tenders submitted must be in a sealed envelope clearly marked with the Tender number, placed in the tender box before closing time. Failure will result in the tender being invalid.
6. A two-envelope procedure will be followed for this bid as follows:
 - a. **Envelope 1: Technical Proposal will contain part A & B of the bid document from page 1 of this document up to and including page 79 inclusive of all returnable schedules in PART A and B of the document, including any additional pages appended to the returnable schedule of Part A& B.** Place and seal these pages in an envelope marked “**Envelope 1: Technical Proposal**”, stating on the outside the Department’s address and identification details (Bid No and Project Title as they appear on the cover page of this document), as well as the Bidder’s name and contact address.
 - b. **Envelope 2: Financial Proposal will contain part C of the bid document from page 80 to page 86, inclusive of all returnable schedules belonging to this part of the document, as well as any additional pages appended to the returnable schedule and the memory stick with the bidder’s Pricing Model.** Place and seal these pages and memory stick in an envelope marked “**Envelope 2: Financial Proposal**”, stating on the outside the Department’s address and identification details (Bid No and Project Title as they appear on the cover page of this document), as well as the Bidder’s name and contact address.
 - c. Place the 2 envelopes separately into the bid box when submitting the bid. Please note that bids not submitted in accordance with the two-envelope procedure described here, will not be considered.

*Tender documents, in English, are available free of charge on the website: www.stellenbosch.gov.za. Alternatively, hard copies of the document are obtainable from the offices of the Supply Chain Management Unit, Stellenbosch Municipality, Town House Complex, 1st Floor, Plein Street, Stellenbosch, upon payment of a non-refundable fee of **R3130.00 per document**.*

Note: The municipality will never contact you to pay money in exchange for the award of a tender.

G Mettler (Ms)
MUNICIPAL MANAGER



TENDER KENNISGEWING

STELLENBOSCH MUNISIPALITEIT NOOI U VIR DIE VOLGENDE TENDER: B/SM 128/26 VERSOEK OM VOORSTEL VAN PRIVAAT ONTWIKKELAARS OM SAAM MET STELLENBOSCH MUNISIPALITEIT TE VENNOOTSKAP IN DIE ONTWIKKELING VAN GAPBEHUISING OP ERF 7001, CLOTESVILLE, STELLENBOSCH

TENDER NOMMER: B/SM 128/26
BESKRYWING: VERSOEK OM VOORSTEL VAN PRIVAAT ONTWIKKELAARS OM SAAM MET STELLENBOSCH MUNISIPALITEIT TE VENNOOTSKAP IN DIE ONTWIKKELING VAN GAP-BEHUISING OP ERF 7001, CLOTESVILLE, STELLENBOSCH

SLUITINGSDATUM: 19 Oktober 2026
TYD VAN SLUITING: 12h00. Tenders sal oopgemaak word in die Raadsaal of in die Voorsieningskanaalbestuurs Raadsaal.

NAVRAE:

Tender spesifikasies: Bonga Ndzuzo at 021 808 8733:
E-mail: Bonga.Ndzuzo@stellenbosch.gov.za
Vkb vereistes: Renae Bergstedt by 021 808 8588:
E-pos: Renae.Bergstedt@stellenbosch.gov.za
Kantoor Ure: 08h00-15h30

'n Verpligte Verduidelikingsvergadering via Microsoft Teams sal gehou word op **29 September 2026** om **10h00**. Voornemende bidders moet hul kontakbesonderhede (maatskappy se naam, telefoonnommer en e-posadres(se)) teen **16h00** op die **27 September 2026** indien. Kontakbesonderhede moet in die aanlyn MS-vormverslag ingevoer word wat beskikbaar is vanaf hierdie skakel: [B/SM 128/ 26 CALL FOR PROPOSAL FOR THE DEVELOPMENT OF GAP HOUSING IN CLOETESVILLE – Fill out form](#). Tendersaars wat versuim om hul besonderhede binne die tydsbestek te stuur, sal nie die inligtingsessie bywoon nie. Tendersaars wat versuim om die verpligte inligtingsessie by te woon, sal as nie-nakomend beskou word.

Tenders mag slegs ingedien word op die tenderdokumentasie verskaf deur Stellenbosch Munisipaliteit en moet geldig wees vir **180.dae** na die sluitingsdatum. Laat, elektroniese formaat of gefakse tenders sal nie aanvaar word nie en Stellenbosch Munisipaliteit is nie verplig om die laagste of enige tender wat ingedien word te aanvaar nie.

Verseëelde tenders duidelik gemerk: **“B/SM 128/26 VERSOEK OM VOORSTEL VAN PRIVAAT ONTWIKKELAARS OM SAAM MET STELLENBOSCH MUNISIPALITEIT TE VENNOOTSKAP IN DIE ONTWIKKELING VAN GAP-BEHUISING OP ERF 7001, CLOTESVILLE, STELLENBOSCH”** op die koevert, moet geplaas word in tenderbus buite die kantore van Stellenbosch Munisipaliteit, Meenthuis Kompleks, (Hoofgebou tussen Stadsaal en Munisipale Biblioteek), Stellenbosch. Die tenderbus is 24 uur per dag beskikbaar en tenders moet vergesel word met die voltooië stel tenderdokumente. Tendersaanbiedinge wat nie deur die volledige tenderdokument vergesel word nie, sal nie oorweeg word nie.

LET WEL: Hierdie tender sal geëvalueer word ingevolge die Algemene Kontrakvoorwaardes, (Algemeen) of “, Voorsieningskanaal Bestuursbeleid and relevante spesifikasies, soos vervat in die tender dokument asook die Stellenbosch **Voorkeurverkrygingsbeleid** **effektief vanaf 16 Januarie 2023 in samewerking met die Voorkeurverkrygingsregulasies wat op 04 November 2022 deur die Minister van Finansies in Staatskoerant No 47452 afgekondig is.**

Die voorkeerpunte stelsel is soos volg gebaseer: 90/10 in terme van die goedgekeurde beleid:

Prys	90
BBSEB status	5
Ligging	5
Totale punte vir prys, B-BSEB en ligging	100



Die volgende voorwaardes vir Tender soos volg: (versuim om te voldoen, kan veroorsaak dat u Tender gediskwalifiseer word):

1. Hierdie tender is onderworpe aan die algemene kontrakvoorwaardes (GCC)
2. Toepaslike opdrag
3. Tenderaars moet geregistreer wees op Sentrale verskaffersdatabasis (SVD) as hulle met die munisipaliteit sake wil doen
4. Geen toekenning sal gemaak word aan diensverskaffers wie se belastingstatus ongeldig is.
5. Die tender wat ingedien moet word, moet in 'n verseëelde koevert wees wat duidelik gemerk is met die Tendernommer, wat in die tenderbus voor sluitingstyd geplaas word. Versuim sal tot gevolg hê dat die tender ongeldig is.
6. Die twee-koevertprosedure sal vir hierdie tender gevolg word soos volg:
 - a. **Koevert 1: Tegniese Voorstel sal Deel A en B van die tenderdokument bevat — vanaf bladsy 1 tot en met bladsy 79 — insluitend al die terugstuurbare bylaes in Deel A en B van die dokument, asook enige bykomende bladsye wat bygevoeg is by die terugstuurbare bylaes van Deel A en B.** Plaas en verseël hierdie bladsye in 'n koevert gemerk "Koevert 1: Tegniese Voorstel", met die Departement se adres en identifikasiebesonderhede (tendernommer en projeknaam soos dit op die voorblad van hierdie dokument verskyn) aan die buitekant, asook die tenderaar se naam en kontakadres.
 - b. **Koevert 2: Finansiële Voorstel sal Deel C van die tenderdokument bevat — vanaf bladsy 80 tot bladsy 86 — insluitend al die terugstuurbare bylaes wat by hierdie deel van die dokument hoort, asook enige bykomende bladsye wat bygevoeg is by die terugstuurbare bylaes en die geheuestokkie met die tenderaar se Prysmodeldokument.** Plaas en verseël hierdie bladsye en geheuestokkie in 'n koevert gemerk "Koevert 2: Finansiële Voorstel", met die Departement se adres en identifikasiebesonderhede (tendernommer en projeknaam soos dit op die voorblad van hierdie dokument verskyn) aan die buitekant, asook die tenderaar se naam en kontakadres.
 - c. Plaas die twee koeverte apart in die tenderbus wanneer die tender ingedien word. Let asseblief daarop dat tenders wat nie ingevolge die twee-koevertprosedure soos hier beskryf ingedien word nie, nie oorweeg sal.

Tenderdokumente, in Engels, is verkrygbaar by die kantoor van die Voorsieningskanaalbestuursseenheid, Stellenbosch Munisipaliteit, Meenthuis Kompleks, 1ste Vloer, Pleinstraat, Stellenbosch na betaling van 'n nie-terugbetaalde tenderdeelnamefooi van R3130.00. per dokument. Alternatiewelik mag die dokument gratis afgelaai word vanaf die webblad www.stellenbosch.gov.za.

Let wel: Die munisipaliteit sal jou nooit kontak om geld te betaal in ruil vir die toekenning van 'n tender nie.

G Mettler (Me)
MUNISIPALE BESTUURDER



TENDER NO.: B/SM 128/26

CALL FOR PROPOSALS FOR PRIVATE DEVELOPERS TO PARTNER WITH STELLENBOSCH MUNICIPALITY IN THE DEVELOPMENT OF GAP HOUSING ON ERF 7001, CLOETESVILLE, STELLENBOSCH

PROCUREMENT DOCUMENT

NAME OF TENDERER:	
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DATE: SEPTEMBER 2026

NOTE: All returnable documents as listed on page 11 in this document, including the Bid Form on page 6, must be completed in full and signed. The entire document, from page 1 through 86, must be submitted with the bid. **PLEASE NOTE: A TWO-ENVELOPE PROCEDURE WILL BE FOLLOWED FOR THIS BID.** Please refer to the General Conditions of Tender in Section 7, item number 13, for important information for competing and submitting the tender

PREPARED AND ISSUED BY:

Directorate: Finance
Supply Chain Management
Unit
Stellenbosch Municipality
PO Box 17, Stellenbosch, 7599

**CONTACT FOR ENQUIRIES
REGARDING SPECIFICATIONS**

Bonga Ndzuzo: Programme
Manager
Housing Development
Tel. Number: 021 808 8733



**PART A
INVITATION TO BID**

YOU ARE HEREBY INVITED TO BID FOR THE REQUIREMENTS OF THE (NAME OF MUNICIPALITY/ MUNICIPAL ENTITY)					
BID NUMBER:	B/SM 128/26	CLOSING DATE:	19 October 2026	CLOSING TIME:	12H00
DESCRIPTION	CALL FOR PROPOSALS FROM PRIVATE DEVELOPERS TO PARTNER WITH STELLENBOSCH MUNICIPALITY IN THE DEVELOPMENT OF GAP HOUSING ON ERF 7001, CLOETESVILLE, STELLENBOSCH				
THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (MBD7).					

BID RESPONSE DOCUMENTS MUST BE DEPOSITED IN THE BID BOX SITUATED AT **STELLENBOSCH MUNICIPALITY, TOWN HOUSE COMPLEX (MAIN BUILDING BETWEEN TOWN HALL AND MUNICIPAL LIBRARY), PLEIN STREET, STELLENBOSCH**

SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
TAX COMPLIANCE STATUS	TCS PIN:		OR	CSD No:	
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE [TICK APPLICABLE BOX]	☐ Yes ☐ No		B-BBEE STATUS LEVEL SWORN AFFIDAVIT	☐ Yes ☐ No	

[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSEs) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]

1. ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ Yes ☐ No [IF YES, ENCLOSE PROOF]	2. ARE YOU A FOREIGN-BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	☐ Yes ☐ No [IF YES, ANSWER PART B:3]
3. TOTAL NUMBER OF ITEMS OFFERED		4. TOTAL BID PRICE	ENVELOPE 2
5. SIGNATURE OF BIDDER		6. DATE	

7. NAME AND SURNAME OF RESPONSIBLE PERSON	
---	--

8. CAPACITY UNDER WHICH THIS BID IS SIGNED	
--	--

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:		TECHNICAL INFORMATION MAY BE DIRECTED TO:	
DEPARTMENT	SCM	CONTACT PERSON	BONGA NDZUZO
CONTACT PERSON	RENAE BERGSTEDT	TELEPHONE NUMBER	021 808 8733
TELEPHONE NUMBER	021 808 8588	E-MAIL ADDRESS	Bonga.Ndzuzo@ Stellenbosch.gov.za
E-MAIL ADDRESS	Renaeb.Bergstedt@ Stellenbosch.gov.za		



PART B
TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:

- 1.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
- 1.2. **ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED (NOT TO BE RE-TYPED) OR SUBMITTED ONLINE**
- 1.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 16 January 2023, THE STELLENBOSCH SUPPLY CHAIN MANAGEMENT POLICY, THE GENERAL CONDITIONS OF CONTRACT (GCC, JBCC, FIDIC, CIDB OR NEC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.

2. TAX COMPLIANCE REQUIREMENTS

- 2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
- 2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS.
- 2.3 APPLICATION FOR THE TAX COMPLIANCE STATUS (TCS) CERTIFICATE OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA.
- 2.4 FOREIGN SUPPLIERS MUST COMPLETE THE PRE-AWARD QUESTIONNAIRE IN PART B:3.
- 2.5 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
- 2.6 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
- 2.7 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.

3. QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS

- 3.1. IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)? ☐ YES ☐ NO
- 3.2. DOES THE ENTITY HAVE A BRANCH IN THE RSA? ☐ YES ☐ NO
- 3.3. DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA? ☐ YES ☐ NO
- 3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA? ☐ YES ☐ NO
- 3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION? ☐ YES ☐ NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 ABOVE.

NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.
NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE.

SIGNATURE OF BIDDER:

.....

CAPACITY UNDER WHICH THIS BID IS SIGNED:

.....

NAME AND SURNAME

.....

DATE

.....



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MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

PART A – ADMINISTRATIVE REQUIREMENTS IN TERMS OF THE SUPPLY CHAIN MANAGEMENT POLICY



2. CHECKLIST

PLEASE ENSURE THAT THE FOLLOWING FORMS HAVE BEEN DULY COMPLETED AND SIGNED AND THAT ALL DOCUMENTS AS REQUESTED ARE ATTACHED TO THE TENDER DOCUMENT:

Certificate of Clarification/Virtual Meeting Attendance - Is the form duly completed and signed by both tenderer and agent of the Stellenbosch Municipality?	Yes	No
Authority to Sign a Bid - Is the form duly completed and is a certified copy of the resolution attached?	Yes	No
MBD 4 (Declaration of Interest) - Is the form duly completed and signed?	Yes	No
MBD 5 - Is the form duly completed and signed?	Yes	No
MBD 6.1 (Preference Points claim form for purchases/services) - Is the form duly completed and signed? Is a copy of the B-BBEE Certificate issued by a Verification Agency accredited by SANAS or the original Sworn Affidavit attached? (NB! BBBEE CERTIFICATES CAN BE VERIFIED WITH THE VERIFICATION AGENCY BUT A SWORN AFFIDAVIT MUST BE AN ORIGINAL AND NOT A COPY TO BE ELIGIBLE FOR BBBEE POINTS)	Yes	No
MBD 8 (Declaration of Past Supply Chain Practices) - Is the form duly completed and signed?	Yes	No
MBD 9 (Certificate of Independent Bid Determination) - Is the form duly completed and signed?	Yes	No
MBD 10 (Certificate of Payment of Municipal Accounts) - Is the form duly completed and signed? Are the Identity numbers, residential addresses and municipal account numbers of ALL members, partners, directors, etc. provided on the form as requested? (NB! MUNICIPAL ACCOUNTS WILL BE VERIFIED AND USED AS BASIS FOR PREFERENCE POINTS SCORING IN TERMS OF THE STELLENBOSCH PREFERENTIAL PROCUREMENT POLICY. THE BUSINESS ADDRESS, LEASE AGREEMENT OR SWORN AFFADAVIT WILL BE THE BASIS FOR AWARDDING POINTS FOR LOCALITY)	Yes	No
OHSA (Occupational Health and Safety) - Is the form duly completed and signed? Is a valid Letter of Good Standing from the Compensation Commissioner attached?	Yes	No
Form of Indemnity - Is the form duly completed and signed?	Yes	No
Pricing Schedule - Is the form duly completed and signed?	Yes	No
Form of Offer - Is the form duly completed and signed? (If applicable)	Yes	No
Declaration by Tenderer - Is the form duly completed and signed?	Yes	No



3. CLARIFICATION/VIRTUAL MEETING CERTIFICATE

Virtual meetings declaration:

I / We*, the undersigned, certify that I/we* have familiarized ourselves with the requirements of this tender as discussed at the virtual meeting for which I/we* am / are* submitting this Tender and have, as far as practicable, familiarized myself/ourselves* with all information, risks, contingencies and other circumstances which may influence or affect my / our* tender.

NAME & SURNAME			
CAPACITY			
NAME OF FIRM			
ADDRESS			
TELEPHONE NO			
E-MAIL		SIGNATURE	

NB: Please note that no latecomers will be allowed.



4. AUTHORITY TO SIGN A BID

1. SOLE PROPRIETOR (SINGLE OWNER BUSINESS) AND NATURAL PERSON

1.1. I, _____, the undersigned, hereby confirm that I am the sole owner of the business trading as _____.

OR

1.2. I, _____, the undersigned, hereby confirm that I am submitting this tender in my capacity as natural person.

SIGNATURE:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

OR

2. COMPANIES AND/OR CLOSE CORPORATIONS

- 2.1. If a Bidder is a **COMPANY**, a certified copy of the resolution by the board of directors, duly signed, authorising the person who signs this bid to do so, as well as to sign any contract resulting from this bid and any other documents and correspondence in connection with this bid and/or contract on behalf of the company **must be submitted with this bid**, that is, before the closing time and date of the bid
- 2.2. In the case of a **CLOSE CORPORATION (CC)** submitting a bid, a **resolution by its members**, authorizing a member or other official of the corporation to sign the documents on their behalf, **shall be included with the bid**.

PARTICULARS OF RESOLUTION BY BOARD OF DIRECTORS OF THE COMPANY/MEMBERS OF THE CC

Date Resolution was taken			
Resolution signed by (name and surname)			
Capacity			
Name and surname of delegated Authorised Signatory			
Capacity			
Specimen Signature			
Full name and surname of ALL Director(s) / Member (s)			
1.		2.	
3.		4.	
5.		6.	
7.		8.	
9.		10.	
Is a COPY of the resolution attached?		YES	NO
SIGNED ON BEHALF OF COMPANY / CC:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	



OR

3. PARTNERSHIP

We, the undersigned partners in the business trading as _____ hereby authorize Mr/Ms _____ to sign this bid as well as any contract resulting from the bid and any other documents and correspondence in connection with this bid and /or contract for and on behalf of the abovementioned partnership.

The following particulars in respect of every partner must be furnished and signed by every partner:

Full name of partner			Signature
SIGNED ON BEHALF OF PARTNERSHIP:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	

OR

4. CONSORTIUM

We, the undersigned consortium partners, hereby authorize _____ (Name of entity) to act as lead consortium partner and further authorize Mr./Ms. _____ To sign this offer as well as any contract resulting from this tender and any other documents and correspondence in connection with this tender and / or contract for and on behalf of the consortium.

The following particulars in respect of each consortium member must be provided and signed by each member:

Full Name of Consortium Member	Role of Consortium Member	% Participation	Signature
SIGNED ON BEHALF OF PARTNERSHIP:		DATE:	
PRINT NAME:			
WITNESS 1:		WITNESS 2:	



5. CERTIFICATE OF AUTHORITY FOR JOINT VENTURES

This returnable schedule is to be completed by JOINT VENTURES

We, the undersigned, are submitting this tender offer in joint venture and hereby authorize Mr./Ms. _____

authorized signatory of the Company/Close Corporation/Partnership (name) _____

_____, acting in the capacity of lead partner, to sign all documents in connection with the tender offer and any contract resulting from it on our behalf.

(i) Name of firm (Lead partner)			
Address			
		Tel. No.	
Signature		Designation	

(ii) Name of firm			
Address			
		Tel. No.	
Signature		Designation	

(iii) Name of firm			
Address:			
		Tel. No.	
Signature		Designation	

(iv) Name of firm			
Address			
		Tel. No.	
Signature		Designation	

NOTE: A copy of the Joint Venture Agreement showing clearly the percentage contribution of each partner to the Joint Venture shall be appended to this Schedule.



6. GENERAL CONDITIONS OF CONTRACT – GOVERNMENT PROCUREMENT

1. DEFINITIONS

The following terms shall be interpreted as indicated:

- 1.1. "Closing time" means the date and hour specified in the bidding documents for the receipt of bids.
- 1.2. "Contract" means the written agreement entered into between the purchaser and the supplier, as recorded in the contract form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
- 1.3. "Contract price" means the price payable to the supplier under the contract for the full and proper performance of his contractual obligations.
- 1.4. "Corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution.
- 1.5. "Countervailing duties" are imposed in cases where an enterprise abroad is subsidized by its government and encouraged to market its products internationally
- 1.6. "Country of origin" means the place where the goods were mined, grown or produced or from which the services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembly of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility from its components.
- 1.7. "Day" means calendar day.
- 1.8. "Delivery" means delivery in compliance of the conditions of the contract or order.
- 1.9. "Delivery ex stock" means immediate delivery directly from stock actually on hand
- 1.10. "Delivery into consignees store or to his site" means delivered and unloaded in the specified store or depot or on the specified site in compliance with the conditions of the contract or order, the supplier bearing all risks and charges involved until the supplies are so delivered and a valid receipt is obtained.
- 1.11. "Dumping" occurs when a private enterprise abroad market its goods on own initiative in the RSA at lower prices than that of the country of origin and which have the potential to harm the local industries in the RSA.
- 1.12. "Force majeure" means an event beyond the control of the supplier and not involving the supplier's fault or negligence and not foreseeable.
- 1.13. Such events may include, but is not restricted to, acts of the purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.
- 1.14. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of any bidder, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the bidder of the benefits of free and open competition.
- 1.15. "GCC" means the General Conditions of Contract.
- 1.16. "Goods" means all of the equipment, machinery, and/or other materials that the supplier is required to supply to the purchaser under the contract.
- 1.17. "Imported content" means that portion of the bidding price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or his subcontractors) and which costs are inclusive of the costs abroad, plus freight and other direct importation costs such as landing costs, dock dues, import duty, sales duty or other similar tax or duty at the South African place of entry as well as transportation and handling charges to the factory in the Republic where the supplies covered by the bid will be manufactured.
- 1.18. "Local content" means that portion of the bidding price which is not included in the imported content provided that local manufacture does take place.



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- 1.19. "Manufacture" means the production of products in a factory using labour, materials, components and machinery and includes other related value-adding activities.
- 1.20. "Order" means an official written order issued for the supply of goods or works or the rendering of a service.
- 1.21. "Project site" where applicable, means the place indicated in bidding documents.
- 1.22. "Purchaser" means the organization purchasing the goods.
- 1.23. "Republic" means the Republic of South Africa.
- 1.24. "SCC" means the Special Conditions of Contract.
- 1.25. "Services" means those functional services ancillary to the supply of the goods, such as transportation and any other incidental services, such as installation, commissioning, provision of technical assistance, training, catering, gardening, security, maintenance and other such obligations of the supplier covered under the contract.
- 1.26. "Supplier" means the successful bidder who is awarded the contract to maintain and administer the required and specified service(s) to the State.
- 1.27. "Tort" means in breach of contract.
- 1.28. "Turnkey" means a procurement process where one service provider assumes total responsibility for all aspects of the project and delivers the full end product / service required by the contract.
- 1.29. "Written" or "in writing" means handwritten in ink or any form of electronic or mechanical writing.

2. Application

- 2.1. These general conditions are applicable to all bids, contracts and orders including bids for functional and professional services, sales, hiring, letting and the granting or acquiring of rights, but excluding immovable property, unless otherwise indicated in the bidding documents.
- 2.2. Where applicable, special conditions of contract are also laid down to cover specific supplies, services or works.
- 2.3. Where such special conditions of contract are in conflict with these general conditions, the special conditions shall apply.

3. General

- 3.1. Unless otherwise indicated in the bidding documents, the purchaser shall not be liable for any expense incurred in the preparation and submission of a bid. Where applicable a non-refundable fee for documents may be charged.
- 3.2. Invitations to bid are usually published in locally distributed news media and on the municipality / municipal entity website.

4. Standards

- 4.1. The goods supplied shall conform to the standards mentioned in the bidding documents and specifications.

5. Use of contract documents and information; inspection.

- 5.1. The supplier shall not, without the purchaser's prior written consent, disclose the contract, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the purchaser in connection therewith, to any person other than a person employed by the supplier in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only as far as may be necessary for purposes of such performance.
- 5.2. The supplier shall not, without the purchaser's prior written consent, make use of any document or information mentioned in GCC clause 5.1 except for purposes of performing the contract.
- 5.3. Any document, other than the contract itself mentioned in GCC clause 5.1 shall remain the property of the purchaser and shall be returned (all copies) to the purchaser on completion of the supplier's performance under the contract if so required by the purchaser.



- 5.4. The supplier shall permit the purchaser to inspect the supplier's records relating to the performance of the supplier and to have them audited by auditors appointed by the purchaser, if so required by the purchaser.

6. Patent rights

- 6.1. The supplier shall indemnify the purchaser against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the goods or any part thereof by the purchaser.
- 6.2. When a supplier developed documentation / projects for the municipality / municipal entity, the intellectual, copy and patent rights or ownership of such documents or projects will vest in the municipality / municipal entity.

7. Performance security

- 7.1. Within thirty (30) days of receipt of the notification of contract award, the successful bidder shall furnish to the purchaser the performance security of the amount specified in SCC.
- 7.2. The proceeds of the performance security shall be payable to the purchaser as compensation for any loss resulting from the supplier's failure to complete his obligations under the contract.
- 7.3. The performance security shall be denominated in the currency of the contract or in a freely convertible currency acceptable to the purchaser and shall be in one of the following forms:
- 7.3.1. bank guarantee or an irrevocable letter of credit issued by a reputable bank located in the purchaser's country or abroad, acceptable to the purchaser, in the form provided in the bidding documents or another form acceptable to the purchaser; or
 - 7.3.2. a cashier's or certified cheque
- 7.4. The performance security will be discharged by the purchaser and returned to the supplier not later than thirty (30) days following the date of completion of the supplier's performance obligations under the contract, including any warranty obligations, unless otherwise specified.

8. Inspections, tests, and analyses

- 8.1. All pre-bidding testing will be for the account of the bidder. If it is a bid condition that supplies to be produced or services to be rendered should at any stage during production or execution or on completion, be subject to inspections, tests and analysis, the bidder or contractor's premises shall be open, at all reasonable hours, for inspection by a representative of the purchaser or an organization acting on behalf of the purchaser.
- 8.2. If there are no inspection requirements indicated in the bidding documents and no mention is made in the contract, but during the contract period it is decided that inspections shall be carried out, the purchaser shall itself make the necessary arrangements, including payment arrangements with the testing authority concerned.
- 8.3. If the inspections, tests, and analyses referred to in clauses 8.2 and 8.3 show the goods to be in accordance with the contract requirements, the cost of the inspections, tests and analyses shall be defrayed by the purchaser.
- 8.4. Where the goods or services referred to in clauses 8.2 and 8.3 do not comply with the contract requirements, irrespective of whether such goods or services are accepted or not, the cost in connection with these inspections, tests or analyses shall be defrayed by the supplier.
- 8.5. Supplies and services which are referred to in clauses 8.2 and 8.3 and which do not comply with the contract requirements may be rejected.



8.6. Any contract goods may on or after delivery be inspected, tested or analyzed and may be rejected if found not to comply with the requirements of the contract. Such rejected goods shall be held at the cost and risk of the supplier who shall, when called upon, remove them immediately at his own cost and forthwith substitute them with goods which do comply with the requirements of the contract. Failing such removal the rejected goods shall be returned at the suppliers cost and risk. Should the supplier fail to provide the substitute goods forthwith, the purchaser may, without giving the supplier further opportunity to substitute the rejected goods, purchase such goods as may be necessary at the expense of the supplier.

8.7. The provisions of clauses 8.4 to 8.7 shall not prejudice the right of the purchaser to cancel the contract on account of a breach of the conditions thereof, or to act in terms of Clause 22 of GCC.

9. Packing

9.1. The supplier shall provide such packing of the goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing, case size and weights shall take into consideration, where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.

9.2. The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the contract, including additional requirements, and in any subsequent instructions ordered by the purchaser.

10. Delivery

Delivery of the goods shall be made by the supplier in accordance with the documents and terms specified in the contract. The details of shipping and/or other documents to be furnished by the supplier are specified.

11. Insurance

The goods supplied under the contract shall be fully insured in a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified.

12. Transportation

Should a price other than an all-inclusive delivered price be required, this shall be specified.

13. Incidental

13.1. The supplier may be required to provide any or all of the following services, including additional services, if any:

13.1.1. performance or supervision of on-site assembly and/or commissioning of the supplied goods;

13.1.2. furnishing of tools required for assembly and/or maintenance of the supplied goods;

13.1.3. furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied goods;

13.1.4. performance or supervision or maintenance and/or repair of the supplied goods, for a period of time agreed by the parties, provided that this service shall not relieve the supplier of any warranty obligations under this contract; and

13.1.5. training of the purchaser's personnel, at the supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied goods.

13.2. Prices charged by the supplier for incidental services, if not included in the contract price for the goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the supplier for similar services.



14. Spare parts

14.1. As specified, the supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the supplier:

14.1.1. such spare parts as the purchaser may elect to purchase from the supplier, provided that this election shall not relieve the supplier of any warranty obligations under the contract; and;

14.1.2. in the event of termination of production of the spare parts:

14.1.2.1. advance notification to the purchaser of the pending termination, in sufficient time to permit the purchaser to procure needed requirements; and

14.1.2.2. following such termination, furnishing at no cost to the purchaser, the blueprints, drawings, and specifications of the spare parts, if requested.

15. Warranty

15.1. The supplier warrants that the goods supplied under the contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the contract. The supplier further warrants that all goods supplied under this contract shall have no defect, arising from design, materials, or workmanship (except when the design and/or material is required by the purchaser's specifications) or from any act or omission of the supplier, that may develop under normal use of the supplied goods in the conditions prevailing in the country of final destination.

15.2. This warranty shall remain valid for twelve (12) months after the goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the contract, or for eighteen (18) months after the date of shipment from the port or place of loading in the source country, whichever period concludes earlier, unless specified otherwise in SCC.

15.3. The purchaser shall promptly notify the supplier in writing of any claims arising under this warranty.

15.4. Upon receipt of such notice, the supplier shall, within the period specified in SCC and with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to the purchaser.

15.5. If the supplier, having been notified, fails to remedy the defect(s) within the period specified, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expense and without prejudice to any other rights which the purchaser may have against the supplier under the contract.

16. Payment

16.1. The method and conditions of payment to be made to the supplier under this contract shall be specified.

16.2. The supplier shall furnish the purchaser with an invoice accompanied by a copy of the delivery note and upon fulfillment of other obligations stipulated in the contract.

16.3. Payments shall be made by the purchaser **no later than thirty (30) days** after submission of an **invoice, statement** or claim by the supplier.

16.4. Payment will be made in Rand unless otherwise stipulated.

17. Prices

Prices charged by the supplier for goods delivered and services performed under the contract shall not vary from the prices quoted by the supplier in his bid, with the exception of any price adjustments authorized or in the purchaser's request for bid validity extension, as the case may be.

18. Variation orders

In cases where the estimated value of the envisaged changes in purchase does not vary more than 15% of the total value of the original contract, the contractor may be instructed to deliver the goods or render the services as such. In cases of measurable quantities, the contractor may be approached to reduce the unit price and such offers, may be accepted provided that there is no escalation in price.



19. Assignment

The supplier shall not assign, in whole or in part, its obligations to perform under the contract, except with the purchaser's prior written consent.

20. Subcontracts

The supplier shall notify the purchaser in writing of all subcontracts awarded under this contract, if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the supplier from any liability or obligation under the contract.

21. Delays in the supplier's performance

21.1. Delivery of the goods and performance of services shall be made by the supplier in accordance with the time schedule prescribed by the purchaser in the contract.

21.2. If at any time during performance of the contract, the supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the goods and performance of services, the supplier shall promptly notify the purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the supplier's notice, the purchaser shall evaluate the situation and may at his discretion extend the supplier's time for performance, with or without the imposition of penalties, in which case the extension shall be ratified by the parties by amendment of contract.

21.3. The right is reserved to procure outside of the contract small quantities or to have minor essential services executed if an emergency arises, the supplier's point of supply is not situated at or near the place where the supplies are required, or the supplier's services are not readily available.

21.4. Except as provided under GCC Clause 25, a delay by the supplier in the performance of its delivery obligations shall render the supplier liable to the imposition of penalties, pursuant to GCC Clause 22, unless an extension of time is agreed upon pursuant to GCC Clause 22 without the application of penalties.

21.5. Upon any delay beyond the delivery period in the case of a supplies contract, the purchaser shall, without cancelling the contract, be entitled to purchase supplies of a similar quality and up to the same quantity in substitution of the goods not supplied in conformity with the contract and to return any goods delivered later at the supplier's expense and risk, or to cancel the contract and buy such goods as may be required to complete the contract and without prejudice to his other rights, be entitled to claim damages from the supplier.

22. Penalties

Subject to GCC Clause 25, if the supplier fails to deliver any or all of the goods or to perform the services within the period(s) specified in the contract, the purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, as a penalty, a sum calculated on the delivered price of the delayed goods or unperformed services using the current prime interest rate calculated for each day of the delay until actual delivery or performance. The purchaser may also consider termination of the contract pursuant to GCC Clause 23.

23. Termination for default

23.1. The purchaser, without prejudice to any other remedy for breach of contract, by written notice of default sent to the supplier, may terminate this contract in whole or in part:

23.1.1. if the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, or within any extension thereof granted by the purchaser pursuant to GCC Clause 21.2;

23.1.2. if the Supplier fails to perform any other obligation(s) under the contract; or

23.1.3. if the supplier, in the judgment of the purchaser, has engaged in corrupt or fraudulent practices in competing for or in executing the contract.

23.2. In the event the purchaser terminates the contract in whole or in part, the purchaser may procure, upon such terms and in such manner as it deems appropriate, goods, works or services similar to those undelivered, and the supplier shall be liable to the purchaser for any excess costs for



such similar goods, works or services. However, the supplier shall continue performance of the contract to the extent not terminated.

23.3. Where the purchaser terminates the contract in whole or in part, the purchaser may decide to impose a restriction penalty on the supplier by prohibiting such supplier from doing business with the public sector for a period not exceeding 10 years.

23.4. If a purchaser intends imposing a restriction on a supplier or any person associated with the supplier, the supplier will be allowed a time period of not more than fourteen (14) days to provide reasons why the envisaged restriction should not be imposed. Should the supplier fail to respond within the stipulated fourteen (14) days the purchaser may regard the supplier as having no objection and proceed with the restriction.

23.5. Any restriction imposed on any person by the purchaser will, at the discretion of the purchaser, also be applicable to any other enterprise or any partner, manager, director or other person who wholly or partly exercises or exercised or may exercise control over the enterprise of the first-mentioned person, and with which enterprise or person the first-mentioned person, is or was in the opinion of the purchaser actively associated.

23.6. If a restriction is imposed, the purchaser must, within five (5) working days of such imposition, furnish the National Treasury, with the following information:

23.6.1. the name and address of the supplier and / or person restricted by the purchaser;

23.6.2. the date of commencement of the restriction

23.6.3. the period of restriction; and

23.6.4. the reasons for the restriction.

These details will be loaded in the National Treasury's central database of suppliers or persons prohibited from doing business with the public sector.

23.7. If a court of law convicts a person of an offence as contemplated in sections 12 or 13 of the Prevention and Combating of Corrupt Activities Act, No. 12 of 2004, the court may also rule that such person's name be endorsed on the Register for Tender Defaulters. When a person's name has been endorsed on the Register, the person will be prohibited from doing business with the public sector for a period not less than five years and not more than 10 years. The National Treasury is empowered to determine the period of restriction and each case will be dealt with on its own merits. According to section 32 of the Act the Register must be open to the public. The Register can be perused on the National Treasury website.

24. Anti-dumping and countervailing duties and rights

When, after the date of bid, provisional payments are required, or antidumping or countervailing duties are imposed, or the amount of a provisional payment or anti-dumping or countervailing right is increased in respect of any dumped or subsidized import, the State is not liable for any amount so required or imposed, or for the amount of any such increase. When, after the said date, such a provisional payment is no longer required or any such anti-dumping or countervailing right is abolished, or where the amount of such provisional payment or any such right is reduced, any such favourable difference shall on demand be paid forthwith by the contractor to the State or the State may deduct such amounts from moneys (if any) which may otherwise be due to the contractor in regard to supplies or services which he delivered or rendered, or is to deliver or render in terms of the contract or any other contract or any other amount which may be due to him.

25. Force Majeure

25.1. Notwithstanding the provisions of GCC Clauses 22 and 23, the supplier shall not be liable for forfeiture of its performance security, damages, or termination for default if and to the extent that his delay in performance or other failure to perform his obligations under the contract is the result of an event of force majeure.

25.2. If a force majeure situation arises, the supplier shall promptly notify the purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the force majeure event.



26. Termination for insolvency

The purchaser may at any time terminate the contract by giving written notice to the supplier if the supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the supplier, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the purchaser.

27. Settlement of Disputes

27.1. If any dispute or difference of any kind whatsoever arises between the purchaser and the supplier in connection with or arising out of the contract, the parties shall make every effort to resolve amicably such dispute or difference by mutual consultation.

27.2. If, after thirty (30) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the purchaser or the supplier may give notice to the other party of his intention to commence with mediation. No mediation in respect of this matter may be commenced unless such notice is given to the other party.

27.3. Should it not be possible to settle a dispute by means of mediation, it may be settled in a South African court of law.

27.4. Notwithstanding any reference to mediation and/or court proceedings herein,

27.4.1. the parties shall continue to perform their respective obligations under the contract unless they otherwise agree; and

27.4.2. the purchaser shall pay the supplier any monies due for goods delivered and / or services rendered according to the prescripts of the contract.

28. Limitation of liability

28.1. Except in cases of criminal negligence or willful misconduct, and in the case of infringement pursuant to Clause 6;

28.1.1. the supplier shall not be liable to the purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the supplier to pay penalties and/or damages to the purchaser; and

28.1.2. the aggregate liability of the supplier to the purchaser, whether under the contract, in tort or otherwise, shall not exceed the total contract price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment

29. Governing language

The contract shall be written in English. All correspondence and other documents pertaining to the contract that is exchanged by the parties shall also be written in English.

30. Applicable law

The contract shall be interpreted in accordance with South African laws, unless otherwise specified.

31. Notices

31.1. Every written acceptance of a bid shall be posted to the supplier concerned by registered or certified mail and any other notice to him shall be posted by ordinary mail to the address furnished in his bid or to the address notified later by him in writing and such posting shall be deemed to be proper service of such notice

31.2. The time mentioned in the contract documents for performing any act after such aforesaid notice has been given, shall be reckoned from the date of posting of such notice.

32. Taxes and duties

32.1. A foreign supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the purchaser's country.



32.2.A local supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted goods to the purchaser.

32.3.No contract shall be concluded with any bidder whose tax matters are not in order. Prior to the award of a bid SARS must have certified that the tax matters of the preferred bidder are in order.

32.4.No contract shall be concluded with any bidder whose municipal rates and taxes and municipal services charges are in arrears.

33. Transfer of contracts

The contractor shall not abandon, transfer, cede, assign or sublet a contract or part thereof without the written permission of the purchaser.

34. Amendment of contracts

No agreement to amend or vary a contract or order or the conditions, stipulations or provisions thereof shall be valid and of any force unless such agreement to amend or vary is entered into in writing and signed by the contracting parties. Any waiver of the requirement that the agreement to amend or vary shall be in writing, shall also be in writing.

35. Prohibition of restrictive practices.

35.1.In terms of section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, an agreement between, or concerted practice by, firms, or a decision by an association of firms, is prohibited if it is between parties in a horizontal relationship and if a bidder(s) is/are or a contractor(s) was/were involved in collusive bidding.

35.2.If a bidder(s) or contractor(s), based on reasonable grounds or evidence obtained by the purchaser has/have engaged in the restrictive practice referred to above, the purchaser may refer the matter to the Competition Commission for investigation and possible imposition of administrative penalties as contemplated in section 59 of the Competition Act No 89 of 1998.

35.3.If a bidder(s) or contractor(s) has/have been found guilty by the Competition Commission of the restrictive practice referred to above, the purchaser may, in addition and without prejudice to any other remedy provided for, invalidate the bid(s) for such item(s) offered, and/or terminate the contract in whole or part, and/or restrict the bidder(s) or contractor(s) from conducting business with the public sector for a period not exceeding ten (10) years and/or claim damages from the bidder(s) or contractor(s) concerned.

General Conditions of Contract (revised July 2015)



7. GENERAL CONDITIONS OF TENDER

1. Sealed tenders, with the “**Tender Number and Title**” clearly endorsed on the envelope, must be deposited in the **tender box** at the offices of the Stellenbosch Municipality, Plein Street, Stellenbosch.
2. The tender must be lodged by the Tenderer in the tender box in the Main Hall Entrance, Stellenbosch Municipal Offices, Plein Street, Stellenbosch

PLEASE NOTE:

- 2.1. Tenders that are deposited in the incorrect box will not be considered.
 - 2.2. Mailed, telegraphic or faxed tenders will not be accepted.
 - 2.3. Documents may only be completed in non-erasable ink.
 - 2.4. The use of correction fluid/tape is not allowed.
 - 2.4.1. In the event of a mistake having been made, it shall be crossed out in ink and be accompanied by an initial at each and every alteration.
 - 2.4.2. Alterations or deletions not signed by the Tenderer may render the tender invalid.
 - 2.5. All bids must be submitted in writing on the official forms supplied (not to be re-typed)
 - 2.6. All prices shall be quoted in South African currency and be **INCLUSIVE of VAT**.
- 3. Where the value of an intended contract (or company turnover) will exceed R1 000 000, 00 (R1 million) it is the bidder's responsibility to be registered with the South African Revenue Service (SARS) for VAT purposes in order to be able to issue tax invoices. The municipality will deem the price above R 1 000 000,00 (R1 million) to be VAT inclusive even if it is indicated that no VAT is charged. Please ensure that provision is made for VAT in these instances. The TOTAL price tendered will remain fixed.**
- 3.1 It is a requirement of this contract that the amount of value-added tax (VAT) must be shown clearly on each invoice.
 - 3.2 The amended Value-Added Tax Act requires that a Tax Invoice for supplies in excess of R3 000 should, in addition to the other required information, also disclose the VAT registration number of the recipient, with effect from 1 March 2005. The VAT registration number of the Stellenbosch Municipality is **4700102181**.
- 3 Any Tender received after the appointed time for the closing of Tenders shall not be considered but shall be filed unopened with the other Tenders received or may be returned to the Tenderer at his request.
 - 4 Tenders may not be telefaxed to the Municipality and therefore any tenders received by fax will **not** be considered.
 - 5 Tenders shall be opened in public at the Stellenbosch Municipal Offices as soon as possible after the closing time for the receipt of tenders.
 - 6 The Municipality shall have the right to summarily disqualify any Tenderer who, either at the date of submission of this tender or at the date of its award, is indebted to the Municipality in respect of any rental, levies, rates and/or service charges; ALTERNATIVELY;
 - 6.1 That an agreement be signed whereby the Tenderer agrees that a percentage or fixed amount at the discretion of the Municipality, be deducted from payments due to him for this tender, until the debt is paid in full.
 - 6.2 The tenderer shall declare **all** the Municipal account numbers in the Stellenbosch Area for which the enterprise or the proprietors or directors in their personal capacity is/ are responsible or co-



responsible.

7. Negotiations for a fair market-related price

7.1 The award of the tender may be subject to price negotiation with the preferred tenderers.

8 This bid will be evaluated and adjudicated according to the following criteria:

- 8.1 Relevant specifications
- 8.2 Value for money
- 8.3 Capability to execute the contract
- 8.4 PPPFA & associated regulations

9 Land Availability Agreement

The award of the tender is subject to the signing of a Land Availability Agreement (LAA) between the successful bidder and Stellenbosch Municipality.

10 Inclusion as a standard clause in the tender specification documents where any asset is constructed (delete whichever is not applicable)

On practical completion date, a report or certificate should be issued indicating the total costs of the project attributable to each significant component as identified within the lowest asset hierarchy level (4) as specified within the infrastructure catalogue or Annexure A of the Stellenbosch Municipality's asset management policy as approved in 2014, if not contained in the catalogue.

Inclusion in the contract with consultants

If construction is still in progress over the year-end period of the Stellenbosch Municipality, being 30 June of each year, the Municipality should be furnished with a report/certificate at year-end (30 June), which details (a) the cumulative expenditure incurred up to 30 June for the project. (b) any details if the project is taking a significant longer period of time to complete than expected, including reasons for any delays. (c) details where construction or development has been halted either during the current or previous reporting period(s), including reasons for halting the construction or development of the asset/project.

11 Centralised Supplier Database

No Bids will be awarded to a bidder who is not registered on the Centralised Supplier Database (CSD).

The CSD supplier number starting with (MAAA), is automatically generated by the Central Database System after successful registration and validation of a prospective service provider. This number is now a mandatory requirement, as referred to in regulation 14(1) (b) of the Municipal Supply Chain Management Regulations, as part of the listing criteria for accrediting a prospective service provider. Prospective suppliers should self – register on the CSD website at www.csd.gov.za. Registration on the CSD will be compulsory in order to conduct business with the STELLENBOSCH MUNICIPALITY. Assistance with CSD Registration can be provided by contacting 021 808 8594 or Nicolene.Hamilton@stellenbosch.gov.za

Centralised Supplier Database No. MAAA.....

13 Important information for completing and submitting the tender



-
- 13.1. **PLEASE NOTE:** No Alternative or corrections to inserted information in the document (including pricing) may be performed by erasing or using masking fluid (Tipp-EX or similar) on any submitted page. Alterations/corrections to inserted information may only be performed as follows:
- a. Strike a line through the incorrect information, write the corrected information as appropriate (under, above, or next to the information to be corrected), and initial at every incidence of alteration/correction.
 - b. In the case of access to a digital copy of the bid document (PDF), simply reprint the page, enter the information on the reprinted page, and substitute it in the document.
- 13.2. **PLEASE NOTE: A TWO-ENVELOPE PROCEDURE WILL BE FOLLOWED FOR THIS BID**, as follows:
- a. **Envelope 1: Technical Proposal will contain part A & B of the bid document from page 1 of this document up to and including page 80 inclusive of all returnable schedules in PART A and B of the document, including any additional pages appended to the returnable schedule of Part A& B.** Place and seal these pages in an envelope marked “**Envelope 1: Technical Proposal**”, stating on the outside the Department’s address and identification details (Bid No and Project Title as they appear on the cover page of this document), as well as the Bidder’s name and contact address.
 - b. **Envelope 2: Financial Proposal will contain part C of the bid document from page 81 to page 86, inclusive of all returnable schedules belonging to this part of the document, as well as any additional pages appended to the returnable schedule and the memory stick with the bidder’s Pricing Model.** Place and seal these pages and memory stick in an envelope marked “**Envelope 2: Financial Proposal**”, stating on the outside the Department’s address and identification details (Bid No and Project Title as they appear on the cover page of this document), as well as the Bidder’s name and contact address.
 - c. Place the 2 envelopes separately into the bid box when submitting the bid. Please note that bids not submitted in accordance with the two-envelope procedure described here will not be considered.



8. SPECIAL CONDITIONS OF CONTRACT (If applicable)

Settlement of Disputes:

Should the parties fail to resolve any dispute by way of mutual consultation, either party shall be entitled to refer the matter for mediation. Such referral shall be done by either party giving written notice to the other of its intention to commence with mediation. No mediation may be commenced unless such notice is given to the other party.

Irrespective of whether the mediation resolves the dispute, the parties shall bear their own costs concerning the mediation and share the costs of the mediator and related costs equally.

Where the parties reach a settlement of the dispute or any part thereof, the mediator shall record such agreement and on signing thereof by the parties, the agreement shall be final and binding.

Save for reference to any portion of any settlement or decision which has been agreed to be final and binding on the parties, no reference shall be made by or on behalf of either party in any subsequent court proceedings, to any outcome of an amicable settlement by mutual consultation, or the fact that any particular evidence was given, or to any submission, statement or admission made in the course of amicable settlement by mutual consultation or mediation.

If the parties cannot reach an agreement, the Mediator must refer the matter to Arbitration.

Arbitration

An arbitrator will be appointed by mutual agreement as per the provisions of the Arbitration Act of 1965, as amended, nominated from the Association of Arbitrators (Southern Africa).

The Arbitrator must be a legal practitioner with more than 10 years of legal experience. Must have a good knowledge of the Municipal Finance Management Act and other relevant Municipal Legislation, and may, in addition, be qualified in respect of the main nature of the Contract (Engineer, Quantity Surveyor, Accountant, etc.).

The Arbitrator shall hear arguments both in writing and oral representations and parties shall have the right to contend the position of the other party and shall have the right to defend its own position.

The ruling of the Arbitrator shall be executed, but the matter may thereafter be defended in court if parties still do not agree.



9. MBD 4 – DECLARATION OF INTEREST

- No bid will be accepted from persons in the service of the state¹.
- Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority and/or take an oath declaring his/her interest.
- In order to give effect to the above, the following questionnaire must be completed and submitted with the bid:

3.1.	Full Name of bidder or his or her representative											
3.2.	Identity Number											
3.3.	Position occupied in the Company (director, shareholder ² etc.)											
3.4.	Company Registration Number											
3.5.	Tax Reference Number											
3.6.	VAT Registration Number											
3.7.	Are you presently in the service of the state?	YES		NO								
3.7.1.	If so, furnish particulars:											
3.8.	Have you been in the service of the state for the past twelve months?	YES		NO								
3.8.1.	If so, furnish particulars:											

¹ MSCM Regulations: "in the service of the state" means to be –

- a member of –
 - any municipal council;
 - any provincial legislature; or
 - the National Assembly or the National Council of Provinces;
- a member of the board of directors of any municipal entity;
- an official of any municipality or municipal entity;
- an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
- an executive member of the accounting authority of any national or provincial public entity; or
- an employee of Parliament or a provincial legislature.

² "Shareholder" means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.



3.9.	Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid?	YES		NO
3.9.1.	If so, furnish particulars:			
3.10.	Are you aware of any relationship (family, friend, other) between a bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid?	YES		NO
3.10.1.	If so, furnish particulars:			
3.11.	Are any of the company's directors, managers, principal shareholders or stakeholders in the service of the state?	YES		NO
3.11.1.	If so, furnish particulars:			
3.12.	Is any spouse, child or parent of the company's directors, managers, principal shareholders or stakeholders in the service of the state?	YES		NO
3.12.1.	If so, furnish particulars:			
3.13.	Do you or any of the directors, trustees, managers, principal shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract?	YES		NO
3.13.1.	If so, furnish particulars:			



3.14.	Please provide the following information on ALL directors/shareholders/trustees/members below:		
Full Name and Surname	Identity Number	Personal Income Tax Number	Provide State ³ Employee Number

NB:

- a) PLEASE ATTACH CERTIFIED COPY(IES) OF ID DOCUMENT(S)
 b) PLEASE PROVIDE PERSONAL INCOME TAX NUMBERS FOR ALL DIRECTORS / SHAREHOLDERS / TRUSTEES / MEMBERS, ETC.

4. DECLARATION

I, the undersigned (name) _____,
 certify that the information furnished in paragraph 3 above is correct.

I accept that the state may act against me should this declaration prove to be false.

SIGNATURE		DATE	
NAME OF SIGNATORY			
POSITION			
NAME OF COMPANY			

³ MSCM Regulations: "in the service of the state" means to be –

- a. a member of –
 - i. any municipal council;
 - ii. any provincial legislature; or
 - iii. the National Assembly or the National Council of Provinces;
- b. a member of the board of directors of any municipal entity;
- c. an official of any municipality or municipal entity;
- d. an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);
- e. an executive member of the accounting authority of any national or provincial public entity; or
- f. an employee of Parliament or a provincial legislature.



10. MBD5 – DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (VAT INCLUDED)

For all procurement expected to exceed R10 million (VAT included), bidders must complete the following questionnaire:

1. Are you by law required to prepare annual financial statements for auditing?	YES		NO	
1.1. If yes, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.				
2. Do you have any outstanding undisputed commitments for municipal services towards a municipality or any other service provider in respect of which payment is overdue for more than 30 days?	YES		NO	
2.1. If no, this serves to certify that the bidder has no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days.				
2.2. If yes, provide particulars.				
3. Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?	YES		NO	
3.1. If yes, furnish particulars				
4. Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic?	YES		NO	
4.1 If yes, furnish particulars				

CERTIFICATION

I, the undersigned (name) _____, certify that the information furnished on this declaration form is correct.

I accept that the state may act against me should this declaration prove to be false.

SIGNATURE		DATE	
NAME (PRINT)			
CAPACITY			
NAME OF FIRM			



11. MBD6.1 – PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022 – PURCHASES/SERVICES 90/10

NB:

Before completing this form, bidders must study the general conditions, definitions and directives applicable in respect of B-BBEE, as prescribed in the Preferential Procurement Regulations, 16 January 2023 and the Stellenbosch Preferential Procurement Policy 2026/2027

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution and any other applicable preference

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2

- a) The value of this bid is estimated to exceed R50 000 000 (all applicable taxes included) and therefore the 90/10 preference point system shall be applicable; or

1.3 Points for this bid shall be awarded for:

- (a) Price;
- (b) B-BBEE Status Level of Contributor. and
- (c) Locality of supplier

1.4 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	90
B-BBEE STATUS LEVEL OF CONTRIBUTOR	5
LOCALITY (See definitions)	5
Total points for Price, BBEE and Locality (must not exceed 100)	100

1.5 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.6 Failure on the part of a bidder to submit proof of Locality together with the bid, will be interpreted to mean that preference points for Locality are not claimed.

1.7 The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at



any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

2. DEFINITIONS

- (a) **“B-BBEE”** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;
- (b) **“B-BBEE status level of contributor”** means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
- (c) **“bid”** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of goods or services, through price quotations, advertised competitive bidding processes or proposals;
- (d) **“Broad-Based Black Economic Empowerment Act”** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- (e) **“EME”** means an Exempted Micro Enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;
- (f) **“functionality”** means the ability of a tenderer to provide goods or services in accordance with specifications as set out in the tender documents.
- (g) **“Locality”** means the local suppliers and/or service providers that business offices are within the Municipal area of Stellenbosch (WC024).
- (h) **“price”** includes all applicable taxes less all unconditional discounts;
- (i) **“proof of B-BBEE status level of contributor”** means:
 - 1) B-BBEE Status level certificate issued by an authorized body or person;
 - 2) A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;
 - 3) Any other requirement prescribed in terms of the B-BBEE Act;
- (j) **“QSE”** means a qualifying small business enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;
- (k) **“Specific goals”** means specific goals as contemplated in section 2(1)(d) of the Act which may include contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender and disability including the implementation of programmes of the Reconstruction and Development Programme as published in Government Gazette No. 16085 dated 23 November 1994;
- (l) **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;



3. FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES

4. POINTS AWARDED FOR PRICE

4.1 THE 90/10 PREFERENCE POINT SYSTEMS

A maximum of 90 points is allocated for price on the following basis:

90/10

$$Ps = 90 \left(1 - \frac{Pt - P_{min}}{P_{min}} \right)$$

Where

- Ps = Points scored for price of bid under consideration
 Pt = Price of bid under consideration
 Pmin = Price of lowest acceptable bid

4.2 FORMULAE FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME-GENERATING PROCUREMENT

4.3 POINTS AWARDED FOR PRICE

A maximum of 90 points is allocated for price on the following basis:

90/10

$$Ps = 90 \left(1 + \frac{Pt - P_{max}}{P_{max}} \right)$$

Where

- Ps = Points scored for price of bid under consideration
 Pt = Price of bid under consideration
 Pmax = Price of highest acceptable bid

5. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

5.1 In terms of Regulation 4 (2) and 5 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining a specific goal specified for the tender

5.2 The tendering conditions will stipulate the specific goals, as contemplated in section 2(1)(d)(ii) of the Preferential Procurement Act, be attained.

5.3 A maximum of 10 (90/10) preference points system), must be allocated for specific goals. These goals are :

(a) contracting with persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race, gender or disability;

(b) Promotion of enterprises located in the municipal area (WCO24)



- 5.4 Regarding par 5.3 (a) at least 50% of the 10 points must be allocated to promote this goal and points will be allocated in terms of the BBBEE scorecard as follows.

B-BBEE Level of Contributor	Status	Number of Points for 90/10 Preference Points System
1		10
2		9
3		8
4		5
5		4
6		3
7		2
8		1
Non-compliant contributor		0

- 5.5 A tenderer must submit proof of its BBBEE status level contributor.
- 5.6 A tenderer failing to submit proof of BBBEE status level of contributor –
- 5.6.1 may only score in terms of the 80/90-point formula for price; and
- 5.6.2 scores 0 points out of 10/5 BBBEE status level of contributor, which is in line with section 2 (1) (d) (i) of the Act, where the supplier or service provider did not provide proof thereof.
- 5.7 Regarding par 5.3 (b) a maximum of 50% of the 20/10 points must be allocated to promote this goal. Maximum points will be allocated as follows.

Locality of supplier	Number of Points for 90/10 Preference Points System
Within the boundaries of the municipality	5
Outside of the boundaries of the municipality	0



6. BID DECLARATION

6.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution and/or Locality must complete the following:

7. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

7.1 B-BBEE Status Level of Contributor: . = (maximum of 5)

(Points claimed in respect of paragraph 7.1 must be substantiated by relevant proof of B-BBEE status level of contributor.)

7.2 Within the boundaries of Stellenbosch Municipality (WC024)?

YES	☐	NO	☐
-----	--------------------------	----	--------------------------

Business Address -

(Points claimed in respect of paragraph 7.2 must be substantiated by relevant proof that the business premises is situated in the Municipal area of Stellenbosch (WC024). A valid municipal account or proof of valid lease agreement, or sworn affidavit must be attached)

8. SUB-CONTRACTING

8.1 Will any portion of the contract be sub-contracted?

(**Tick applicable box**)

YES	☐	NO	☐
-----	--------------------------	----	--------------------------

8.1.1 If yes, indicate:

- i) What percentage of the contract will be subcontracted.....%
- ii) The name of the sub-contractor.....
- iii) The B-BBEE status level of the sub-contractor.....
- iv) Whether the sub-contractor is an EME or QSE

(**Tick applicable box**)

YES	☐	NO	☐
-----	--------------------------	----	--------------------------

v) Specify, by ticking the appropriate box, if subcontracting with an enterprise

Designated Group: An EME or QSE which is at last 51% owned by:	EME √	QSE √
Black people		
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		



Black people who are military veterans		
OR		
Any EME		
Any QSE		

9. DECLARATION WITH REGARD TO COMPANY/FIRM

9.1 Name of company/firm:.....

9.2 VAT registration number:.....

9.3 Company registration number:.....

9.4 TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
 - ☐ One person business/sole propriety
 - ☐ Close corporation
 - ☐ Company
 - ☐ (Pty) Limited
- [TICK APPLICABLE BOX]

9.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....

.....

.....

9.6 COMPANY CLASSIFICATION

- ☐ Manufacturer
 - ☐ Supplier
 - ☐ Professional service provider
 - ☐ Other service providers, e.g. transporter, etc.
- [TICK APPLICABLE BOX]

9.7 MUNICIPAL INFORMATION

Municipality where business is situated:

Registered Account Number:

Stand Number:.....

9.8 Total number of years the company/firm has been in business:.....

9.9 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we acknowledge that:

- i) The information furnished is true and correct;
- ii) The preference points claimed are in accordance with the General Conditions as



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indicated in paragraph 1 of this form;

- iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- iv) If the B-BBEE status level of contributor/Locality points has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –
 - (a) disqualify the person from the bidding process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
 - (e) forward the matter for criminal prosecution.

SIGNATURE OF BIDDER(S):			
WITNESS 1:		WITNESS 2:	
DATE:			
ADDRESS:			



PLEASE COMPLETE IN FULL YOUR OWN AFFIDAVIT TO CLAIM POINTS

SWORN AFFIDAVIT – B-BBEE EXEMPTED MICRO ENTERPRISE – GENERAL (DRAFT EXAMPLE)
(DO NOT USE. USE NEW/APPLICABLE TEMPLATE)

I, the undersigned,

Full name & Surname	
Identity number	

Hereby declare under oath as follows:

1. The contents of this statement are to the best of my knowledge a true reflection of the facts.
2. I am a Member / Director / Owner (**Select one**) of the following enterprise and am duly authorised to act on its behalf: **NB!**

Enterprise Name:	
Trading Name (If Applicable):	
Registration Number:	
Vat Number (If applicable)	
Enterprise Physical Address:	
Type of Entity (CC, (Pty) Ltd, Sole Prop etc.):	
Nature of Business:	
Definition of "Black People"	As per the Broad-Based Black Economic Empowerment Act 53 of 2003 as Amended by Act No 46 of 2013 "Black People" is a generic term which means Africans, Coloureds and Indians – (a) who are citizens of the Republic of South Africa by birth or descent; or (b) who became citizens of the Republic of South Africa by naturalisation- i. before 27 April 1994; or ii. on or after 27 April 1994 and who would have been entitled to acquire citizenship by naturalization prior to that date;"



Definition of “Black Designated Groups”	“Black Designated Groups means: (a) unemployed black people not attending and not required by law to attend an educational institution and not awaiting admission to an educational institution; (b) Black people who are youth as defined in the National Youth Commission Act of 1996; (c) Black people who are persons with disabilities as defined in the Code of Good Practice on employment of people with disabilities issued under the Employment Equity Act; (d) Black people living in rural and under developed areas; (e) Black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011;”
--	---



3. I hereby declare under Oath that:

- The Enterprise is _____ % Black Owned using the flow-through principle as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____ % Black Female Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- The Enterprise is _____ % Black Designated Group Owned as per Amended Code Series 100 of the Amended Codes of Good Practice issued under section 9 (1) of B-BBEE Act No 53 of 2003 as Amended by Act No 46 of 2013,
- Black Designated Group Owned % Breakdown as per the definition stated above:
 - Black Youth % = _____ %
 - Black Disabled % = _____ %
 - Black Unemployed % = _____ %
 - Black People living in Rural areas % = _____ %
 - Black Military Veterans % = _____ %
- Based on the Audited Financial Statements/Financial Statements and other information available on the latest financial year-end of _____ (DD/MM/YYYY), the annual Total Revenue was R10,000,000.00 (Ten Million Rands) or less
- Please Confirm on the below table the B-BBEE Level Contributor, **by ticking the applicable box.**

NB!

100% Black Owned	Level One (135% B-BBEE procurement recognition level)	
At least 51% Black Owned	Level Two (125% B-BBEE procurement recognition level)	
Less than 51% Black Owned	Level Four (100% B-BBEE procurement recognition level)	

4. I know and understand the contents of this affidavit and I have no objection to take the prescribed oath and consider the oath binding on my conscience and on the Owners of the Enterprise which I represent in this matter.
5. The sworn affidavit will be valid for a period of 12 months from the date signed by commissioner.

Deponent Signature: _____

Date : _____

NB! ORIGINALLY CERTIFIED/ NOT COPY

Commissioner of Oaths
Signature & stamp
Date:



EXAMPLE OF POINT SCORING AND ALLOCATION OF PREFERENCE POINTS (80/20) WHERE LOCALITY AS A GOAL IS INCLUDED. STELLENBOSCH PREFERENTIAL PROCUREMENT POLICY.

BIDDER	PRICE	BBBEE LEVEL (VALID)	BUSINESS PREMISES (IN WC024)
TENDERER A	R 80 000	1	NO
TENDERER B	R 75 000	1	YES
TENDERER C	R 70 000	2	NO

BIDDER	PRICE POINTS (Out of 80)	BBBEE POINTS (Out of 10)	LOCALITY POINTS (Out of 10)	TOTAL POINTS (Out of 100)
TENDERER A	68.57	10	0	78.57
TENDERER B	74.29	10	10	94.29
TENDERER C	80	9	0	89



12. MBD 8 – DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

1. This Municipal Bidding Document must form part of all bids invited.
2. It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
3. The bid of any bidder may be rejected if that bidder, or any of its directors have:
 - 3.1. abused the municipality's / municipal entity's supply chain management system or committed any improper conduct in relation to such system;
 - 3.2. been convicted for fraud or corruption during the past five years;
 - 3.3. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
 - 3.4. been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).
4. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

4.1	Is the bidder or any of its directors listed on the National Treasury's database as a company or person prohibited from doing business with the public sector? <i>(Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the audi alteram partem rule was applied).</i>	Yes	No
4.1.1	If so, furnish particulars:		
4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? <i>(To access this Register enter the National Treasury's website, www.treasury.gov.za, click on the icon "Register for Tender Defaulters" or submit your written request for a hard copy of the Register to facsimile number (012) 3265445).</i>	Yes	No
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes	No



4.3.1	If so, furnish particulars:		
4.4	Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes	No
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes	No
4.5.1	If so, furnish particulars:		

5. CERTIFICATION

I, the undersigned (full name), _____, certify that the information furnished on this declaration form true and correct.

I accept that, in addition to cancellation of a contract, action may be taken against me should this declaration prove to be false.

SIGNATURE:		NAME (PRINT):	
CAPACITY:		DATE:	
NAME OF FIRM:			



13. MBD 9 – CERTIFICATE OF INDEPENDENT BID DETERMINATION

1. This Municipal Bidding Document (MBD) must form part of all bids invited.
2. Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).⁴ Collusive bidding is a *per se* prohibition meaning that it cannot be justified under any grounds.
3. Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
 - 3.1. take all reasonable steps to prevent such abuse;
 - 3.2. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - 3.3. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.
4. This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.
5. In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid:

CERTIFICATE OF INDEPENDENT BID DETERMINATION:

In response to the invitation for the bid made by:

STELLENBOSCH MUNICIPALITY

I, the undersigned, in submitting the accompanying bid, hereby make the following statements that I certify to be true and complete in every respect:

1. I have read and I understand the contents of this Certificate;
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:

⁴ Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.



- 5.1. has been requested to submit a bid in response to this bid invitation;
 - 5.2. could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - 5.3. provides the same goods and services as the bidder and/or is in the same line of business as the bidder
6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium⁵ will not be construed as collusive bidding.
 7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - 7.1. prices;
 - 7.2. geographical area where product or service will be rendered (market allocation)
 - 7.3. methods, factors or formulas used to calculate prices;
 - 7.4. the intention or decision to submit or not to submit, a bid;
 - 7.5. the submission of a bid which does not meet the specifications and conditions of the bid; or
 - 7.6. bidding with the intention not to win the bid.
 8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.
 9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
 10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No. 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No. 12 of 2004 or any other applicable legislation.

SIGNATURE:		NAME (PRINT):	
CAPACITY:		DATE:	
NAME OF FIRM:			

⁵ Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.



14. MBD 10 – CERTIFICATE FOR PAYMENT OF MUNICIPAL SERVICES

DECLARATION IN TERMS OF CLAUSE 112(1) OF THE MUNICIPAL FINANCE MANAGEMENT ACT (NO.56 OF 2003)

I, _____, _____ (full name and ID no.), hereby acknowledge that according to SCM Regulation 38(1)(d)(i), the Municipality may reject the tender of the tenderer if any municipal rates and taxes or municipal service charges owed by the Tenderer or any of its directors/members/partners to the Stellenbosch Municipality, or to any other municipality or municipal entity, are in arrears for more than 3 (three) months.

I declare that I am duly authorised to act on behalf of _____ (name of the firm) and hereby declare, that to the best of my personal knowledge, neither the firm nor any director/member/partner of said firm is in arrears on any of its municipal accounts with any municipality in the Republic of South Africa, for a period longer than 3 (three) months.

I further hereby certify that the information set out in this schedule and/or attachment(s) hereto is true and correct. The Tenderer acknowledges that failure to properly and truthfully complete this schedule may result in the tender being disqualified, and/or in the event that the tenderer is successful, the cancellation of the contract.

PHYSICAL BUSINESS ADDRESS(ES) OF THE TENDERER	MUNICIPAL ACCOUNT NUMBER

FURTHER DETAILS OF THE BIDDER'S Director / Shareholder / Partners, etc.:

Director / Shareholder / partner	Physical address of the Business	Municipal Account number(s)	Physical residential address of the Director / shareholder / partner	Municipal Account number(s)

NB: Please attach certified copy (ies) of ID document(s) and Municipal Accounts If the entity or any of its Directors/Shareholders/Partners, etc. rents/leases premises, a copy of the rental/lease agreement or sworn affidavit must be submitted with this tender.

- PLEASE SUBMIT MUNICIPAL ACCOUNTS FOR THE FOLLOWING TWO MONTHS AFTER BID CLOSURE TO THE RELEVANT SCM PRACTITIONER, SHOULD THE BID NOT BE AWARDED YET.

Signature	Position	Date



15. COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 1993 (ACT 130 OF 1993)

COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 1993 (ACT 130 OF 1993)

Stellenbosch Municipality has legal duty in terms of Section 89 of the said Act to ensure that all contractors with whom agreements are entered into for the execution of work are registered as employers in accordance with the provisions of this Act and that all the necessary assessments have been paid by the contractor.

In order to enter into this agreement, the following information is needed regarding the above-mentioned:

Contractor's registration number with the office of the
Compensation Commissioner:

NOTE:

A copy of the latest receipt together with a copy of the relevant assessment OR a copy of a valid Letter of Good Standing must be handed in, in this regard.

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



16. FORM OF INDEMNITY

INDEMNITY

Given by (Name of Company) _____
of (registered address of Company) _____
a company incorporated with limited liability according to the Company Laws of the Republic of South Africa (hereinafter called the Contractor), represented herein by (Name of Representative) _____
_____ in his capacity as (Designation) _____
of the Contractor, is duly authorised hereto by a resolution dated _____ /20____,
to sign on behalf of the Contractor.

WHEREAS the Contractor has entered into a Contract dated _____ / 20____,
with the Municipality who require this indemnity from the Contractor.

NOW THEREFORE THIS DEED WITNESSES that the Contractor does hereby indemnify and hold harmless the Municipality in respect of all loss or damage that may be incurred or sustained by the Municipality by reason of or in any way arising out of or caused by operations that may be carried out by the Contractor in connection with the aforementioned contract; and also in respect of all claims that may be made against the Municipality in consequence of such operations, by reason of or in any way arising out of any accidents or damage to life or property or any other cause whatsoever; and also in respect of all legal or other expenses that may be incurred by the Municipality in examining, resisting or settling any such claims; for the due performance of which the Contractor binds itself according to law.

SIGNATURE OF CONTRACTOR:	
DATE:	
SIGNATURE OF WITNESS 1:	
DATE:	
SIGNATURE OF WITNESS 2:	
DATE:	



STELLENBOSCH
STELLENBOSCH • PNIEL • FRANSCHHOEK
MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

PART B – SPECIFICATIONS AND PRICING SCHEDULE



17. SPECIFICATIONS

1. INTRODUCTION

Stellenbosch Municipality invites proposals from experienced private property developers to partner in delivering a fully integrated GAP housing development on Erf 7001, Cloetesville. This initiative addresses the need for affordable, dignified housing options for households in the non-subsidised market segment, specifically targeting income earners in the middle- to upper-GAP housing bracket.

All statutory development rights, including rezoning, subdivision, environmental authorisation (EIA), and traffic impact assessment (TIA), have been secured by the Municipality. The selected (successful) bidder will operate under a Land Availability Agreement (LAA), granting development rights over municipal land for the duration of the project. The land will not be transferred in bulk; rather, unit-level transfers will be executed upon sale to qualifying buyers.

ANNEXURES

- **ANNEXURE A:** MPT DECISION
- **ANNEXURE B:** APPROVED SUBDIVISION LAYOUT
- **ANNEXURE C:** CONCEPT DESIGNS
- **ANNEXURE D:** FFE SPECIFICATION
- **ANNEXURE E:** DRAFT LAND AVAILABILITY AGREEMENT (LAA)
- **ANNEXURE F:** SPECIALIST STUDIES

2. PROPERTY DESCRIPTION

ERF 7001, CLOETESVILLE

• Extent:	6.6341ha
• Registered Owner:	Stellenbosch Municipality
• Local Authority:	Stellenbosch Municipality
• Servitudes:	None
• Current Zoning:	Subdivisional Area Overlay Zone
• Current Land Use:	Vacant, Water Reservoir, and a telecommunication tower
• Title Deed:	T56720/1987
• Title Deed Restrictions:	None
• SG Number:	3122/87
• Applicable Zoning Scheme:	Stellenbosch Municipality Zoning Scheme By-Law 2019 (Amended 2023)

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



3. BACKGROUND

In accordance with housing needs, Stellenbosch Municipality has identified a portion of land, Erf 7001 in Cloeteville, for residential development. Ownership of the property currently vests with Stellenbosch Municipality. "Erf 7001, referred to as "Soek-mekaar" ... is characterised by numerous trees and is located immediately adjacent to a man-made water retention structure. Furthermore, it is situated a stone's throw away from Welgevonden Estate (gated community)."

The Municipality has a waiting list of over 18,200 people in need of housing, and any development proposal must align with this identified need. The main goal of this Technical Proposal is to deliver medium to upper (GAP) housing units. There is a pressing need to develop the Property to create an integrated urban area (Cloeteville), offering housing options along with suitable economic and social amenities. The town planning and design principles aim to incorporate aspects of integration, community safety, accessibility, and creating dignified spaces.

4. DETAILS OF SITE AND LOCATION

Erf 7001 is located in Ward 17 in Cloeteville, Stellenbosch. The ward is mainly residential and includes parts of Cloeteville, Welgevonden, Green Oaks, Stellita Park, Weltevrede, and the Municipal Flats in Rhode, Kloof, and Long Streets. It is bordered by the R44 Klapmuts Road, Lakey, and Long streets. The site is situated west of the R44 and is close to a primary school and a local sports ground. Erf 7001 is characterised by many trees.

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	

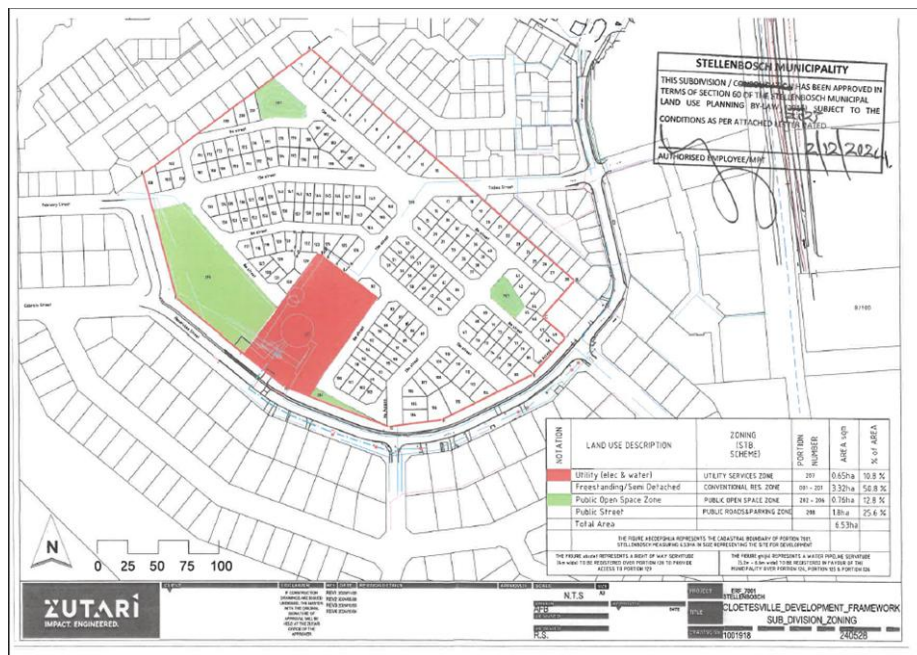


Figure 1: Subdivision layout plan

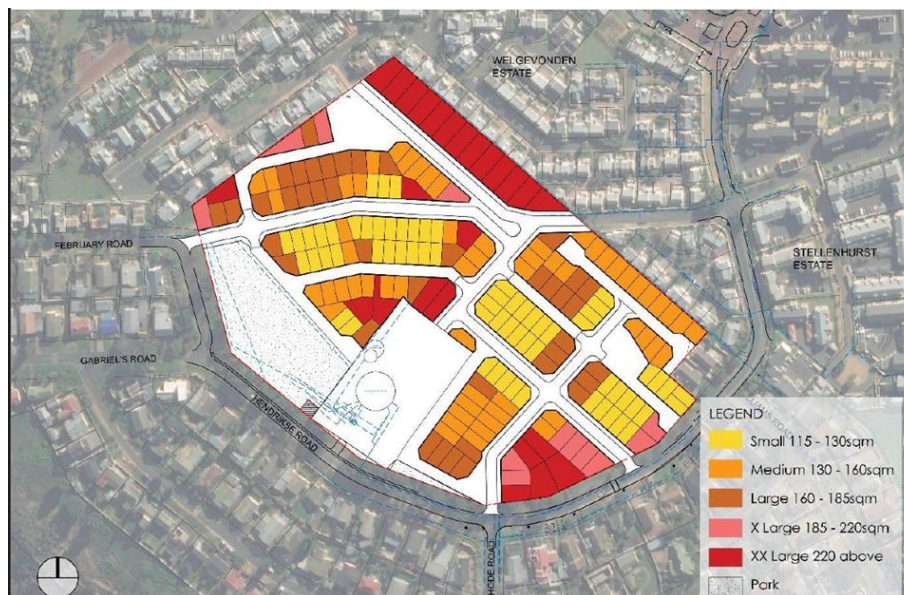


Figure 2: Site Development Plan with a range of erf sizes

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



5. DEVELOPMENT OBJECTIVES

The Municipality's goals for this project are:

- To promote inclusive, dignified, and well-located residential development for middle and upper-GAP market segments.
- To provide quality housing typologies that are architecturally attractive, sustainable, and affordable within designated price bands.
- To enhance economic mobility and spatial integration by placing GAP housing in a well-served, accessible urban area.
- To leverage private sector innovation, design, and finance to deliver publicly supported outcomes.
- To deliver a self-contained development with appropriate open spaces, parking, roads, and pedestrian access.

This development must also be guided by the following principles:

- Sensitivity to the cultural and social heritage of the area
- The underlying idea is to achieve affordable housing, which will serve the most economically vulnerable citizens.

6. REZONING AND SUBDIVISION RIGHTS

- The development must conform precisely to the subdivisional and zoning plan approved by the Municipal Planning Tribunal, **ANNEXURE A** (Drawing No. 1001918, dated 04/10/2024). The proposal must provide for the creation of 208 titled erven, comprising:
- 201 Residential Erven: Conventional Residential Zone erven, ranging in size from approximately 115m² to 312m².
- Public Open Space Erven: Zoned Public Open Space Zone, to be developed and managed as public recreational areas (Erven 202-206).
- 1 Utility Services Erf: Zoned for municipal services infrastructure (Erf 207).
- 1 Public Road and Parking Erf: To be developed as public thoroughfares and parking areas, including all internal roads, sidewalks, and stormwater management systems (Erf 208).

Furthermore, the proposal must incorporate the following mandatory legal and infrastructural requirements, according to the MPT decision:

- The registration of a 4m wide right of way servitude and a separate services servitude (5.2m and 6.6m wide) in favour of the municipality.
- Adherence to the approved permanent departures for building lines for the residential erven.
- Full compliance with all engineering conditions stipulated by the Directorate: Infrastructure

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



Services regarding water, sewer, roads, and non-motorised transport (NMT) upgrades.

7. HOUSING PRODUCT MIX & PRICING STRUCTURE

Concept designs for the five (5) residential typologies have been prepared and are attached as **ANNEXURE C** to this tender document.

The bidder should price the residential units according to the five typologies below. The price of each typology must fall within the specified price range.

- The smallest units (typology 1) should be priced between R 720,000 and R 750,000
- The medium units (typology 2) should be priced between R 780,000 and R 800,000
- The large units (typology 3) should be priced between R 950,000.00 and R 1,000,000
- The extra-large (typology 4) should be priced between R 1,020,000 and R 1,050,000
- The two extra-large (typology 5) should be priced between R 1,150,000 and R 1,200,000

Should a bidder wish to propose pricing that differs from the pricing structure above, the alternative pricing must be submitted in a separate third envelope.

The third envelope must include all the information and requirements specified for envelope 2, together with a clear, detailed justification for the proposed pricing deviation.

When considering alternative pricing, the Municipality will follow the process set out in Clause 5 of Part C of this tender document.

The bidder must include a provisional land cost in the selling price of each unit, as follows:

- Typology 1: a provisional land cost of R11,000.
- Typology 2: a provisional land cost of R61,000.
- Typology 3: a provisional land cost of R95,000.
- Typology 4: a provisional land cost of R143,000.
- Typology 5: a provisional land cost of R157,000.

NOTE: The developer must add the applicable provisional land cost to the selling price of each unit. This land cost (plot cost) will be payable by the developer to Stellenbosch Municipality upon the sale of the units.

The plot costs are based on property valuation and are subject to Council approval (*i.e., acceptance or discounting of plot cost by Council*).

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



The developer will be required to prepare and submit a Site Development Plan (SDP) to the Municipality's Land Use Management Department for approval. The developer must appoint a registered Land Surveyor as part of the professional team, responsible for land surveying and pegging, and for the registration of the SDP with the Surveyor-General.

8. MUNICIPAL SUPPORT AND DEVELOPMENT

Municipal Contribution

The Municipality will fund all link and external bulk services required to connect the site to surrounding infrastructure networks (roads, water, sewer) if budgeted for in the MTRF period. The funding for link and bulk services will be based on the subsidy quantum for municipal engineering services.

A formal Land Availability Agreement (LAA) will be entered into with the successful bidder, providing development rights, timeframes, conditions for transfer of completed units, and dispute resolution mechanisms.

The bidder should take note that the Department of Energy does not provide any subsidies for electricity for GAP housing.

Developer Contribution

Finance, design, and construct all top structures, including foundations, walls, roofs, finishes, electrical and plumbing services; Install all internal civil infrastructure and reticulation, including roads, stormwater, potable water, sewer, street lighting, and landscaping within the site boundaries; Obtain all statutory approvals required for building plan submission and construction commencement (in accordance with SANS 10400, NHBRC enrolment, and National Building Regulations); Implement a sales and marketing strategy in conjunction and approval by the Municipality, including buyer qualification, contract facilitation, and conveyancing for individual transfers; Provide project oversight and reporting to the Municipality, including progress milestones, compliance audits, and risk mitigation actions.

NOTE: The developer is expected to apply for all available funding and grants applicable to bulk, link, and internal reticulation infrastructure, including but not limited to the Integrated Urban Development Grant (IUDG).

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



9. LAND TENURE AND SALES

- Land will remain in municipal ownership throughout development.
- Individual units will be transferred directly from the Municipality to the end-user upon sale, based on LAA conditions.
- No bulk land sales or long-term leases will be permitted.
- The developer shall facilitate and manage all sales processes but may not transfer land to third parties without prior approval.

10. BULK AND INFRASTRUCTURE AVAILABILITY FOR ERF 7001

The Municipality has approved the rezoning and subdivision of Erf 7001 for 204 residential erven, subject to compliance with infrastructure requirements outlined in the Infrastructure Services Directorate's approval memo (Ref: Civil LU 2644; TP 591/2023). Key bulk and internal infrastructure upgrades, as well as developer responsibilities, are summarized below:

Water Services

- a) Pump upgrades from Idas Valley Reservoir to Uniepark Reservoir (feeding Cloeteville Reservoir):
- The developer should provide a cost estimate for this and include it as a line item in the pricing, which should form part of the offer. The cost estimate must include professional fees, contingencies, and escalation. This requirement does not imply that the developer will be awarded this work upon appointment; the work may be undertaken internally by the Municipality.

Sewer Services

- a) Bulk sewer line from Kayamandi to Merriman Street:
- The developer should provide a cost estimate for this and include it as a line item in the pricing, which should form part of the offer. The cost estimate must include professional fees, contingencies, and escalation. This requirement does not imply that the developer will be awarded this work upon appointment; the work may be undertaken internally by the Municipality.

Roads & Non-Motorised Transport (NMT)

The developer should provide a cost estimate for this and include it as a line item in the pricing, which should form part of the offer.

- a) Hendrickse Rd / Tolbos Rd and Lang St / Gabriel Rd intersections:
- To be converted to STOP or Priority Control on the minor approaches.
- b) Sidewalk expansion along Hendrickse Rd and Gabriels Rd to Lang Street (public transport route):

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



- The developer should provide a cost estimate for this and include it as a line item in the pricing, which should form part of the offer.
- c) Traffic calming measures (6 speedhumps and 4 raised intersections) along February Rd, Gabriels Rd, Tolbos Rd, and Lang Rd:
 - The developer should provide a cost estimate for this and include it as a line item in the pricing, which should form part of the offer.
- d) Public transport drop-off points (February Rd and Hendrickse Rd – final positions confirmed at detail design stage):
 - The developer should provide a cost estimate for this and include it as a line item in the pricing, which should form part of the offer.

Compliance with all conditions from the Provincial Roads Engineer remains mandatory.

Stormwater Management

The developer must construct two on-site stormwater detention ponds with inlet/outlet structures, erosion protection, and connections to the existing network to mitigate increased runoff from the development.

Developer Obligations: The appointed developer is responsible for fully servicing each erf (water, sewer, stormwater, and road access) and submitting detailed engineering drawings for municipal approval prior to construction.

Upon completion, as-built drawings signed by a professionally registered engineer must be provided. All works must adhere to Stellenbosch Municipality's Design Guidelines and Minimum Standards for Civil Engineering Services.

Infrastructure upgrades must be completed before the transfer of any property or approval of building plans, whichever occurs first. The Municipality will maintain internal services post-development.

PRINT NAME:			
CAPACITY:		Name of firm	
SIGNATURE:		DATE:	



18. PRE-QUALIFICATION

This is a pre-qualification process. Proposals will be evaluated based on compliance with the following requirements:

The pre-qualification criterion is subdivided into seven (7) criteria: 1) Developer's Introduction; 2) Developer's Experience; 3) Contractor's Experience; 4) Experience of Key Personnel; 5) Methodology and Programme; 6) Funding Record; and 7) Pricing Structure.

1. CRITERION 1: DEVELOPER'S INTRODUCTION

The bidder must provide a brief history of the bidder. The introduction must include its history, composition, and experience in housing development (not a company brochure). The bidder introduction must include the names and brief CVs of directors, and the lead director who has been proposed as contracts manager for this development.

2. CRITERION 2: DEVELOPER'S EXPERIENCE

Schedule of three (3) relevant property development projects previously undertaken by the bidder in the past 10 years, with a value equal to R50 million or greater, of the properties with indication of any mixed-use components.

3. CRITERION 3: DEVELOPER'S CONTRACTOR'S EXPERIENCE

- The contractor should demonstrate their experience in the GAP housing market and residential construction projects. These projects, a minimum of three (3), with a value equal to R50 million or greater, undertaken in the past 10 years, can range from free-standing dwelling houses to cluster homes and multi-storey apartments.
- A formal commitment and undertaking letter must be provided by the contractor who will execute the project, in cases where the contractor is not an internal resource of the bidder.
- Completion for projects provided & NHBRC certificates to be attached. A contractor without an NHBRC certificate will be considered non-responsive, and the developer will be disqualified.
- The contractor is required to submit client-issued letters of recommendation for completed projects that demonstrate relevant experience in the specified scope of work. Each letter must include the name and contact details of a verifiable client reference.

4. CRITERION 4: DEVELOPER'S KEY PERSONNEL EXPERIENCE

- The professional team should demonstrate experience in areas related to the development of residential property with a focus on the core areas of planning, conceptual, preliminary, and detailed design, and supervision of property development projects.
- The professional team must have at least the following disciplines as part of their portfolio, based on the scope of work completed in the projects:
 - Registered Professional Project Manager must have 8 or more years of post-qualification experience. Provide a certified copy of qualifications (BSc/BEng/BTech) in the Built Environment, and a certified copy of proof of professional registration with SACPCMP as a Professional Construction Project Manager (PrCPM), or with PMI as a Project Management Professional (PMP)
 - Registered Professional Architect or Senior Architectural Technologist must have 5 or more years of post-qualification experience. Provide a certified copy of qualifications (BSc/BTech) in Architecture, and a certified copy of proof of professional registration with the SACAP
 - Registered Professional Civil Engineer must have 5 or more years of post-qualification experience. Provide a certified copy of qualifications (BSc/BEng/BTech) in Civil Engineering, and certified proof of professional registration with ECSA
 - Registered Professional Structural Engineer must have 5 or more years of post-qualification experience. Provide a certified copy of qualifications (BSc/Beng/BTech) in Structural Engineering, and a certified copy of proof of professional registration with ECSA
 - Registered Professional Electrical Engineer must have 5 or more years of post-qualification experience. Provide a certified copy of qualifications (BSc/BEng/BTech) in



- Electrical Engineering, and a certified copy of proof of professional registration with ECSA
- Registered Professional Quantity Surveyor must have 5 or more years of post-qualification experience. Provide a certified copy of qualifications (BSc/BTech) in Quantity Surveying, and a certified copy of proof of professional registration with SACQSP
- Construction Health and Safety Agent must have 5 or more years of post-qualification experience. Provide a certified copy of qualifications (BSc/BTech) in Construction Health and Safety Management, and a certified copy of proof of professional registration with SACPCMP
- Registered Professional Land Surveyor must have 5 or more years of post-qualification experience. Provide a certified copy of qualifications (BSc/BTech) in Geomatics/Land Surveying, and a certified copy of proof of professional registration with the South African Geomatics Council (SAGC)
- Each professional team should also indicate the previous projects, a minimum of three (3), undertaken in the past 10 years with a value equal to R50 million or greater, inclusive of VAT, for each project.
- Each professional must provide a CV with details of relevant experience and qualifications, including the projects chosen.
- The proof of qualification and registration to be certified must not be older than 3 months.
- A formal commitment and undertaking letter must be provided by each member of the proposed professional team who will participate in the project, in instances where such team members are not permanent or internal resources of the bidder. The letter should confirm the individual's availability, willingness, and ability to contribute to the project in accordance with the proposed scope, timeline, and professional responsibilities.
- No associate proof of registration will be accepted. Should associate proof of registration be submitted as proof of professional registration, the bid will be considered non-responsive.

5. CRITERION 5: METHODOLOGY & PROGRAMME

- The bidder must submit a development methodology and programme that clearly defines dates based on sourcing of funding, design development process, building plans submission process, construction programme, selling of units to beneficiaries, and any other activities.
- The programme must align with the project delivery timeframes of the Stellenbosch Municipality Housing Pipeline 2026/27 to 2028/29.
- The methodology should describe the development funding plan (narrative).

6. CRITERION 6: FUNDING RECORD

The bidder must demonstrate the financial capacity to fund the development through a viable combination of balance sheet strength, debt funding, and equity investment. The bidder must also provide evidence of the ability to financially sustain a development of this scale and nature throughout its lifecycle.

7. CRITERION 7: PRICING STRUCTURE

The developer must provide a detailed pricing breakdown for each of the five (5) residential typologies, including the selling price per unit, the cost of land per unit, and the cost of optional features per unit.

The offer to the Municipality must be the total amount for providing A-Grade services to the Erf, in accordance with the First Home Finance subsidy, payable to the Municipality upon the sale of the units.

If the cost of providing the services is higher than the amount allowed for in the subsidy, the Municipality will contribute up to the approved subsidy amount, as determined by the Provincial Department of Infrastructure (PDol). The bidder will be responsible for recovering any additional costs through the sale of the unit.

A-Grade municipal services refer to the highest standard of permanent internal services provided through government housing programmes. This includes sanitation, individual water connections to each property, properly lined stormwater systems and paved roads.

NOTE: A failure to provide any of the required information will result in the bid being non-responsive.



Pre-qualification Criteria	Sub-criteria	Compliance (Yes/No)
SECTION 1: ORGANISATION VIABILITY		
1. Bidders' introduction	1.1. Introduction to bidder, maximum of 350 words. 1.2. Brief CV for each director.	
2. Bidder's Experience	2.1. Experience of the bidder in executing work of similar property development work. 2.2. NHBRC registration certificate is provided.	
3. Contractor's Experience	3.1. Experience of the Contractor within the bidding entity is expected to have an active NHBRC registration at the time of tender closing. 3.2. Contractor to demonstrate experience in various residential construction projects ranging from standalone dwelling units to medium-density cluster units and high-rise apartment typologies. 3.3. Completion certificates provided for projects. 3.4. Recommendation letter from clients with verifiable reference.	
4. Experience of Key Resources in executing work of a similar nature, CV, and proof of registration and qualifications	4.1. Professional Project Manager. 4.2. Professional Architect or Senior Architectural Technologist. 4.3. Professional Structural and Civil Engineer. 4.4. Professional Quantity Surveyor. 4.5. Professional Health & Safety Agent. 4.6. Professional Electrical Engineer. 4.7. Professional Land Surveyor.	
5. Commitment letters	5.1. Commitment letters confirming the contractor's willingness and capacity to perform the specified scope of work. 5.2. A formal commitment and undertaking letter must be provided by each member	



	of the proposed professional team who will participate in the project.	
SECTION 2: TECHNICAL VIABILITY		
1. Development Approach including programme	1.1. Narrative description of development funding plan. 1.2. Methodology outlining the proposed approach to undertake the development. 1.3. Marketing Strategy	

SIGNATURE (Bidder)		FOR OFFICE USE ONLY:	
CAPACITY		Evaluated by	
NAME OF FIRM		Signature:	
NAME (PRINT)		Designation:	
DATE		Date:	



19. SCHEDULE OF PLANT AND EQUIPMENT

The following are lists of major items of relevant equipment that I/we **presently** own or lease and will have available for this contract or will acquire or hire for this contract if my/our tender is accepted.

DETAILS OF MAJOR EQUIPMENT THAT IS OWNED BY AND IMMEDIATELY AVAILABLE FOR THIS CONTRACT.			
QUANTITY	DESCRIPTION	SIZE	CAPACITY

Attach additional pages if more space is required.

DETAIL OF MAJOR EQUIPMENT THAT WILL BE HIRED, OR ACQUIRED FOR THIS CONTRACT IF MY / OUR TENDER IS ACCEPTED.			
QUANTITY	DESCRIPTION,	SIZE	CAPACITY

Attach additional pages if more space is required.

Number of sheets appended by the tenderer to this schedule (<i>If nil, enter NIL</i>)			
SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



20. SCHEDULE OF SUBCONTRACTORS

I/we, the tenderer, notify the Stellenbosch Municipality that it is our intention to employ the following Subcontractors for work in this contract.

SUBCONTRACTORS				
Category / Type	Subcontractor Name; Address; Contact Person; Tel. No.		Items of work (pay items) to be undertaken by the Subcontractor	Estimated cost of Work (Rand)
1.	Name of firm			
	Contact person			
	Tel No			
	Address			
2.	Name of firm			
	Contact person			
	Tel No			
	Address			
3.	Name of firm			
	Contact person			
	Tel No			
	Address			
4.	Name of firm			
	Contact person			
	Tel No			
	Address			
5.	Name of firm			
	Contact person			
	Tel No			
	Address			
Number of sheets appended by the tenderer to this schedule (<i>If nil, enter NIL</i>)				

Acceptance of this tender shall not be construed as approval of all or any of the listed subcontractors. Should any of the subcontractors not be approved subsequent to acceptance of the tender, this shall in no way invalidate this tender, and the tendered unit rates for the various items of work shall remain final and binding, even in the event of a subcontractor not listed above being approved by the Engineer.

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



21. SCHEDULE OF WORK EXPERIENCE OF THE TENDERER – CURRENT CONTRACTS

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Company				
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
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Company				From
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Contact Person				To
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Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				

Attach additional pages if more space is required.

Number of sheets appended by the tenderer to this schedule (If nil, enter NIL)			
SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



22. SCHEDULE OF WORK EXPERIENCE OF THE TENDERER – COMPLETED CONTRACTS

The following is a statement of similar work successfully executed by myself/ourselves:

EMPLOYER (Name, Tel, Fax, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				

Attach additional pages if more space is required.

Number of sheets appended by the tenderer to this schedule (If nil, enter NIL)	
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SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



23. DECLARATION BY TENDERER

I / We acknowledge that I/we am/are fully acquainted with the contents of the conditions of tender of this tender document and that I/we accept the conditions in all respects.

I / We agree that the laws of the Republic of South Africa shall be applicable to the contract resulting from the acceptance of *my / our tender and that I/we elect *domicillium citandi et executandi* (physical address at which legal proceedings may be instituted) in the Republic at:

I / We accept full responsibility for the proper execution and fulfillment of all obligations and conditions devolving in me / us under this agreement as the principal liable for the due fulfillment of this contract.

I / We furthermore confirm I / we satisfied myself / ourselves as to the corrections and validity of my / our tender; that the price quoted cover all the work / items specified in the tender documents and that the price(s) cover all my / our obligations under a resulting contract and that I / we accept that any mistake(s) regarding price and calculations will be at my / our risk.

I / We furthermore confirm that my / our offer remains binding upon me / us and open for acceptance by the Purchases / Employer during the validity period indicated and calculated from the closing date of the bid.

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			
WITNESS 1		WITNESS 2	



24. DEVELOPER'S INTRODUCTION

Attach Developer's introduction here:



25. DEVELOPER'S CONTRACTORS' EXPERIENCE

Use the table below to record the contractor's completed projects and attach the required documentation, such as completion and NHBC registration certificates.

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Company				
Company				From
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Contact Person				To
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Contact Person				To
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Company				From
Tel				
Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



26. DEVELOPER'S PROJECT MANAGER'S EXPERIENCE

Use the table below to record the project manager's completed projects and attach the required documentation, such as CV, Qualifications, and professional registration certificates:

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
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Company				From
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Contact Person				To
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Company				From
Tel				
Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



27. DEVELOPER'S ARCHITECT'S EXPERIENCE

Use the table below to record the architect's completed projects and attach the required documentation, such as CV, qualifications, and professional registration certificates:

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
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Contact Person				To
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Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



28. DEVELOPER'S CIVIL ENGINEER'S EXPERIENCE

Use the table below to record the civil engineer's completed projects and attach the required documentation such as CV, qualifications, and professional registration certificates:

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
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Company				From
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Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



29. DEVELOPER'S STRUCTURAL ENGINEERS' EXPERIENCE

Use the table below to record the structural engineer's completed projects and attach the required documentation, such as CV, qualifications, and professional registration certificates:

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Company				
Company				From
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Contact Person				To
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Contact Person				To
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Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



30. DEVELOPER'S ELECTRICAL ENGINEER'S EXPERIENCE

Use the table below to record the electrical engineer's completed projects and attach the required documentation, such as CV, qualifications, and professional registration certificates:

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Company				
Company				From
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Contact Person				To
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Contact Person				To
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Company				From
Tel				
Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



31. DEVELOPER'S QUANTITY SURVEYOR'S EXPERIENCE

Use the table below to record the quantity surveyor's completed projects and attach the required documentation, such as CV, qualifications, and professional registration certificates:

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
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Company				From
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Contact Person				To
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Contact Person				To
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Company				From
Tel				
Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



32. DEVELOPER'S CONSTRUCTION HEALTH AND SAFETY AGENT EXPERIENCE

Use the table below to record the health and safety agent's completed projects and attach the required documentation, such as CV, qualifications, and professional registration certificates:

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
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Contact Person				To
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Company				From
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Company				From
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Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



33. DEVELOPER'S LAND SURVEYOR'S EXPERIENCE

Use the table below to record the land surveyor's completed projects and attach the required documentation, such as CV, qualifications, and professional registration certificates:

EMPLOYER (Name, Tel, Email)		NATURE OF WORK	VALUE OF WORK (INCL. VAT)	CONTRACT PERIOD
Company				From
Tel				
Contact Person				To
Email				
Company				From
Tel				
Contact Person				To
Company				
Company				From
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Contact Person				To
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Company				From
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Contact Person				To
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Company				From
Tel				
Contact Person				To
Email				

SIGNATURE		NAME (PRINT)	
CAPACITY		DATE	
NAME OF FIRM			



34. DEVELOPMENT APPROACH

Attach development approach narrative here:



PART C: FORM OF OFFER AND ACCEPTANCE



TENDER NO.: B/SM 128/26

**CALL FOR PROPOSAL FOR PRIVATE DEVELOPERS TO PARTNER WITH
STELLENBOSCH MUNICIPALITY IN THE DEVELOPMENT OF GAP HOUSING ON
ERF 7001, CLOETESVILLE, STELLENBOSCH**

PROCUREMENT DOCUMENT

NAME OF TENDERER:			
Total Bid Price (Inclusive of VAT) (refer to page 86):			
BBBEE LEVEL			
CLAIM POINTS FOR	LOCALITY	YES ☐	NO ☐

DATE: SEPTEMBER 2026

NOTE: All returnable documents as listed on page 11 in this document, including the Bid Form on page 6, must be completed in full and signed. The entire document, from page 1 through 86, must be submitted with the bid. **PLEASE NOTE: A TWO-ENVELOPE PROCEDURE WILL BE FOLLOWED FOR THIS BID.** Please refer to the General Conditions of Tender in Section 7, item number 13, for important information for competing and submitting the tender

PREPARED AND ISSUED BY:

Directorate: Finance:
Supply Chain Management Unit
Stellenbosch Municipality,
PO Box 17, Stellenbosch, 7599

**CONTACT FOR ENQUIRIES
REGARDING SPECIFICATIONS:**

Bonga Ndzuzo
Housing Development
Tel. Number: 021 808 8733



35. PRICING SCHEDULE

NOTE:

1. Only firm prices will be accepted. Non-firm prices will not be considered.
2. All delivery costs **MUST** be included in the bid price, for delivery at the prescribed destination.
3. Document **MUST** be completed in non-erasable black ink.
4. **NO** correction fluid/tape may be used.
 - a. In the event of a mistake having been made, it shall be crossed out in ink and be accompanied by an initial at each and every alteration.
5. The Bidder **MUST** indicate whether he/she/the entity is a registered VAT Vendor or not.

I / We _____

(full name of Bidder), the undersigned in my capacity as _____

of the firm _____

hereby offer to Stellenbosch Municipality to render the services as described, in accordance with the specification and conditions of contract to the entire satisfaction of the Stellenbosch Municipality and subject to the conditions of tender, for the amounts indicated hereunder:

	INDICATE WITH AN 'X'							
Are you/is the firm a registered VAT Vendor	YES				NO			
If "YES", please provide VAT number								

Please note the following:

1. Stellenbosch Municipality reserves the right to adjust the scope of work/ quantity required to stay within its budget.
2. Only firm prices will be accepted, and non-firm prices will not be considered.



36. CONTRACT AWARD AND NEGOTIATION

1. CONTRACT AWARD

In accordance with section 3.1 of the Stellenbosch Municipality Immovable Property Disposal Policy, acceptance of the bidder's offer will be subject to formal Council approval in an open Council meeting. Council must resolve that the property is not required for the minimum level of basic municipal services, as required by section 14(1) of the MFMA, before the disposal can be effected. No binding commitment will arise until such approval is obtained.

The conditional award will also be subject to the developer agreeing in principle to the Land Availability Agreement (LAA) terms, including the Municipality's right to accept the selling price of each unit based on erf size, and to the Municipality's requirement that its housing beneficiary database is given first consideration before units are marketed to the general public. Failure to conclude the LAA within the agreed negotiation period will result in the withdrawal of the award without any liability to the Municipality.

2. RISK ASSESSMENT

Prior to finalising the award, the Municipality will undertake a comprehensive risk assessment in accordance with Regulation 7 of the MATR and section 12.3 of the Disposal Policy. This assessment will address legal risks (including compliance with land use approvals, statutory obligations, and contractual enforceability), financial risks (including the developer's financial capacity, creditworthiness, and funding arrangements), and project delivery risks (including track record, technical capacity, and alignment with project timelines and municipal infrastructure availability).

The risk assessment will also consider the potential impact of the development on municipal service delivery, the transfer of liabilities associated with the land, and the reputational risks to the Municipality. Only bidders who demonstrate acceptable risk profiles and mitigation strategies will be confirmed for award.

3. VALUE FOR MONEY

The transaction must comply with the fair market value requirements of regulations 5(3)(b)(i) and 13 of the MATR, as well as section 44 of the Disposal Policy. The agreed selling price of each unit will be based on the proposals of the appointed developer and reflected in the LAA.

Notwithstanding the fair market value principle, the Municipality reserves the right to apply public interest concessions as contemplated in regulation 13(2) of the MATR and section 2.1 of the Disposal Policy. Such concessions may include discounted pricing for qualifying GAP housing beneficiaries or other measures aimed at promoting equity, redressing spatial imbalances, and supporting socio-economic development.

4. NEGOTIATION OF LAND AVAILABILITY AGREEMENT (LAA)

Following the conditional award, the Municipality and the appointed developer will enter into negotiations to finalise the LAA. Negotiations will be conducted within the framework of regulation 11(d) of the MATR, which allows for conditions specifying the framework for direct negotiations on asset disposal. The LAA will set out the allocation of development rights, the unit selling prices, beneficiary prioritisation procedures, infrastructure responsibilities, timeframes for development, and the obligations of both parties.

The negotiation process will also address performance milestones, penalties for non-performance, dispute resolution mechanisms, and compliance monitoring. All agreed terms must be reduced to writing and signed by both parties before any development activity commences. No variation to the LAA may be made without the prior written consent of the Municipality.



5. TIME PERIOD FOR NEGOTIATION

The conditional award will remain valid for the negotiation period specified in the LAA, which will be determined during contract finalisation. This period must be sufficient to allow for due diligence, finalisation of the LAA, and council approval, but will not exceed the timeframe set out in the Municipality's internal approvals schedule unless extended by council resolution.

If the parties fail to reach an agreement within the prescribed period, the Municipality reserves the right to terminate negotiations and either approach the next highest-ranked bidder or re-advertise the opportunity. All negotiations will be conducted in good faith, with the objective of achieving a commercially viable and socially responsible development that meets the Municipality's strategic objectives.



37. PRICING ASSUMPTIONS AND INSTRUCTIONS

The purpose of this section is to standardise the basis upon which bidders prepare their financial submissions. All proposals must comply with the pricing structure, assumptions, and instructions below.

1 PRICING BAND

Bidders must align unit sales prices strictly with the price ranges set out under **Sub-section 17.7: Housing Product Mix & Pricing Structure** of this CFP and Annexure A of the Land Availability Agreement.

No units may be marketed or sold outside of these approved pricing bands without prior written consent from Stellenbosch Municipality.

2 GENERAL PRICING ASSUMPTIONS

The following assumptions must be adopted in preparing all financial submissions:

The following assumptions must be adopted in preparing all financial submissions:

1. **VAT:** All prices must include VAT at the current rate
2. **Escalation:** Construction escalation per annum
3. **Subsidy Quantum:** Infrastructure cost estimates for link and internal services must be aligned with the National Housing Programme subsidy quantum applicable to municipal engineering services.
4. **Bulk Services:** Developers must carry all costs for internal reticulation and top structures. Bidders are required to provide cost estimates for the provision of these bulk services.
5. **Transfer Costs:** All conveyancing and transfer costs are for the account of the Developer, in accordance with the LAA.
6. **Contingencies:** A minimum contingency must be provided for in construction costs.
7. **Professional Fees:** All applicable professional fees must be included, benchmarked against ECSA, SACAP, SACQSP, and other statutory guidelines.
8. **Sales & Marketing:** Costs of marketing, sales administration, and buyer support must be included in the financial model.

3 PRICING INSTRUCTION

Bidders must prepare and submit the following schedules as part of their Financial Proposal:

- The developer must provide a detailed pricing breakdown for each of the five (5) residential typologies, including the selling price per unit, the cost of land per unit, and the cost of optional features per unit.

The full financial proposal must be submitted in Excel (latest version or equivalent compatible format) to enable review and verification. The pricing model must be on a flash drive and returned with the bid document in envelope two.

NOTE: The tender hard copy will govern (in the event that there are discrepancies on the soft copy vs the hard copy)

The following must be appended in envelope two:

SECTION 3: FINANCIAL VIABILITY		
1. Funding record	1.1. Audited Financial Statements for the past three financial years, including balance sheet, income statement, and cash flow statement.	
	1.2. Statement of Available Funding indicating committed equity	



	contributions and/or confirmed debt facilities, supported by letters from financial institutions or investors. 1.3. Proof of Financial Capacity, such as bank confirmation letters, funding commitments, or similar evidence of liquidity.	
2. Development Cost and Funding Model	2.1. Development Finance (Financial Model incl. unit cost)	

NB: The amount to be provided below must be the total cost for all A-Grade engineering services required for the development.

THE TOTAL PRICE OFFERED INCLUSIVE OF VAT IS:	
In figures:	R
In words:	

INSTALLATION OF A-GRADE SERVICES			
Item	Cost Element	Rate per residential unit	Total for 201 residential units
	Cost for the installation of A-Grade internal services	R	R

Signature(s)		
Name(s)		
Capacity		
Name of tenderer:		
Name of witness:	<i>(Insert name and address of organisation)</i>	Date
Signature of witness:		

ANNEXURE A

MPT

DECISION



STELLENBOSCH
STELLENBOSCH • PNIEL • FRANSCHHOEK
MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

Application Number: LU/16572 (TP591/2023)

Our File Reference Number: Erf 7001, Stellenbosch

Your Reference Number:

Enquiries: P April / B Mdoda

Contact No: 021 – 808 8683 / 8690

Email address: Ulrich.Vonmolendorff@stellenbosch.gov.za

PER E-MAIL: Rudolph.schroeder@zutari.com

Sir

**APPLICATION FOR REZONING, SUBDIVISION, CONSENT USE, PERMANENT DEPARTURE AND CLOSURE OF
A PART OF A PUBLIC SPACE : ERF 7001, HENDRICKSE STREET, STELLENBOSCH**

1. The above application refers.
2. The Municipal Planning Tribunal on the 29 November 2024 resolved as follows:
 1. That the following application(s) in terms of Section 15(2) of the Stellenbosch Municipal Land Use Planning Bylaw on Erf 7001, Stellenbosch for:
 - 1.1. In terms of Section 15(2)(n) of the said bylaw, for the closure of a part of a public place.
 - 1.2. In terms of Section 15(2)(a) of the said bylaw, for the rezoning from Public Open Space Zone to Subdivisional Area Overlay Zone in order to allow for the following uses:
 - 1.2.1 Conventional Residential Zone Erven,
 - 1.2.2 5 Public Open Space Zone Erven,
 - 1.2.3 1 Utility Services Zone Erf and
 - 1.2.4 1 Public Road and Parking Zone Erf
 - 1.3 In terms of Section 15(2)(d) of the said bylaw, for the subdivision into 208 erven, namely:
 - 1.3.1 Erf 1 to Erf 201 (Conventional Residential Zone Erven) ranging from $\pm 115\text{m}^2$ to $\pm 312\text{m}^2$ (total of $\pm 3.32\text{ha}$).

- 1.3.2 Erf 202 ($\pm 945\text{m}^2$), Erf 203 ($\pm 548\text{m}^2$), Erf 204 ($\pm 261\text{m}^2$), Erf 205 ($\pm 5866\text{m}^2$) and Erf 206 ($\pm 8.4\text{m}^2$) zoned Public Open Space Zone
- 1.3.3 Erf 207 ($\pm 6506\text{m}^2$) zoned Utility Services Zone.
- 1.3.4 Erf 208 ($\pm 17976\text{m}^2$) zoned Public Road and Parking Zone.
- 1.3.5 The registration of a 4m wide right of way servitude over Portion 128 in favour of Portion 129.
- 1.3.6 The registration of a 5.2m and 6.6m wide services servitude in favour of the municipality over Portion 124, 125 and 126.
- 1.4 In terms of Section 15(2)(b) of the Stellenbosch Municipality By-Law on Municipal Land Use Planning, 2023, for a permanent departure all residential zoned properties, to relax;
 - 1.4.1 the Street building line for erven up to 250m^2 from 2m to 1m,
 - 1.4.2 the Street building line for erven between 251m^2 to 500m^2 from 3m to 1m and
 - 1.4.3 the common building lines from 1m to 0m for.
- 1.5 In terms of Section 15(2)(o) of the said bylaw, for consent use to erect a telecommunications mast on the portion to be zoned as Public Open Space Zone (Portion 205).

BE APPROVED in terms of Section 60 of the said Bylaw and subject to conditions of approval.

2. The approval is subject to the following **conditions** imposed in terms of Section 66 of the said Bylaw:

- 2.1 The approval only applies to the proposed applications under consideration and shall not be construed as authority to depart from any other legal prescriptions or requirements from Council or other legislation or Bylaws or Regulations that may be applicable.
- 2.2 The approval granted shall not exempt the applicant from complying with any other legal prescriptions or requirements that might have a bearing on the proposed use.

Subdivision, rezoning, departure and closure of public place

- 2.3 The development be undertaken in accordance with the Subdivisional and Zoning Plan with reference; Drawing Project Number 1001918, dated 04/10/2024, drawn by Zutari Impact Engineered and attached as **APPENDIX B**.
- 2.4 An electronic copy (shp, dwg, dxf) of the approved General Plan be submitted to the Directorate Planning and Economic Development for record purposes, which plan indicate the following information:

- 2.4.1) Newly allocated erf numbers
- 2.4.2) Co-ordinates
- 2.4.3) Survey dimensions
- 2.4.4) Street names and numbering
- 2.5 The servitude rights over any property be registered in the title deeds of the applicable property/ies on registration.
- 2.6 Building plans be submitted and approved by the Municipality prior to the commencing of any building works, including the preparation of land, which will only be approved when all relevant conditions of approval have been complied with.
- 2.7 Compliance with the conditions relating to infrastructure services contained in memorandum (Civil LU2644, dated 05 August 2024) and attached as **APPENDIX F**.
- 2.8 Compliance with the conditions relating to Electrical services Department contained in memorandum dated 26/02/2024 and attached as **APPENDIX G**.
- 2.9 Sufficient on-site parking be provided in accordance with the provisions of the Zoning Scheme Bylaw and to be illustrated on the building plans.
- 2.10 Activities on site, during construction and thereafter, comply with the Western Cape Noise Control regulations.
- 2.11 During constructions the relevant implementing agent/contractor must take all reasonable steps to prevent nuisance caused by dust in accordance with the national Dust Control Regulations.
- 2.12 Should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately and Heritage Western Cape must be notified without delay.
- 2.13 The Surveyor General – Western Cape in terms of Section 26(7) of the Bylaw on Municipal Land Use Planning (2023) be informed of the approval of the closure of the public place to endorse their records.

Telecommunication base stations:

- 2.14 The development be undertaken in accordance with the building plan Rev No BP-7001-REV1, Sheet 3, 4, 5, 6, dated 10/11/2023 and drawn by Urban Solutions for ATC South Africa, attached as **APPENDIX B**.
- 2.15 Access to the telecommunication infrastructure and associated equipment be strictly controlled at all times by means of a fence or wall with a locked door or gate to the satisfaction of the Municipality.
- 2.16 No unauthorised person be able to come within 5m in front of the panel antennae for the telecommunication infrastructure.
- 2.17 Adequate warning signs in the three official languages be displayed on the access door or gate, defining it as a no-go zone.
- 2.18 The relevant municipal department be grant access at all reasonable times to the installation, for the purpose of monitoring inspection and compliance certification.
- 2.19 The consent use be restricted to the fenced compound of the mast and equipment room as depicted on the approved building plan.
- 2.20 The mast, equipment room or any boundary enclosure is not utilised for outdoor advertising purposes.
- 2.21 The operator be responsible for ongoing maintenance of the entire installation as well as all costs with respect to such maintenance or future decommissioning of the telecommunication infrastructure.
- 2.22 If the site is decommissioned the operator to remove all site infrastructure and the site to be rehabilitated to its former state or to a condition that is in line with the land use and character of the area at the time of decommissioning to the satisfaction of the Municipality.

3 The **reasons** for the above decision are as follows:

- 3.1 The property is needed by the Municipality for an integrated urban settlement development to address the municipal housing backlog and Erf 7001, Stellenbosch (Cloetesville area) was identified as a suitable site for such a development with a particular goal to deliver on their mandate to provide medium to upper market (GAP) housing opportunities.

3.2 The closure of the public place will be in the interest of the broader community and a portion will be retained for public open space purposes. The closure will regularize some of the current uses (Utility Services) and will enable the various other statutory processes to realize the sites long-term potential, earmarked for infill development.

3.3 The mast will be beneficial to the broader community and customer base, with the increase in coverage and capacity.

4 Matters to be noted:

4.1 Street naming and numbering must be submitted, process, approved and implemented as per the approved policy and delegations.

4.2 Architectural and landscaping design proposals must form part of the scope of works for the call for proposal and implemented accordingly.

5. You are hereby informed in terms of section 79(2) of the Stellenbosch Municipal Land Use Planning Bylaw of your right to appeal the above decision to the Appeal Authority within 21 days from the date of notification of the above decision. Please note that no late appeals or an extension of time for the submission of appeals are permitted in terms of Section 80(1)(a) of the said By-Law.

6. Appeals must be submitted by completing the required form with the prescribed information to satisfy the requirements of Section 80(2) of the said By-law, failing which the appeal will be invalid in terms of Section 81(1)(b) of the said By-Law.

7. **Appeals must be addressed to the Municipal Manager and submitted to his/ her designated official by means of e-mail at the following address: landuse.appeals@stellenbosch.gov.za**

8. Any party (applicant or other) who lodges an appeal must pay the applicable appeal fee in terms of the approved municipal tariffs and submit the proof of payment together with the appeal. The **LU** Reference number on this correspondence, or the applicable Erf/ Farm Number must be used as the reference for the payment of the appeal fee.

9. The appeal form and approved tariff structure and the banking details for the General Account can be accessed and viewed on the municipal website. For any enquiries the office can be contacted at landuse.appeals@stellenbosch.gov.za or 021- 808 8684.

10. An applicant who lodges an appeal must also adhere to the following requirements stipulated in terms of section 80(3) to (7) of the said By-law:

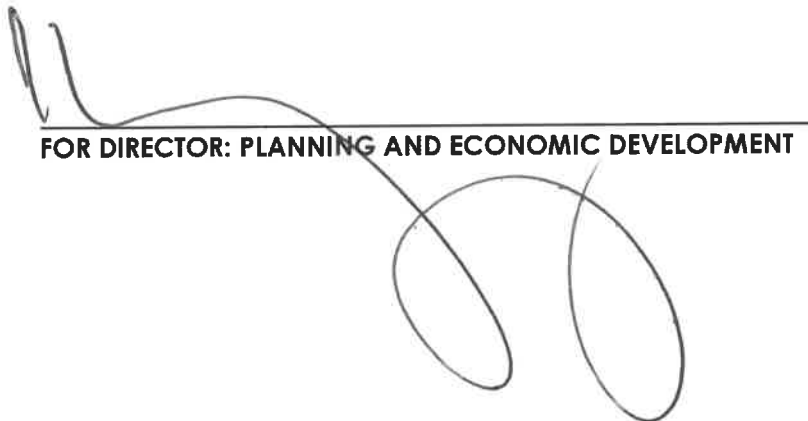
- (a) Simultaneously serve the appeal on any person who commented on the application concerned and any other person as the municipality may determine.

- (b) The notice by the applicant must invite persons to comment on the appeal within 21 days from date of notification of the appeal.
- (c) The notice must be served in accordance with section 35 of the said legislation and in accordance with the prescripts or such additional requirements as may be determined by the Municipality.
- (d) Proof of serving the notification must be submitted to the Municipality at the above E-mail address within 14 days of serving the notification.

11. Kindly note that no appeal right exists in terms of Section 62 of the Local Government Municipal Systems Act, No 32 of 2000.

12. Kindly note the above decision in the case of any approval, is suspended, and may therefore not be acted on, until such time as the period for lodging appeals has lapsed, any appeal has been finalised and you've been advised accordingly.

Yours faithfully



A large, stylized handwritten signature in black ink, consisting of several loops and a long horizontal stroke, positioned over a horizontal line.

FOR DIRECTOR: PLANNING AND ECONOMIC DEVELOPMENT

2/12/2024
DATE

COPIES TO:

Dupre Lombaard

Email: dupre.lombaard@virdus.com

Devin Smyth

Email: smyth.devin@gmail.com

Elie September

Email: elie.september54@gmail.com

WJ Barends (please inform all other Petitioners)

Email: wilfredjbarends@gmail.com

Ronel Beukes & MP Beukes

Email: rbeukes@sun.ac.za

Estelle Lourens

Email: estelle@warwickwine.com

Prof Marietjie Stander

Email: lcms@sun.ac.za

Gavin Davidse

Email: gavindavidse@capitecbank.co.za

Henét de Villiers

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Jaco de Kock

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Scarlett Cornelissen
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A Geldenhuys
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H Bok
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L Van Zyl
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H Schreuder
Email: hschreuder@oldmutual.com

John Aaron
Email: John.Aaron@stellenbosch.gov.za

Squirrel Close HOA
Sophia Kotze
Email: sophie.kotze@gmail.com

APPENDIX B:
Zoning & Subdivision Plan and
Telecommunication Base Station Plans

THIS SUBDIVISION / CONVEYANCE HAS BEEN APPROVED IN
TERMS OF SECTION 60 OF THE STELLERBOSCH MUNICIPAL
LAND USE PLANNING BY-LAW (2004) SUBJECT TO THE
CONDITIONS AS PER ATTACHED LETTER DATED _____

AUTHORISED EMPLOYEE/MPT

2/12/2021

001/09

NOTATION	LAND USE DESCRIPTION	ZONING (1STB. SCHEME)	PORTION	NUMBER	AREA sqm	% of AREA
	Utility (elec & water)	UTILITY SERVICES ZONE		207	0.65ha	10.8 %
	Freestanding/Semi Detached	CONVENTIONAL RES. ZONE		001 - 201	3.32ha	50.8 %
	Public Open Space Zone	PUBLIC OPEN SPACE ZONE		202 - 206	0.76ha	12.8 %
	Public Street	PUBLIC ROADS&PARKING ZONE		208	1.8ha	25.6 %
	Total Area				6.53ha	
	THE FIGURE ABCDEFGHIA REPRESENTS THE CADASTRAL BOUNDARY OF PORTION 7001, STELLENBOSCH MEASURING 6.53HA IN SIZE REPRESENTING THE SITE FOR DEVELOPMENT THE FIGURE abcdefgHIA REPRESENTS A RIGHT OF WAY SERVITUDE (4m wide) TO BE REGISTERED OVER PORTION 128 TO PROVIDE ACCESS TO PORTION 129 THE FIGURE ghijkl REPRESENTS A WATER PIPELINE SERVITUDE (15.2m - 6.6m wide) TO BE REGISTERED IN FAVOUR OF THE MUNICIPALITY OVER PORTION 124, PORTION 125 & PORTION 126					

THE FIGURE ghijkl REPRESENTS A WATER PIPELINE SERVITUDE (5.2m - 6.6m wide) TO BE REGISTERED IN FAVOUR OF THE MUNICIPALITY OVER PORTION 124, PORTION 125 & PORTION 126

THE FIGURE abcdef REPRESENTS A RIGHT OF WAY SERVITUDE
(4m wide) TO BE REGISTERED OVER PORTION 128 TO PROVIDE
ACCESS TO PORTION 129

Z

0 25 50 75 100

DISCLAIMER	REV	DATE
IF CONSTRUCTION DRAWINGS ARE ISSUED UNLESS THE MASTER WITH THE ORIGINAL SIGNATURE OF APPROVAL WILL BE HELD AT THE ZUTING OFFICE OF THE APPROVER	REV1	2023/11/29
	REV2	2024/05/28
	REV3	2024/10/03
	REV4	2024/11/04

ZUTARI
IMPACT. ENGINEERED.

PROJECT
ERF 7001
STELLFENBOSCH

11

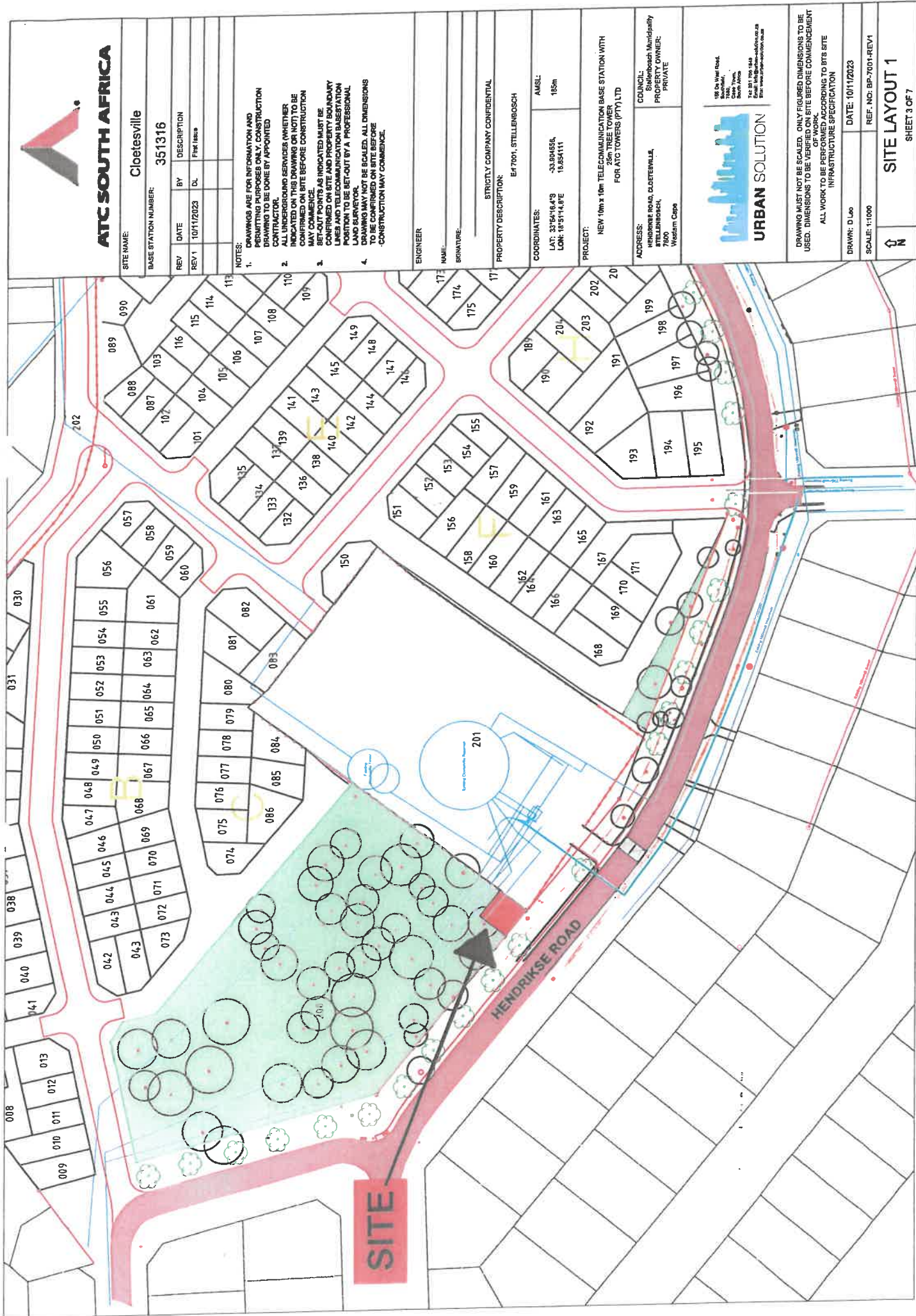
CLOETESVILLE_DEVELOPMENT_FRAMEWORK

SUB_DIVISION_ZONING

1001918

240528

Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm	Portion #	Area sqm
1	312	35	160	69	162	103	178	137	130	171	157	205	5866								
2	291	36	160	70	134	104	223	138	131	172	144	206	8,4								
3	291	37	119	71	129	105	201	139	140	173	160	207	6506								
4	282	38	122	72	128	106	191	140	129	174	160	208	17976								
5	281	39	128	73	126	107	224	141	128	175	160										
6	282	40	117	74	128	108	253	142	128	176	160										
7	282	41	131	75	126	109	159	143	128	177	185										
8	286	42	137	76	128	110	147	144	128	178	165										
9	286	43	145	77	126	111	198	145	128	179	142										
10	286	44	152	78	128	112	198	146	128	180	173										
11	286	45	126	79	125	113	197	147	128	181	138										
12	267	46	128	80	207	114	207	148	160	182	155										
13	269	47	128	81	185	115	401	149	243	183	158										
14	148	48	127	82	158	116	351	150	176	184	158										
15	143	49	126	83	128	117	157	151	127	185	156										
16	142	50	115	84	128	118	146	152	126	186	192										
17	167	51	128	85	128	119	146	153	125	187	183										
18	131	52	128	86	128	120	147	154	125	188	144										
19	156	53	115	87	130	121	137	155	148	189	160										
20	155	54	128	88	185	122	154	156	167	190	160										
21	155	55	128	89	157	123	151	157	128	191	160										
22	155	56	128	90	159	124	178	158	128	192	160										
23	155	57	128	91	154	125	278	159	128	193	151										
24	155	58	128	92	156	126	282	160	128	194	145										
25	155	59	128	93	150	127	149	161	128	195	128										
26	155	60	128	94	154	128	241	162	128	196	128										
27	154	61	128	95	145	129	273	163	200	197	128										
28	148	62	127	96	152	130	128	164	158	198	222										
29	160	63	127	97	141	131	131	165	158	199	263										
30	135	64	163	98	151	132	174	166	160	200	175										
31	160	65	160	99	162	133	177	167	246	201	220										
32	140	66	163	100	184	134	128	168	218	202	945										
33	160	67	163	101	178	135	129	169	169	203	548										
34	160	68	160	102	165	136	129	170	163	204	261										



ATC SOUTH AFRICA

Cloetesville

BASE STATION NUMBER:

351316

REV 1 10/11/2023 DL First Issue

- NOTES:
1. DRAWINGS ARE FOR INFORMATION AND PERMITTING PURPOSES ONLY. CONSTRUCTION DRAWING TO BE DONE BY APPOINTED CONTRACTOR.
 2. ALL UNDERGROUND SERVICES (WHETHER EXISTING OR PROPOSED) MUST BE IDENTIFIED AND MARKED PRIOR TO BE COMMENCED ON SITE BEFORE CONSTRUCTION MAY COMMENCE.
 3. SET-OUT POINTS AS INDICATED MUST BE CONFIRMED ON SITE AND PROPERTY BOUNDARY LINES AND TELECOMMUNICATION BASESTATION POSITION TO BE SET-OUT BY A PROFESSIONAL SURVEYOR. ALL DIMENSIONS MUST BE CONFIRMED ON SITE BEFORE CONSTRUCTION MAY COMMENCE.
 4. CONSTRUCTION MAY COMMENCE.

ENGINEER

NAME:

SIGNATURE:

STRICTLY COMPANY CONFIDENTIAL
PROPERTY DESCRIPTION:
E47001, STELLENBOSCH

COORDINATES:

LAT: 33°54'16.4"S
LONG: 18°51'14.8"E

PROJECT:

NEW 10m x 10m TELECOMMUNICATION BASE STATION WITH
FOR ATC TOWERS (PTY) LTD

ADDRESS:

STATION ROAD, CLOETESVILLE,
STELLENBOSCH,
7800
Western Cape

COUNCIL:

Stellenbosch Municipality
PROPERTY OWNER:
PRIVATE

100 De Vries Road,
Stellenbosch,
7800,
Western Cape,
South Africa
Tel: 021 795 1848
Email: info@urban-solution.co.za
Web: www.urban-solution.co.za

URBAN SOLUTION

DRAWING MUST NOT BE SCALED. ONLY FIGURED DIMENSIONS TO BE USED. DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCEMENT OF WORK.
ALL WORK TO BE PERFORMED ACCORDING TO BITS SITE INFRASTRUCTURE SPECIFICATION

DRAWN: D Loo

SCALE: 1:1000

DATE: 10/11/2023

REF. NO: BP-7001-REV1

SITE LAYOUT 1

SHEET 3 OF 7

SITE

HENDRIKSE ROAD

Existing Cloetesville Tower

Existing Cloetesville



ATC SOUTH AFRICA

SITE NAME:		Cloetesville	
BASE STATION NUMBER:		351316	
REV	DATE	BY	DESCRIPTION
REV1	10/11/2023	DL	First Issue

NOTES:

- DRAWINGS ARE FOR INFORMATION AND PERMITTING PURPOSES ONLY. CONSTRUCTION SHALL BE DONE BY APPOINTED CONTRACTOR.
- ALL UNDERGROUND SERVICES WHETHER INDICATED ON THIS DRAWING OR NOT TO BE CONFIRMED ON SITE BEFORE CONSTRUCTION MAY COMMENCE.
- SET-OUT POINTS AS INDICATED MUST BE CONFIRMED ON SITE AND PROPERTY BOUNDARY LINES AND TELECOMMUNICATION BASE STATION POSITION TO BE SET-OUT BY A PROFESSIONAL LAND SURVEYOR.
- DRAWING MAY NOT BE SCALED. ALL DIMENSIONS TO BE CONFIRMED ON SITE BEFORE CONSTRUCTION MAY COMMENCE.

ENGINEER

NAME:

SIGNATURE:

PROPERTY DESCRIPTION:

Er 7001, BTELLENBOSCH

COORDINATES:

LAT: 30°54'N 4°5'
LONG: 18°54'11.8"E

AMSL:

183m

PROJECT:

NEW 10m x 10m TELECOMMUNICATION BASE STATION WITH 25m TREE TOWER FOR ATC TOWERS (PTY) LTD

ADDRESS:

HENDRIKSE ROAD, CLOETESVILLE, BTELLENBOSCH, 7600 Western Cape

COUNCIL:

Sikelele Municipality
PROPERTY OWNER: PRIVATE



100 De Wet Road,
Wynberg, Cape Town,
South Africa
Tel: 021 734 1144
Email: info@urbansolution.co.za
Web: www.urbansolution.co.za

DRAWING MUST NOT BE SCALED. ONLY FIGURED DIMENSIONS TO BE USED. DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCEMENT OF WORK.
ALL WORK TO BE PERFORMED ACCORDING TO BTS SITE INFRASTRUCTURE SPECIFICATION

DRAWN: D Lap	DATE: 10/11/2023
SCALE: 1:500	REF. NO: BP-7001-REV1



SITE LAYOUT 2

SHEET 4 OF 7

2,4m High clear vu fence
with shark tooth spikes &
electric fence on top -
Not painted

500

3000

10000

2499

3000

1000

3m Sliding Gate

Crusher Stone
finish

ex. water line

1000

1263

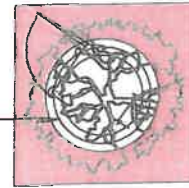
1453

PROPOSED FUTURE
OPERATOR
3X1.5 SPACE

PROPOSED FUTURE
OPERATOR
3X3SPACE

PROPOSED FUTURE
OPERATOR
3X3SPACE

Tree-mast
25m high



3000

1706

1491

1730

1571

500

ATC SOUTH AFRICA

SITE NAME:

Cloetessville

BASE STATION NUMBER:

351316

REV DATE BY DESCRIPTION

REV 1 19/11/2023 DL First Issue

- NOTES:
1. DRAWINGS ARE FOR INFORMATION AND PERMITTING PURPOSES ONLY. CONSTRUCTION DRAWING TO BE DONE BY APPOINTED CONTRACTOR.
 2. ALL UNDERGROUND SERVICES (WHETHER KNOWN OR UNKNOWN) MUST BE IDENTIFIED AND MARKED ON THE DRAWING OR NOT TO BE CONSIDERED BEFORE CONSTRUCTION MAY COMMENCE.
 3. SET-OUT POINTS AS INDICATED MUST BE CONFIRMED ON SITE AND PROPERTY BOUNDARY LINES AND TELECOMMUNICATION BASESTATION POSITION TO BE SET-OUT BY A PROFESSIONAL LAND SURVEYOR.
 4. DIMENSIONS MUST BE MEASURED ALL DIMENSIONS TO BE CONFIRMED ON SITE BEFORE CONSTRUCTION MAY COMMENCE.

ENGINEER

NAME:

SIGNATURE:

STRICTLY COMPANY CONFIDENTIAL

PROPERTY DESCRIPTION:

BT 7001, STELLENBOSCH

COORDINATES:

LAT: 33°54'16.4"S
LONG: 18°51'14.8"E

AMEL:

185m

PROJECT:

NEW 10m x 10m TELECOMMUNICATION BASE STATION WITH
25m TREE TOWER
FOR ATC TOWERS (PTY) LTD

ADDRESS:

WILHELMINA ROAD, GLOETESVILLE,
7800
Western Cape

COUNCIL:
WILHELMINA ROAD, GLOETESVILLE
PROPERTY OWNER:
PRIVATE



185 De Waard Road,
Gloetessville,
7800
Western Cape
Tel: 021 798 1141
Email: info@urbansolution.co.za
Web: www.urbansolution.co.za

DRAWING MUST NOT BE SCALED. ONLY DIMENSIONS TO BE USED. DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCEMENT OF WORK.
ALL WORK TO BE PERFORMED ACCORDING TO BTS SITE INFRASTRUCTURE SPECIFICATION

DRAWN: D Loo

DATE: 19/11/2023

SCALE: 1:50

REF. NO: BP-7001-REV1

ACTUAL SITE LAYOUT

SHEET 5 OF 7



ATC SOUTH AFRICA

SITE NAME:

Cloetesville

BASE STATION NUMBER:

351316

REV	DATE	BY	DESCRIPTION
REV 1	10/11/2023	DL	First Issue

NOTES:

1. DRAWINGS ARE FOR INFORMATION AND PERMITTING PURPOSES ONLY. CONSTRUCTION DRAWING TO BE DONE BY APPOINTED CONTRACTOR.
2. ALL UNDERGROUND SERVICES (WHETHER INSTALLED ON THIS DRAWING OR NOT) TO BE CONFIRMED ON SITE BEFORE CONSTRUCTION MAY COMMENCE.
3. SET-OUT POINTS AS INDICATED MUST BE CONFIRMED ON SITE AND PROPERTY BOUNDARY LINES AND TELECOMMUNICATION BASE STATION POSITION TO BE SET-OUT BY A PROFESSIONAL LAND SURVEYOR.
4. THIS DRAWING MAY NOT BE SCALED. ALL DIMENSIONS TO BE CONFIRMED ON SITE BEFORE CONSTRUCTION MAY COMMENCE.

ENGINEER

NAME:

SIGNATURE:

STRICTLY COMPANY CONFIDENTIAL

PROPERTY DESCRIPTION:

Erft 7001, STELLENBOSCH

COORDINATES:

LAT: 33°54'18.4"S
LONG: 18°51'14.8"E

AMSL:

-33.894558,
18.854111

PROJECT:

NEW 10m x 10m TELECOMMUNICATION BASE STATION WITH
25m TOWER FOR ATC TOWERS (PTY) LTD

ADDRESS:

HUNTER ROAD, CLOETESVILLE,
STELLENBOSCH,
7800
Western Cape

COUNCIL:
Stellenbosch Municipality
PROPERTY OWNER:
PRIVATE



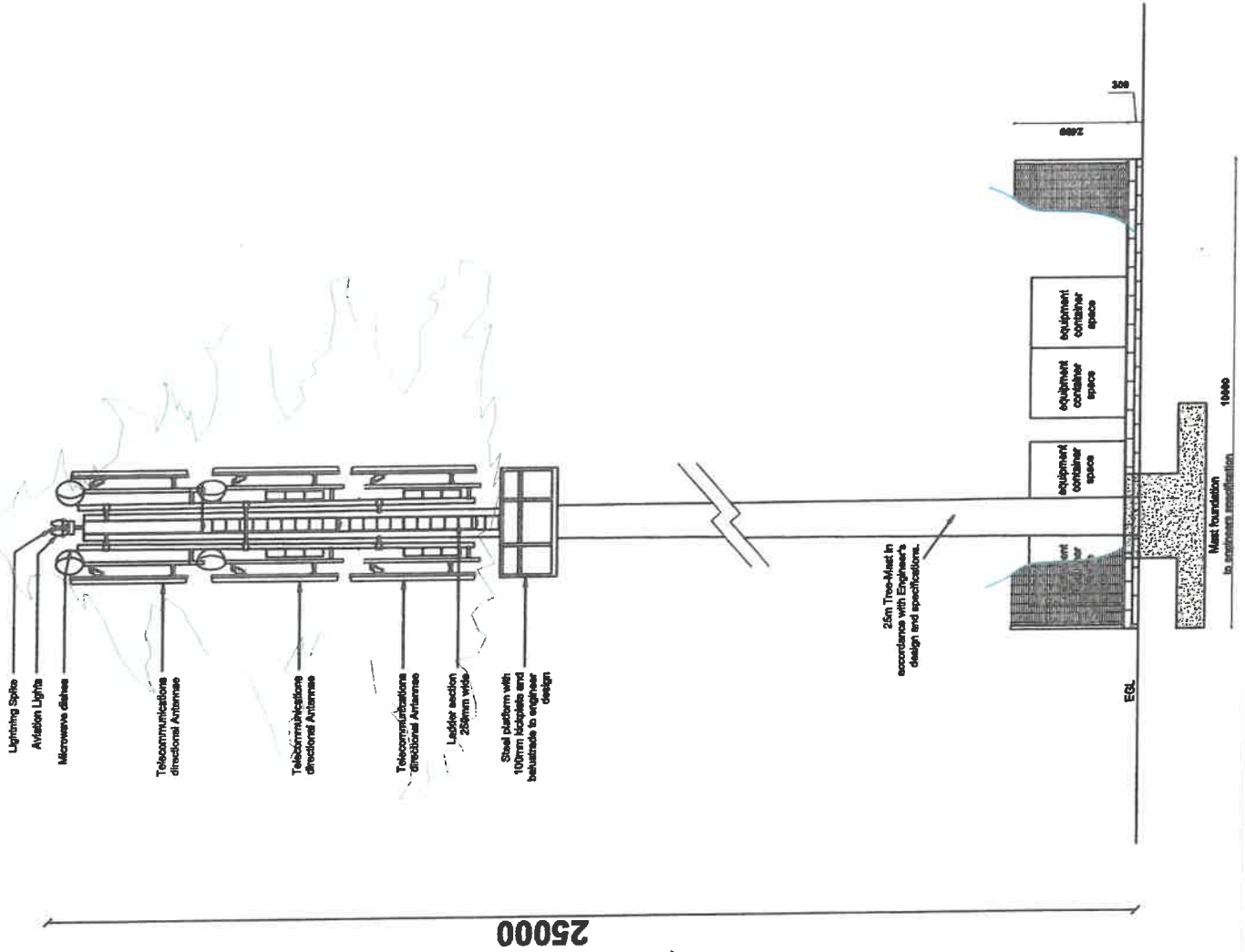
138 De Vries Road,
Stellenbosch,
7800,
Western Cape
South Africa
Tel: 021 709 1548
Email: info@urban-solution.co.za
Web: www.urban-solution.co.za

DRAWN: D Leo
SCALE: 1:100
DATE: 10/11/2023
REF. NO: BP-7001-REV1

↑
N

ELEVATION PLAN

SHEET 6 OF 7



APPENDIX F:
Comments from Infrastructure Services



STELLENBOSCH MUNICIPALITY

STELLENBOSCH·PNIEL·FRANSCHHOEK

MEMORANDUM

DIREKTEUR: INFRASTRUKTUURDIENSTE
DIRECTORATE: INFRASTRUCTURE SERVICES

CIVIL ENGINEERING SERVICES

To ▫ Aan:	Director: Planning + Economic Development
Att Aandag:	Bulelwa Mdoda
From ▫ Van:	Manager: Development (Infrastructure Services)
Author ▫ Skrywer:	Tyrone King
Date ▫ Datum:	5 August 2024
Our Ref ▫ Ons Verw:	Civil LU 2644
Town Planning Ref:	LU/16572 – TP 591/2023
Re ▫ Insake:	Erf 7001, Stellenbosch: Rezoning and subdivision for 204 residential erven; relaxation of parking departure from 2 parking bays to 1 parking bay per dwelling house

The following engineering documents were evaluated as part of this application:

- Civil engineering services report by Zutari dated 2023/11/30 Rev 0
- TIA by Zutari dated 2024/06/11
- Subdivision layout Drawing No 1001918-240528 Rev 2 by Zutari dated 2024/05/28

Parking Departure: The parking departure is not supported. The Zutari motivation letter (undated) in response to our Memo dated 4 April 2024 states that the parking departure will only be required for the row housing erven, but not for semi-detached and free-standing erven. Row housing is not supported by the Infrastructure Directorate, specifically for stormwater drainage reasons, therefore the parking departure is also not supported.

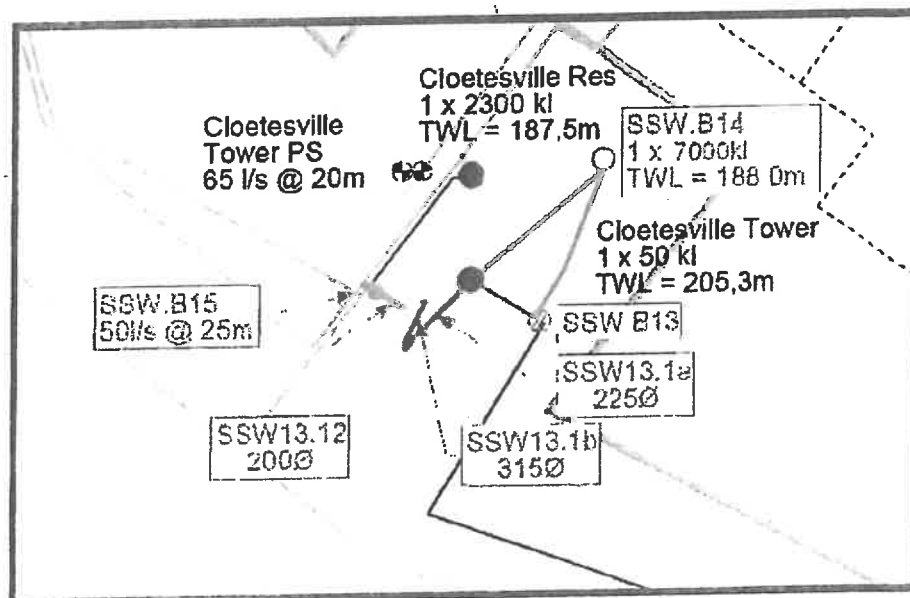
In consideration of provisions related to Civil Engineering Services the application (excluding the parking departure) is supported subject to the following conditions:

Specific Conditions: These conditions must be complied with prior to transfer of the first property or approval of any building plans, whichever occurs first.

1. Water

1.1 The following upgrades must be installed:

- 1.1.1 a) New 7.0ML Cloetesville Reservoir (SSW.B14);
 b) Upgrading of existing pumps from the reservoir to the Cloetesville water tower (SSW.B15);
 c) Upgrading of the existing pumps from the Idas Valley reservoir to Uniepark Reservoir which feeds the existing Cloetesville reservoir;
- Funding: There is R22m ex VAT on the current budget (2024/25 – 2026/27) for "Bulk water supply pipe: Cloetesville / Idas Valley" that can be utilised to fund these items.

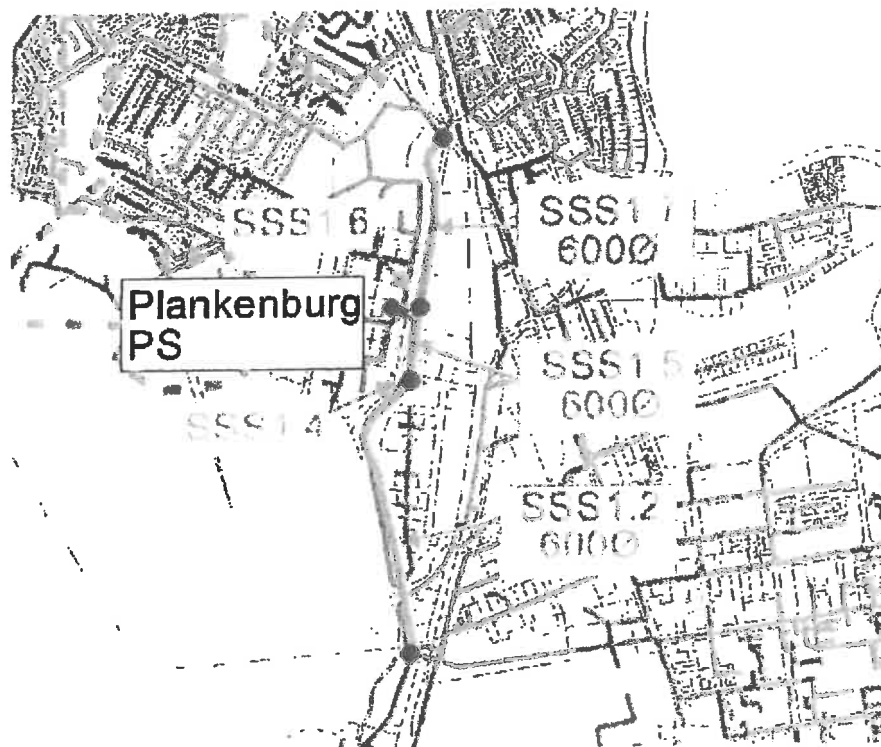


2. Sewer

2.1 The following upgrades must be installed:

2.1.1 Bulk sewer line form Kayamandi to Merriman Street (green line below).

Funding: Currently this project is not on the municipal budget. Budget should therefore be allocated to unlock this housing project.



3. Roads and NMT

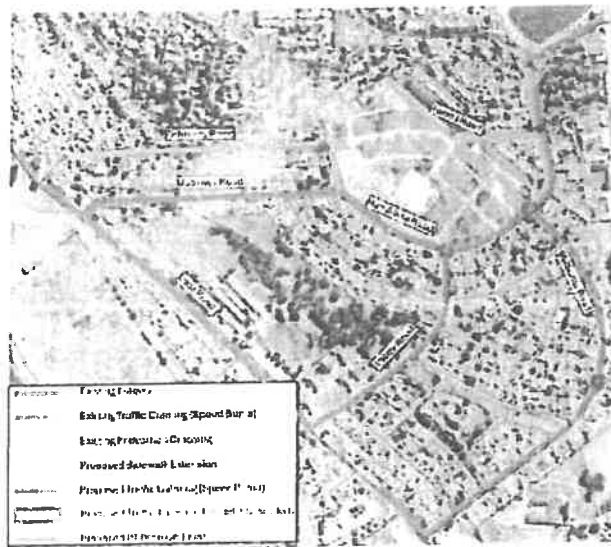
3.1 The following upgrades are must be installed as part of the housing project's implementation:

3.1.1 R44/Hendrickse intersection – provide an extended turning lane on Hendrickse Street (see image below).



Figure 18: Extension of short lane on Hendrickse Road.

- 3.1.2 Hendrickse Rd / Tolbos Rd and Lang St / Gabriel Rd must be converted into a STOP or Priority Control on only the minor approaches.
- 3.1.3 Expand the existing sidewalk along Hendrickse Rd and Gabriels Rd to link with Lang Street - which is the main route for public transport.
- 3.1.4 Install additional traffic calming measures (6x speedhumps and 4x raised intersections) along February Rd, Gabriels Rd, Tolbos Rd and Lang Rd (see **Roads locality and Traffic Calming plan** below).
- 3.1.5 Construct Public Transport Drop-off points – one along February Rd and one along Hendrickse Rd – exact positions to be confirmed during the detail design stage.



Roads locality and Traffic Calming plan

APPENDIX G:
Comments from Electrical Engineering

**ELECTRICITY SERVICES: CONDITIONS OF APPROVAL
ERF 7001 CLOETESVILLE**

GENERAL COMMENT:

1. Recommended for approval

CONDITIONS

2. The electrical consulting engineer responsible for the development shall schedule an appointment with Manager Electricity Services (Infrastructure Services) before commencing with the construction of the development. As well as to discuss new power requirements if required.

3. The development's specifications must be submitted to Stellenbosch Municipality (Infrastructure Services) for approval. i.e.

- a) The design of the electrical distribution system
- b) The location of substations(s) and related equipment.

4. A separate distribution board/s shall be provided for municipal switchgear and metering. (Shall be accessible & lockable).

5. 24-hour access to the location of the substation, metering panel and main distribution board is required by Electrical Services.

6. Appropriate caution shall be taken during construction, to prevent damage to existing service cables and electrical equipment in the vicinity, should damage occur, the applicant will be liable for the cost involved for repairing damages.

7. On completion of the development, Stellenbosch Municipality (Electrical Services) together with the electrical consulting engineer and electrical contractor will conduct a take-over inspection.

8.

9. All new developments and upgrades of supplies to existing projects are subject to **SANS 10400-XA** energy savings and efficiency implementations such as:

- Solar water Heating or Heat Pumps in building
- Energy efficient lighting systems
- Roof insulation with right R-value.
- In large building developments;
- Control Air condition equipment tied to alternative efficiency systems
- Preheat at least 50% of hot water with alternative energy saving sources
- All new hot water pipes to be clad with insulation with R-value of 1
- Provide a professional engineer's certificate to proof that energy saving measures is not feasible.

10. If connecting a generator or solar panels for backup, the generator or solar panels needs to comply to SANS10142



Signature

26/02/2024

Date

ANNEXURE B

APPROVED

SUBDIVISION

LAYOUT

STELLENBOSCH MUNICIPALITY

THIS SUBDIVISION / CONVERSION HAS BEEN APPROVED IN TERMS OF SECTION 60 OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BY-LAW (2001) SUBJECT TO THE CONDITIONS AS PER ATTACHED LETTER DATED 2/12/2021

AUTHORISED EMPLOYEE/MPT

3/100

NOTATION	LAND USE DESCRIPTION	ZONING (STB. SCHEME)	PORTION NUMBER	AREA sqm	% of AREA
	Utility (elec & water)	UTILITY SERVICES ZONE	207	0.65ha	10.8 %
	Freestanding/Semi Detached	CONVENTIONAL RES. ZONE	001 - 201	3.32ha	50.8 %
	Public Open Space Zone	PUBLIC OPEN SPACE ZONE	202 - 206	0.76ha	12.8 %
	Public Street	PUBLIC ROADS/PARKING ZONE	208	1.8ha	25.6 %
	Total Area			6.53ha	
THE FIGURE ABCDEFGHIA REPRESENTS THE CADASTRAL BOUNDARY OF PORTION 7001, STELLENBOSCH MEASURING 6.53HA IN SIZE REPRESENTING THE SITE FOR DEVELOPMENT					
THE FIGURE ABCDEFGHIA REPRESENTS A RIGHT OF WAY SERVITUDE (4m wide) TO BE REGISTERED OVER PORTION 129 TO PROVIDE ACCESS TO PORTION 129					
THE FIGURE GHIM REPRESENTS A WATER PIPELINE SERVITUDE (15.2m - 6.6m wide) TO BE REGISTERED IN FAVOUR OF THE MUNICIPALITY OVER PORTION 124, PORTION 125 & PORTION 126					

PROJECT

ERE 7001 STELLENBOSCH

DATE

10/12/2021

APPROVED

DATE

DRAWN

AFB

DESIGNED

AFB

CHECKED

AFB

R.S.

AFB

SCALE

N.T.S.

REVISIONS

REV 1 2021/12/20

REV 2 2021/12/20

REV 3 2021/12/20

REV 4 2021/12/20

CONSTRUCTION

2021/12/20

DRAWINGS ARE ISSUED UNLESS THE MASTER DRAWING IS WITH THE ORIGINAL APPROVAL WILL BE HELD AT THE ZUTARI OFFICE OF THE APPROVER

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2021/12/20

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DATE

10/12/2021

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ANNEXURE C

Concept Designs

CONCEPT DESIGN

TYPOLOGY 1

TYPOLOGY 1

SMALL UNIT (SEMI-DETACHED DUPLEX)



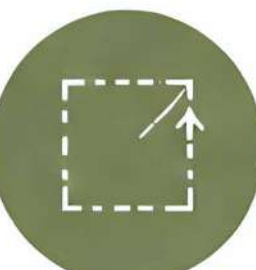
ERF
± 8m × 16m

- 2 BEDROOMS
- 1 BATHROOM
- OPEN PLAN LIVING / DINING / KITCHEN
- CARPORT (OPTION)
- GARDEN
- WASHING LINE / FUTURE EXPANSION

IDEAL FOR:

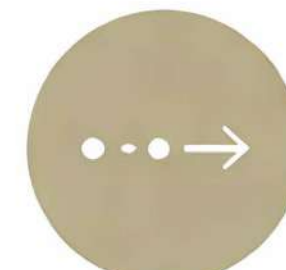
- FIRST TIME BUYERS
- YOUNG FAMILIES
- AFFORDABLE HOUSING DEVELOPMENTS

KEY CONCEPTS



1. COMPACT EFFICIENCY

Maximises functionality within a limited footprint (±70 m²). Every square meter is usable.



2. LINEAR SPATIAL PLANNING

Clear front-to-back progression from public to private spaces for legibility and privacy.



3. OPEN-PLAN LIVING CORE

Kitchen, dining and lounge integrated to create a social, flexible and light-filled space.



4. INDOOR-OUTDOOR CONTINUITY

Living area opens to patio and braai, extending the home and embracing outdoor living.



5. INCREMENTAL FLEXIBILITY

Garage is optional and can adapt to changing needs (room, workspace, rental potential).



6. PRIVACY GRADIENT

Bedrooms at the rear, buffered by bathroom, ensuring privacy from the street.



7. SERVICE CONSOLIDATION

Centralised bathroom and kitchen services optimise plumbing and reduce costs.



8. NATURAL LIGHT & VENTILATION

Cross-ventilation and daylight through front and rear openings for comfort and efficiency.



9. AFFORDABLE LIVING

Simple form, standard sizes and efficient design for cost-effective housing at scale.



10. DEFINED OUTDOOR UTILITY SPACE

Private rear yard with patio, braai and washing line for everyday activities.

TYPOLOGY 1

SMALL UNIT (DUPLEX HOUSING)

Erf : ± 8m × 16m

Building : 5m × 7m

Layout:

Front → Back:

- Living + Kitchen (open plan - downstairs)
- 2 Bathrooms (guest toilet downstairs)
- 2 Bedrooms (upstairs)
- Option Study area
- Future Garage (or Future carport)
- Patio and Braai
- Washing Line

Dimensions:

Kitchen	8	sqm
Lounge/ Dining	21	sqm
Guest Bathroom	2.5	sqm
Bathroom	4	sqm
Bed 1	12	sqm
Bed 2	7	sqm

GROUND FLOOR

FIRST FLOOR



EFFICIENCY
Every m² counts

CLARITY
Simple front-to-back layout

CONNECTION
People, spaces & outdoors

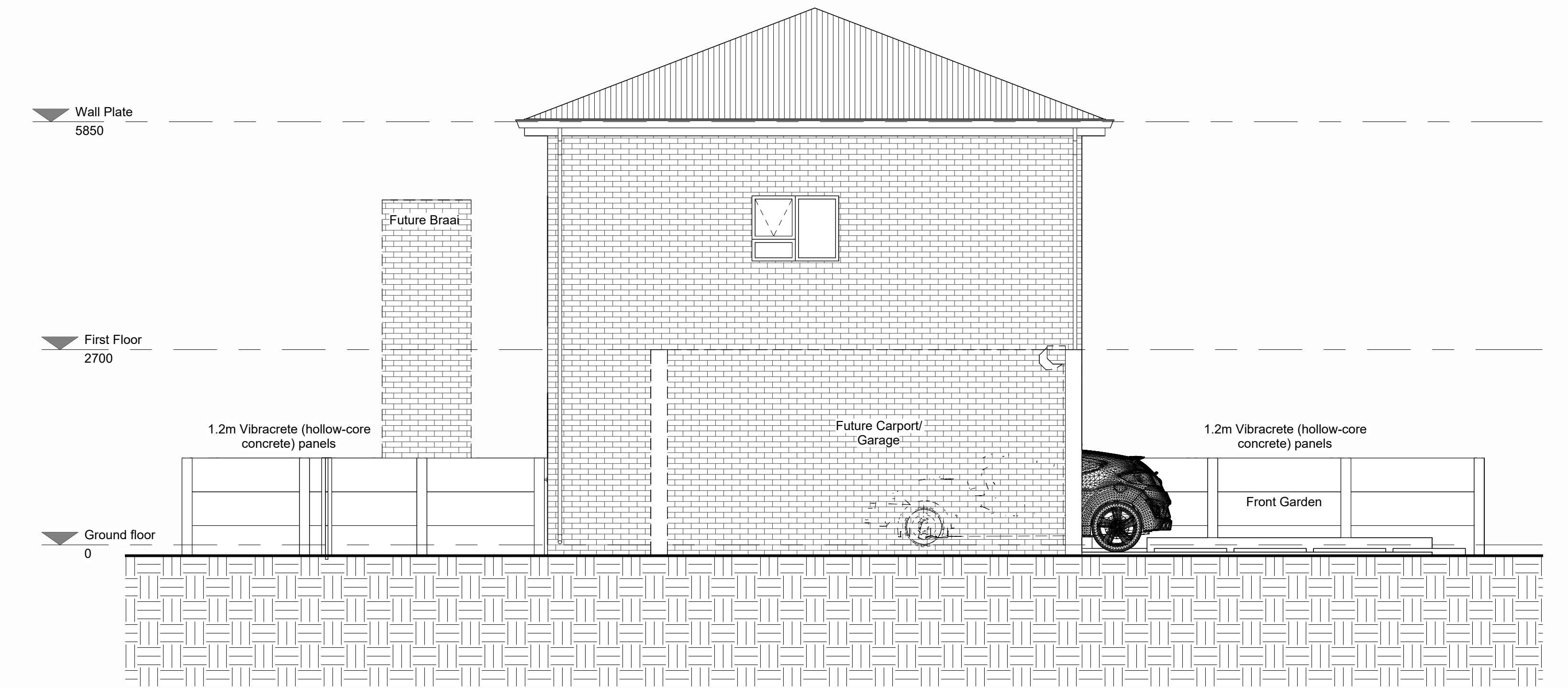
COMFORT
Light, air & well-being

AFFORDABILITY
Smart design, livable homes

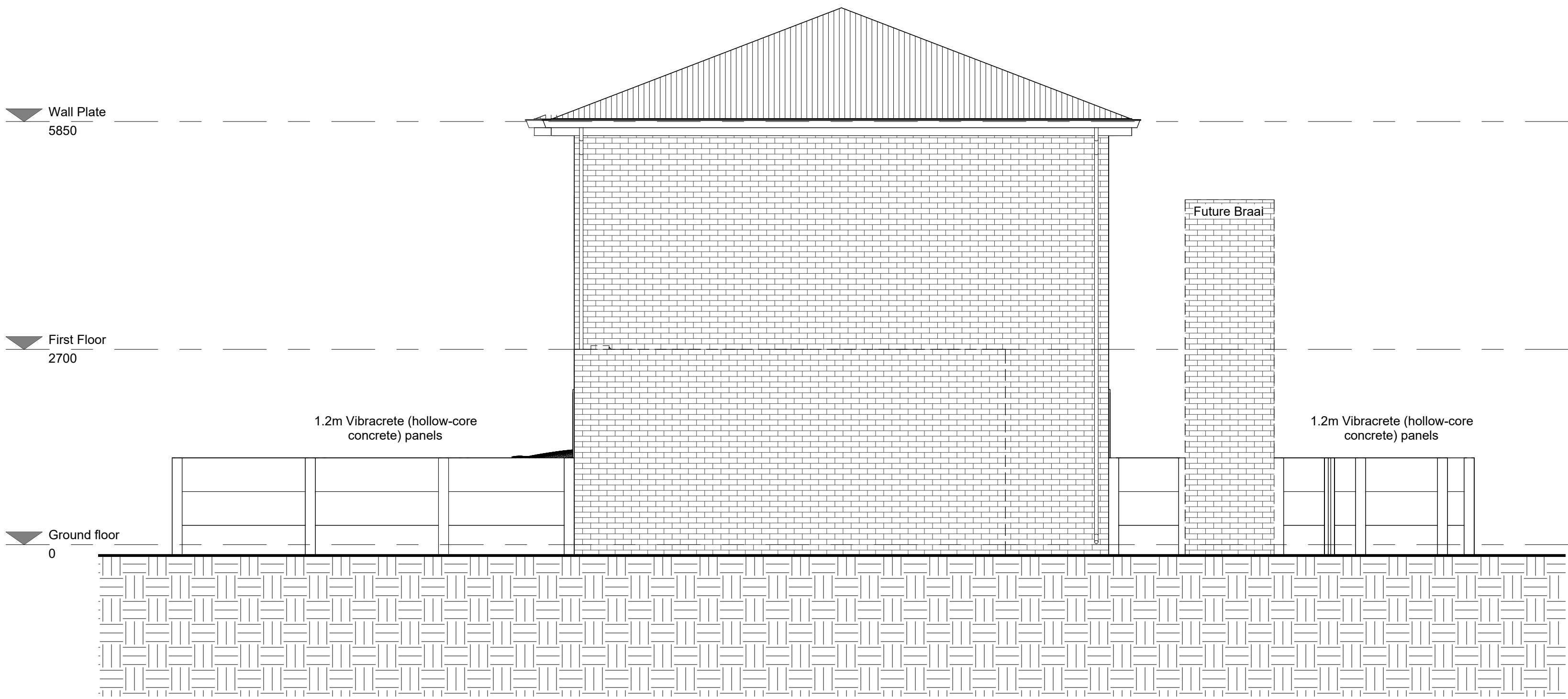
COMMUNITY
Row housing for stronger neighbourhoods

TPOLOGY 1

SMALL UNIT (SEMI-DETACHED DUPLEX)



① East Elevation
1 : 50



② West Elevation
1 : 50



CONCEPT DESIGNS FOR ERF 7001 CLOETESVILLE, STELLENBOSCH

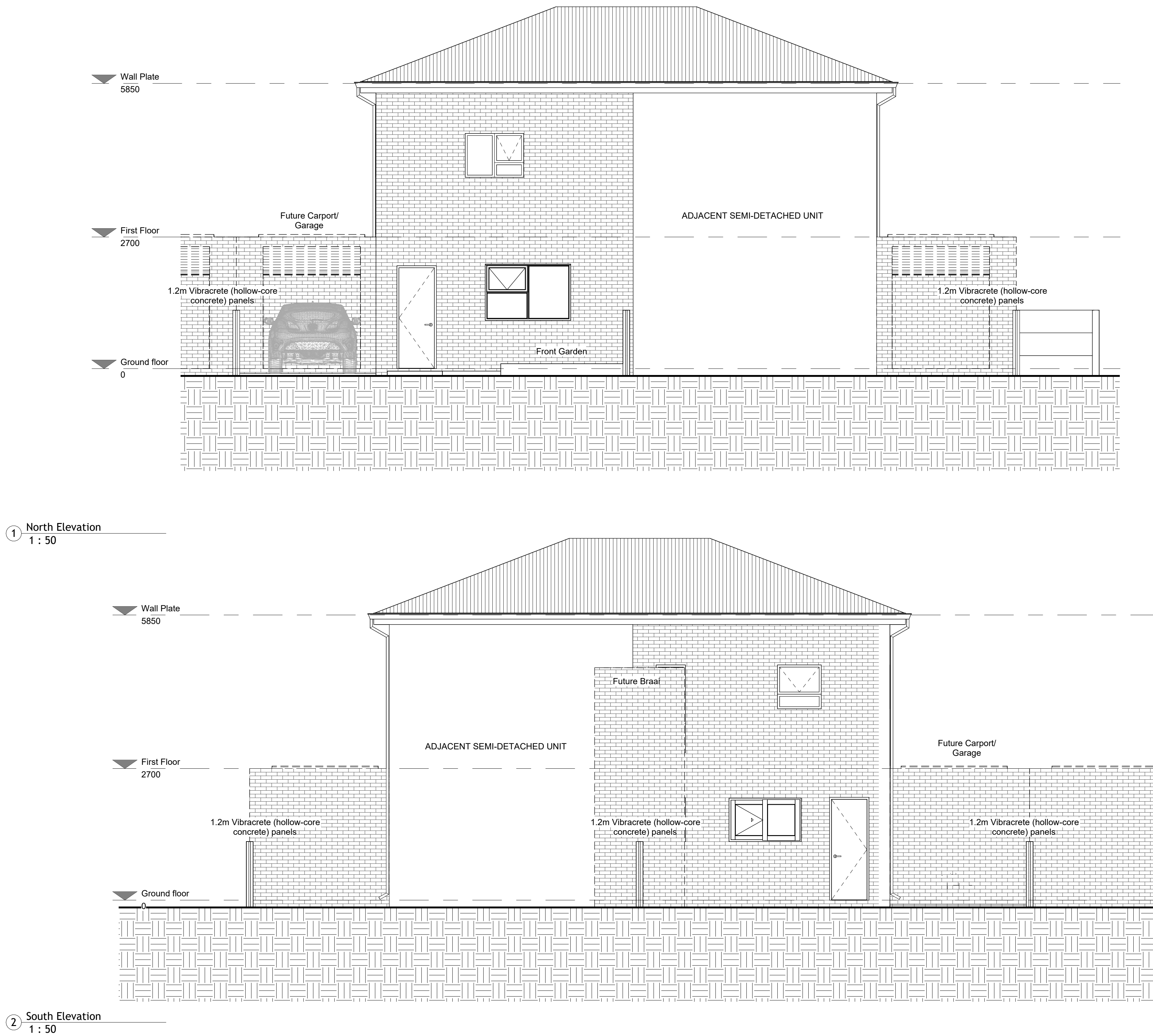
TPOLOGY 1 - SMALL UNIT (SEMI-DETACHED DUPLEX)

May 2026

Prepared by:

TYPOLOGY 1

SMALL UNIT (SEMI-DETACHED DUPLEX)



CONCEPT DESIGNS FOR ERF 7001 CLOETESVILLE, STELLENBOSCH

TYPOLOGY 1 - SMALL UNIT (SEMI-DETACHED DUPLEX)

May 2026

Prepared by:

CONCEPT DESIGN

TYPOLOGY 2

TYPOLOGY 2

MEDIUM UNIT (SEMI-DETACHED DUPLEX)

Erf : ± 9m × 17m

Building : 4.6m × 9.4m

- Layout:
Front → Back:
- Entrance Verandah
 - Open-plan living + dining
 - Guest Toilet
 - Bathroom
 - 2 Bedrooms
 - Future Braai
 - Patio
 - Washing Line

Dimensions:		
Kitchen	10	sqm
Lounge/ Dining	25	sqm
Guest Toilet	2.5	sqm
Bathroom	4	sqm
Bed 1	14	sqm
Bed 2	12	sqm

KEY CONCEPTS

- Shared Wall Efficiency
Semi-detached configuration reduces construction cost and improves land efficiency.
- Compact Functional Planning
Carefully arranged spaces maximise usability within a smaller footprint.
- Linear Spatial Flow
Front-to-back progression enhances clarity and efficient movement.
- Open-Plan Living Core
Living and dining spaces combined to create a sense of openness.
- Buffered Privacy
Bedrooms positioned on the first floor.
- Cost-Effective Housing Model
Ideal for high-density, affordable housing developments.
- Outdoor Extension of Living
Patio and braai provide essential outdoor living despite compact size.
- Natural Ventilation Strategy
Openings positioned front and back to promote cross-ventilation.
- Incremental Adaptability
Potential for future additions or modifications within constrained site.
- Community-Oriented Living
Semi-detached form encourages neighbourhood cohesion while maintaining privacy.



CONCEPT DESIGNS FOR ERF 7001 CLOETESVILLE, STELLENBOSCH

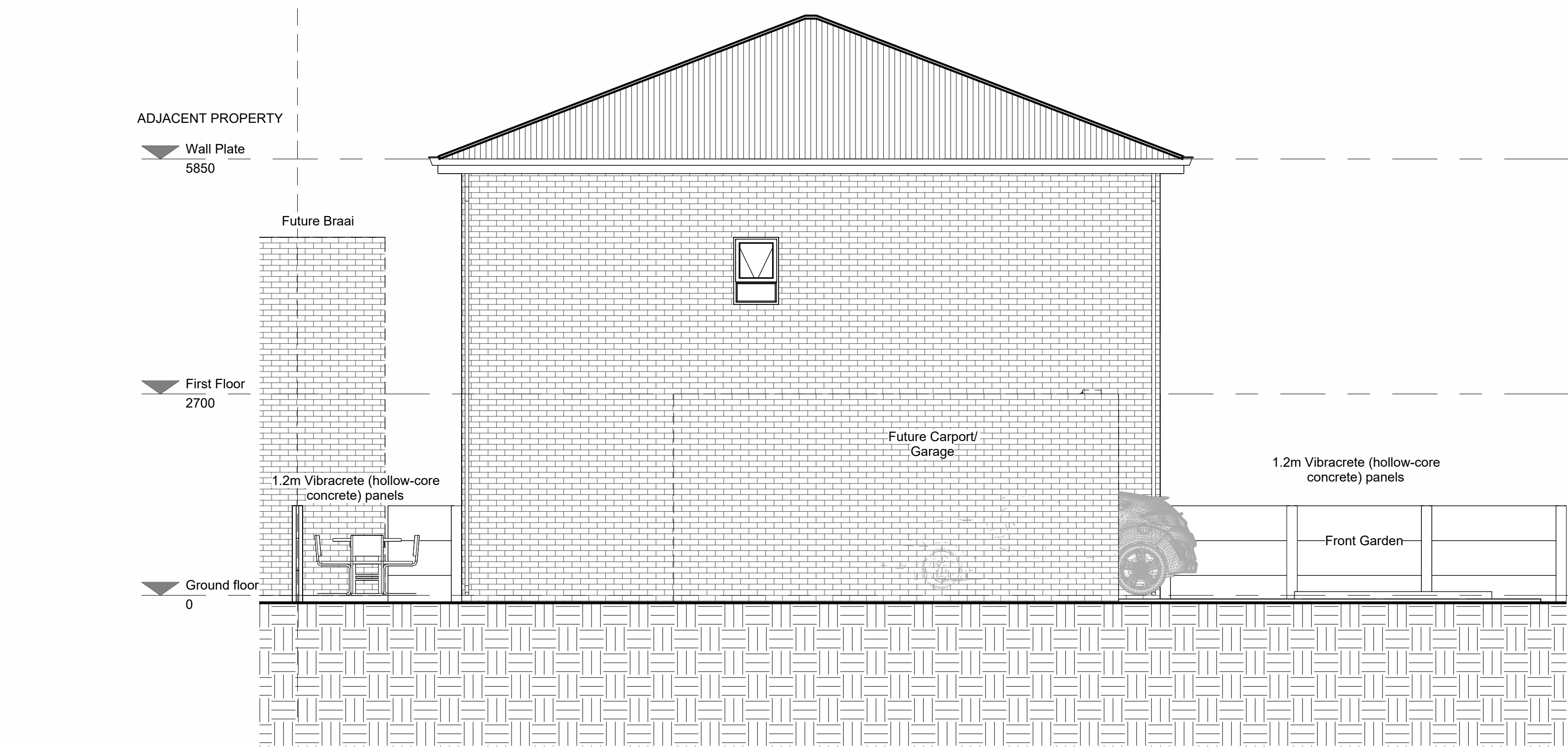
TYPOLOGY 2 - MEDIUM UNIT (SEMI-DETACHED DUPLEX)

May 2026

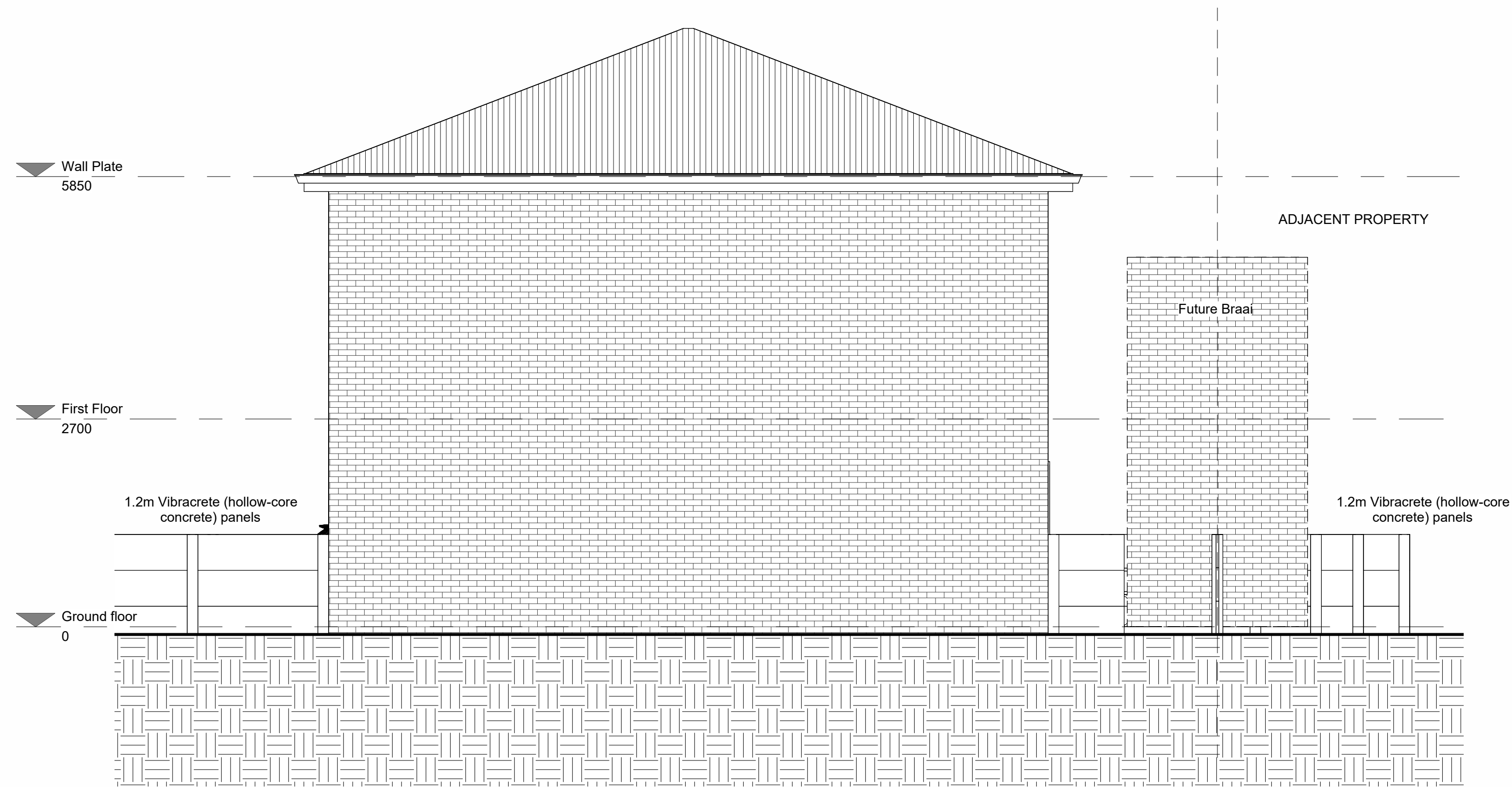
Prepared by:

TYPOLOGY 2

MEDIUM UNIT (SEMI-DETACHED DUPLEX)



① East Elevation
1 : 50

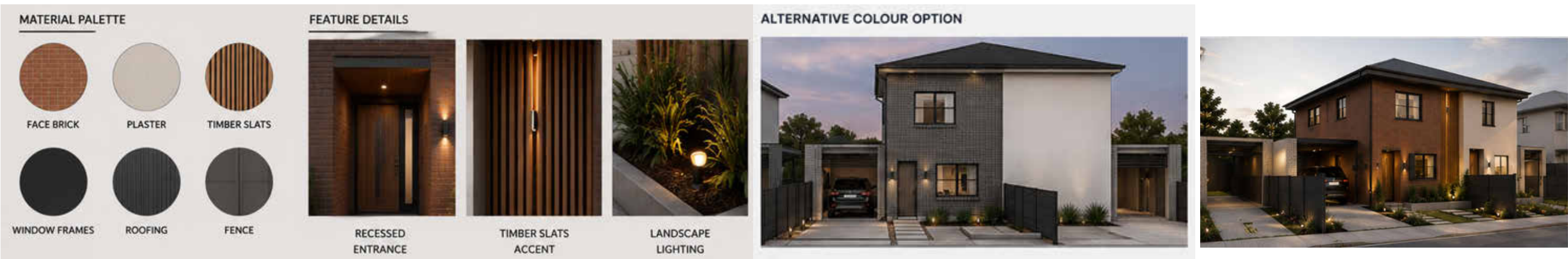
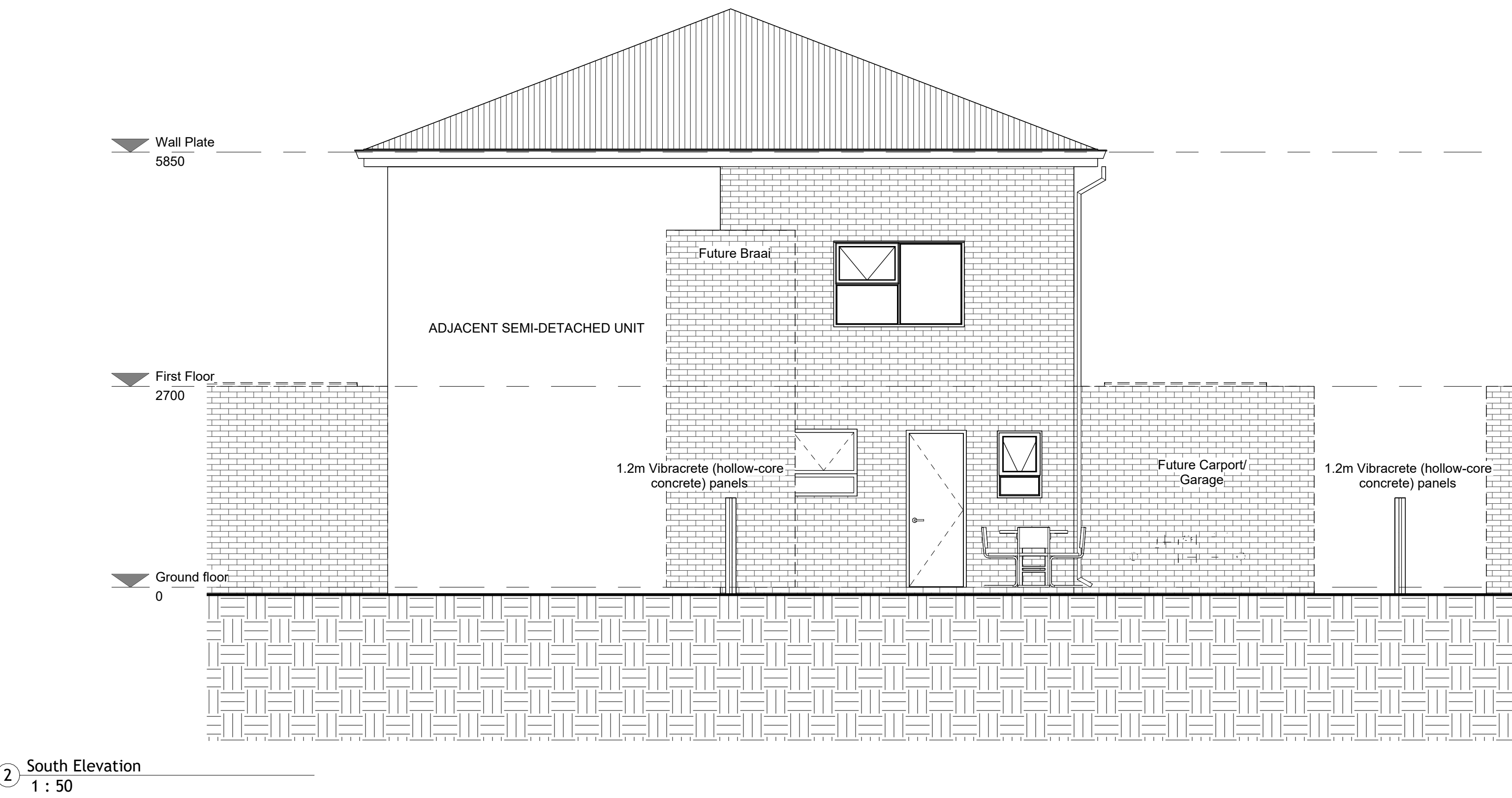


② West Elevation
1 : 50



TYPOLOGY 2

MEDIUM UNIT (SEMI-DETACHED DUPLEX)



CONCEPT DESIGN

TYPOLOGY 3

TYPOLOGY 3

LARGE UNIT (FREE STANDING)

±10.5m × 17.5m

BUILDING
± 85–100m²
footprint

Erf : ± 10.5m × 17.5m

Building : ± 85–92m² footprint

Layout:

- Garage
- Braai
- Entrance Verandah
- Open-plan Kitchen + living + dining
- 2 Bathrooms (ensuite)
- 3 Bedrooms
- Patio
- Washing Line

Dimensions:

Garage	15 sqm
Kitchen	8 sqm
Lounge/ Dining	20 sqm
Bathroom	5 sqm
Bed 1 and Ensuite	13 sqm
Bed 2	11 sqm
Bed 3	7 sqm

KEY CONCEPTS

- 1

1. Compact Family Living

Efficient layout designed to accommodate family life within a controlled footprint.
- 2

2. Centralised Living Hub

Open-plan kitchen and living space act as the heart of the home.
- 3

3. Simplified Spatial Organisation

Clear, legible layout improves usability and reduces construction complexity.
- 4

4. Functional Bedroom Allocation

Bedrooms sized and arranged to maximise usability within limited space.
- 5

5. Integrated Indoor–Outdoor Living

Braai and patio spaces enhance lifestyle quality without increasing building footprint.
- 6

6. Service Consolidation

Bathrooms and kitchen aligned to streamline services and reduce costs.
- 7

7. Privacy Through Positioning

Bedrooms located away from main living and street-facing areas.
- 8

8. Affordable Scalability

Design suited for replication in larger housing developments.
- 9

9. Efficient Garage Integration

Garage positioned for easy access while maintaining spatial flow.
- 10

10. Low-Maintenance Living

Simple forms and layouts reduce long-term maintenance requirements.

1 Ground floor
1 : 75



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CONCEPT DESIGNS FOR ERF 7001 CLOETESVILLE, STELLENBOSCH

TYPOLOGY 3 - LARGE UNIT (FREE STANDING)

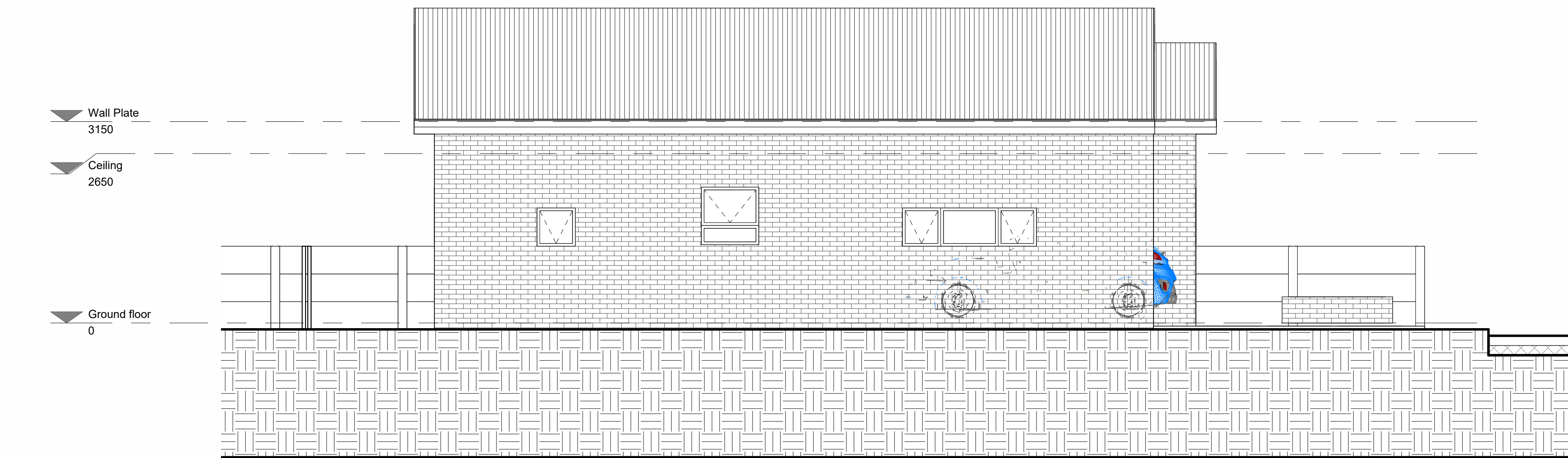
May 2026

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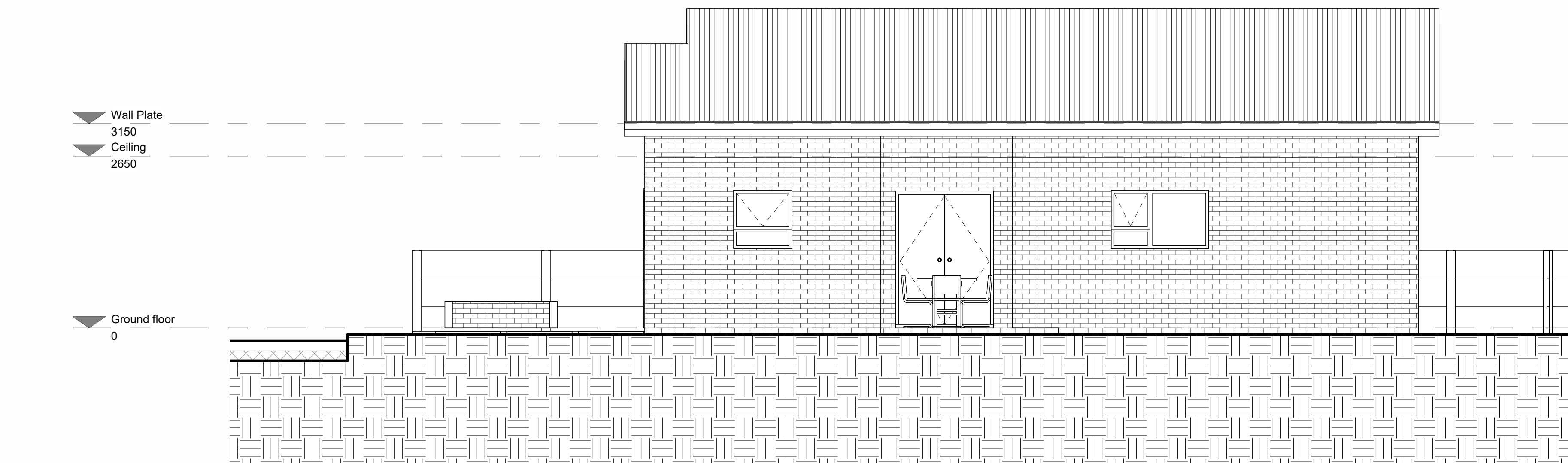
S P A C E
— ARCHITECTS AND DESIGNERS —

TYPOLOGY 3

LARGE UNIT (FREE STANDING)



① East Elevation
1 : 50

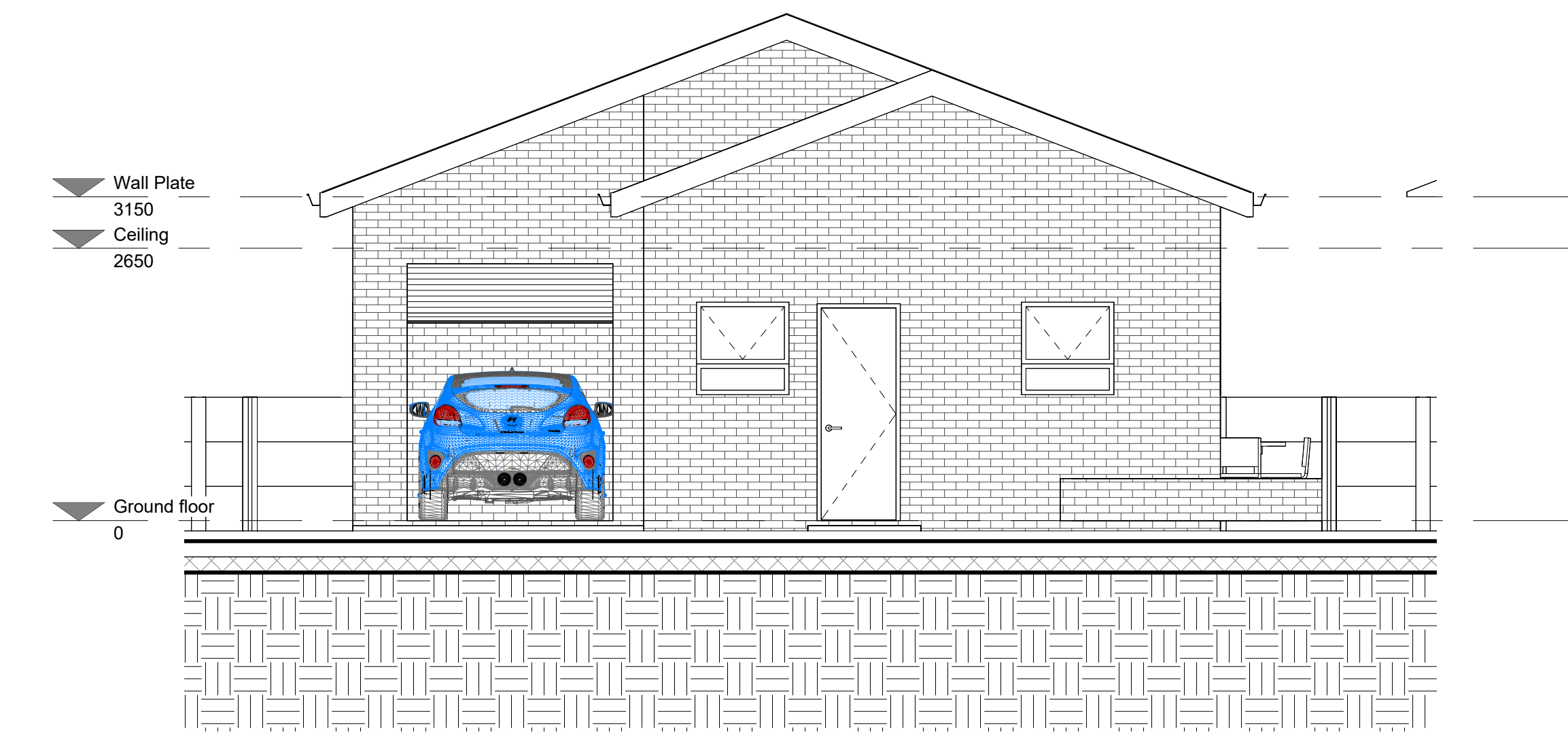


② West Elevation
1 : 50

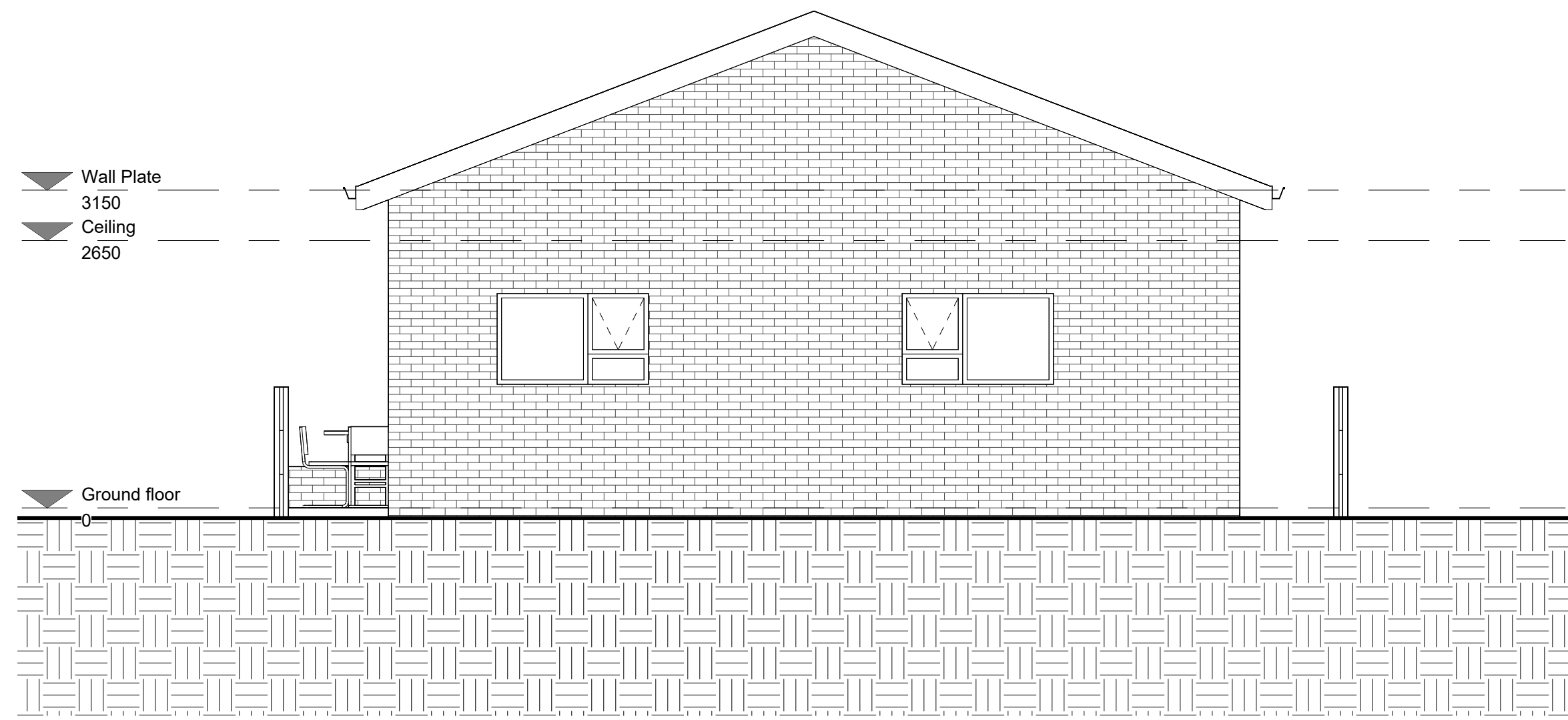


TYPOLOGY 3

LARGE UNIT (FREE STANDING)



① North Elevation
1 : 50



② South Elevation
1 : 50



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CONCEPT DESIGNS FOR ERF 7001 CLOETESVILLE, STELLENBOSCH

TYPOLOGY 3 - LARGE UNIT (FREE STANDING)

May 2026

Prepared by:



CONCEPT DESIGN

TYPOLOGY 4

TYPOLOGY 4

EXTRA LARGE UNIT (FREE STANDING)



±12m × 17.5m



BUILDING
±86-1ppm²
footprint

Erf : ± 12m × 17.5m

Building : ± 85–92m² footprint

Layout:	Dimensions:	
- Garage - Braai - Entrance Verandah - Open-plan Kitchen + living + dining 2 Bathrooms (ensuite) 3 Bedrooms - Patio - Washing Line		
	Garage	15 sqm
	Kitchen	13 sqm
	Lounge/ Dining	21 sqm
	Bathroom	5 sqm
	Bed 1 + ensuite	12 sqm
	Bed 2	11 sqm
	Bed 3	7 sqm

KEY CONCEPTS

1. Balanced Density Living

Optimised footprint offering a balance between spatial comfort and land efficiency.
2. Open-Plan Social Core

Kitchen, lounge, and dining integrated to form a central family hub.
3. Seamless Indoor–Outdoor Flow

Patio and braai connected to living space to extend usability.
4. Compact Privacy Zoning

Bedrooms grouped to create a clear yet efficient private zone.
5. Ensuite-Based Living

Primary bedroom with ensuite improves comfort without increasing footprint significantly.
6. Garage as Functional Buffer

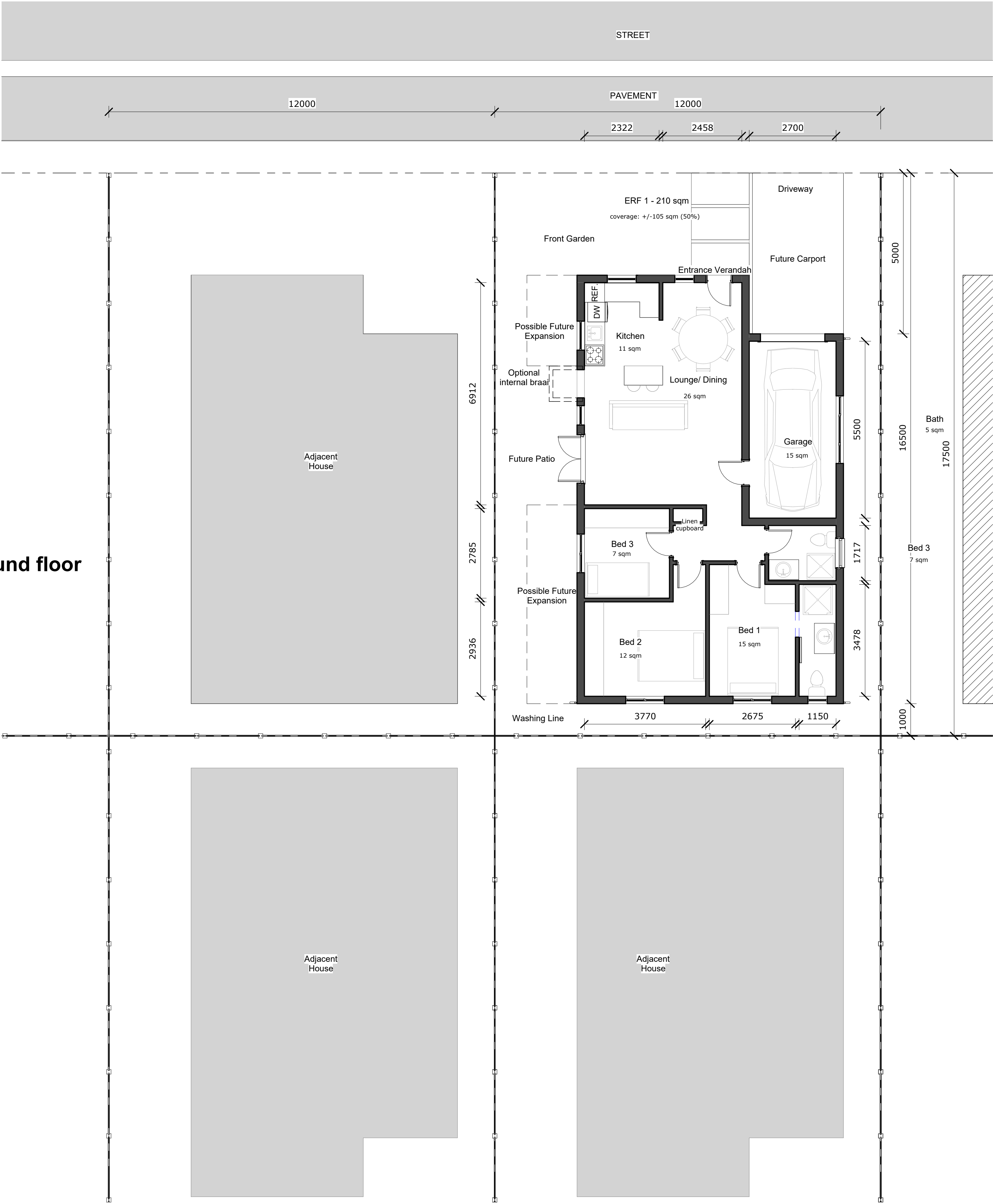
Garage acts as transition between public street and private interior.
7. Efficient Circulation

Minimal passage space ensures maximum usable floor area.
8. Natural Light Penetration

Open-plan layout enhances daylight reach into the depth of the unit.
9. Adaptable Family Unit

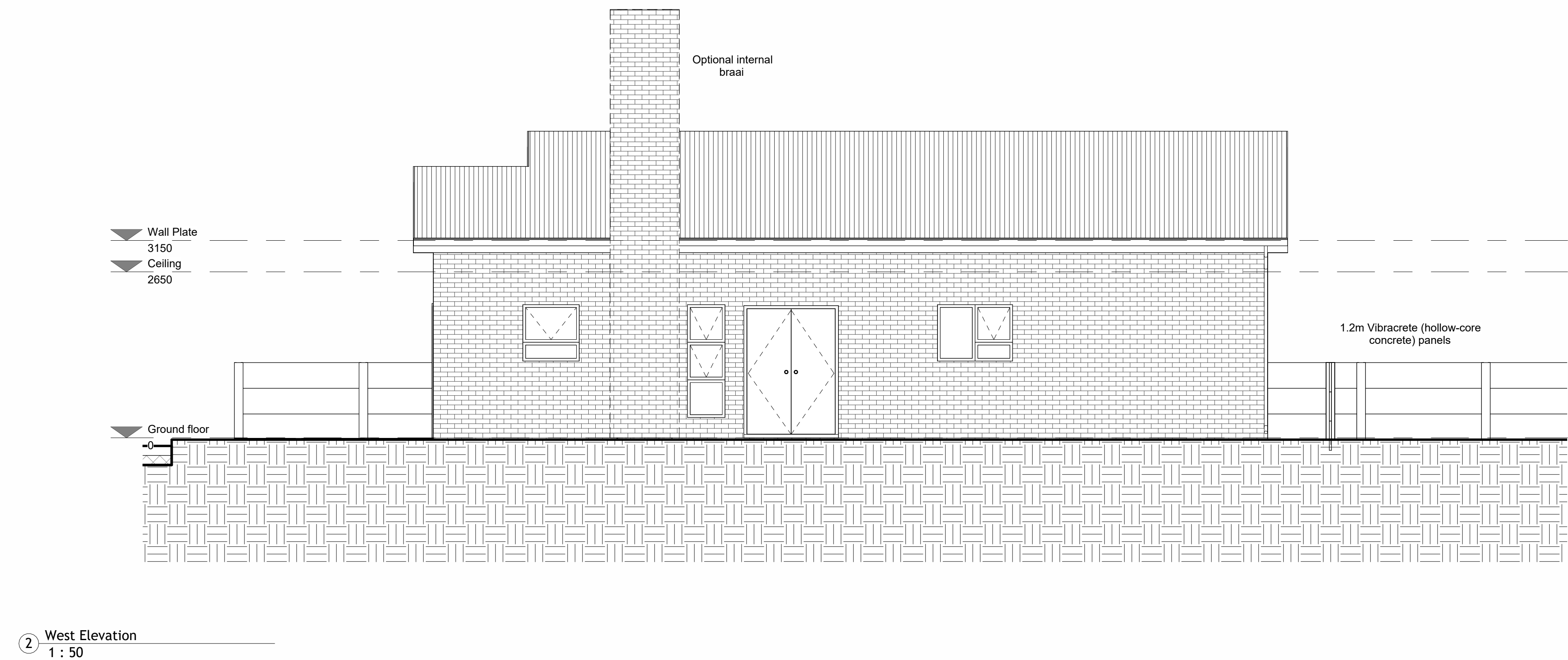
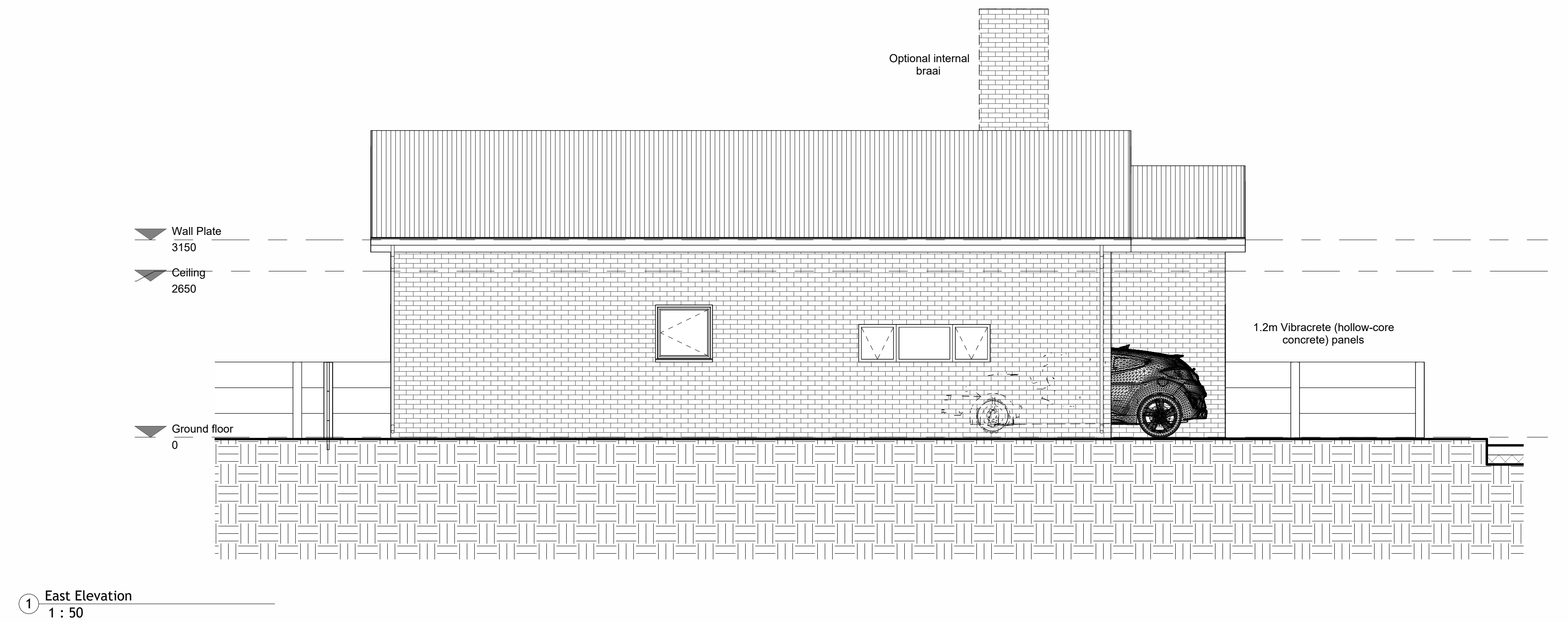
Suitable for growing families with moderate spatial needs.
10. Cost-Conscious Design

Standardised dimensions and compact services reduce construction costs.



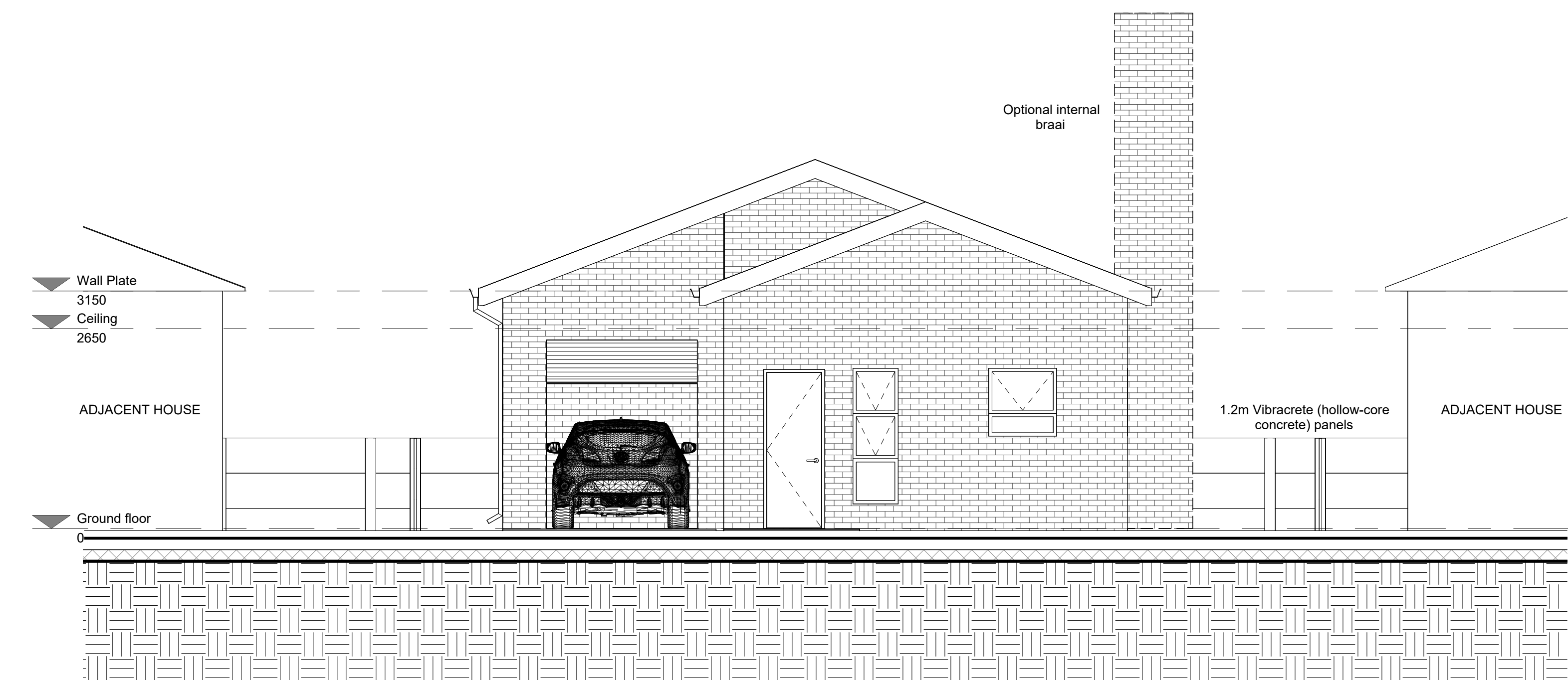
TPOLOGY 4

EXTRA LARGE UNIT (FREE STANDING)

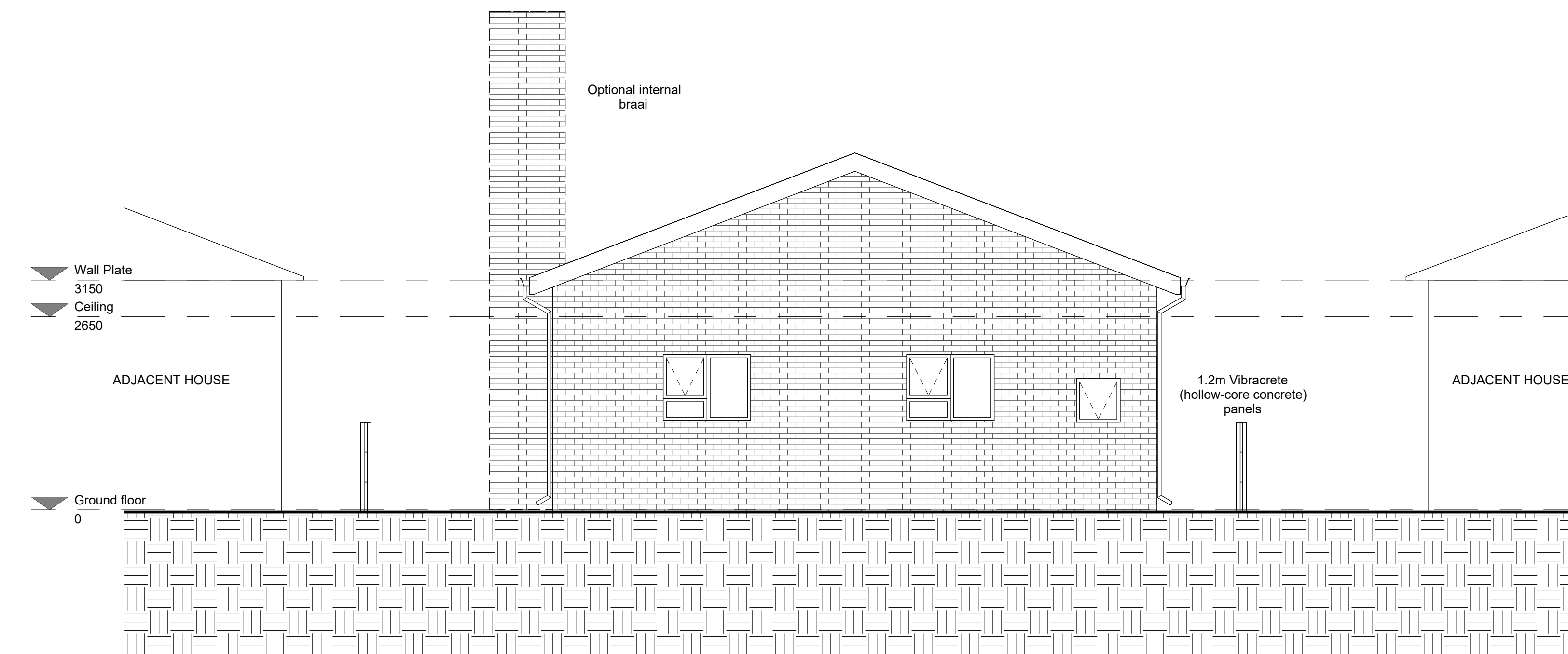


TPOLOGY 4

EXTRA LARGE UNIT (FREE STANDING)



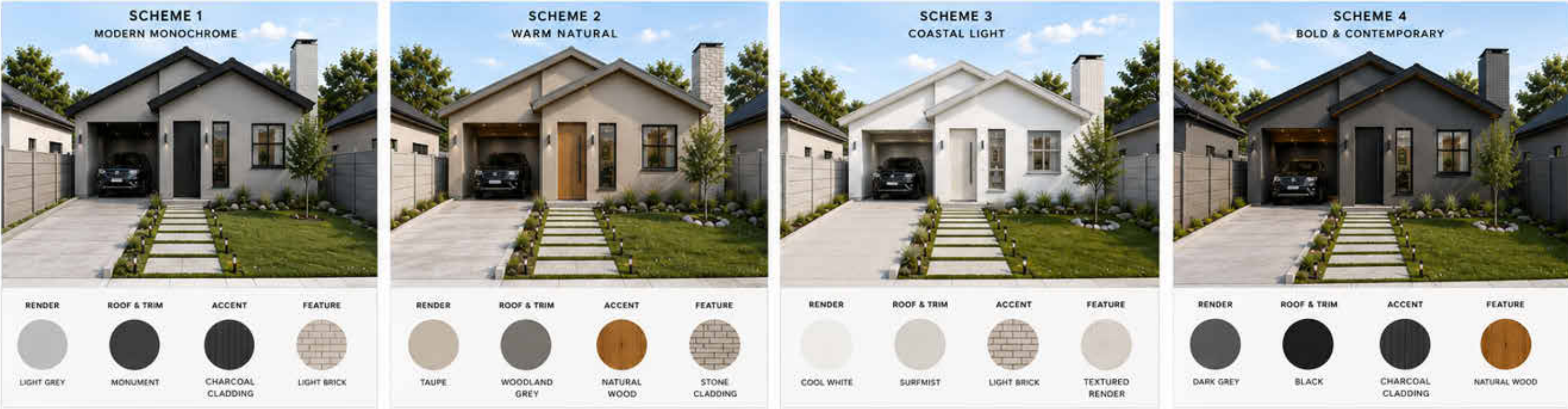
1 North Elevation
1 : 50



2 South Elevation
1 : 50



ALTERNATIVE SCHEME OPTIONS



CONCEPT DESIGN

TYPOLOGY 5

TYPOLOGY 5

XX LARGE UNIT (FREE STANDING)

Erf : ± 13m × 18.5m

Building : ± 110–121m² footprint

Layout:

- Entrance Verandah
- Kitchen
- Dining
- Garage (direct access to Dining)
- Open-plan living + dining
- Braai and Braai
- 2 Bathrooms (ensuite)
- 3 Bedrooms
- Washing Line

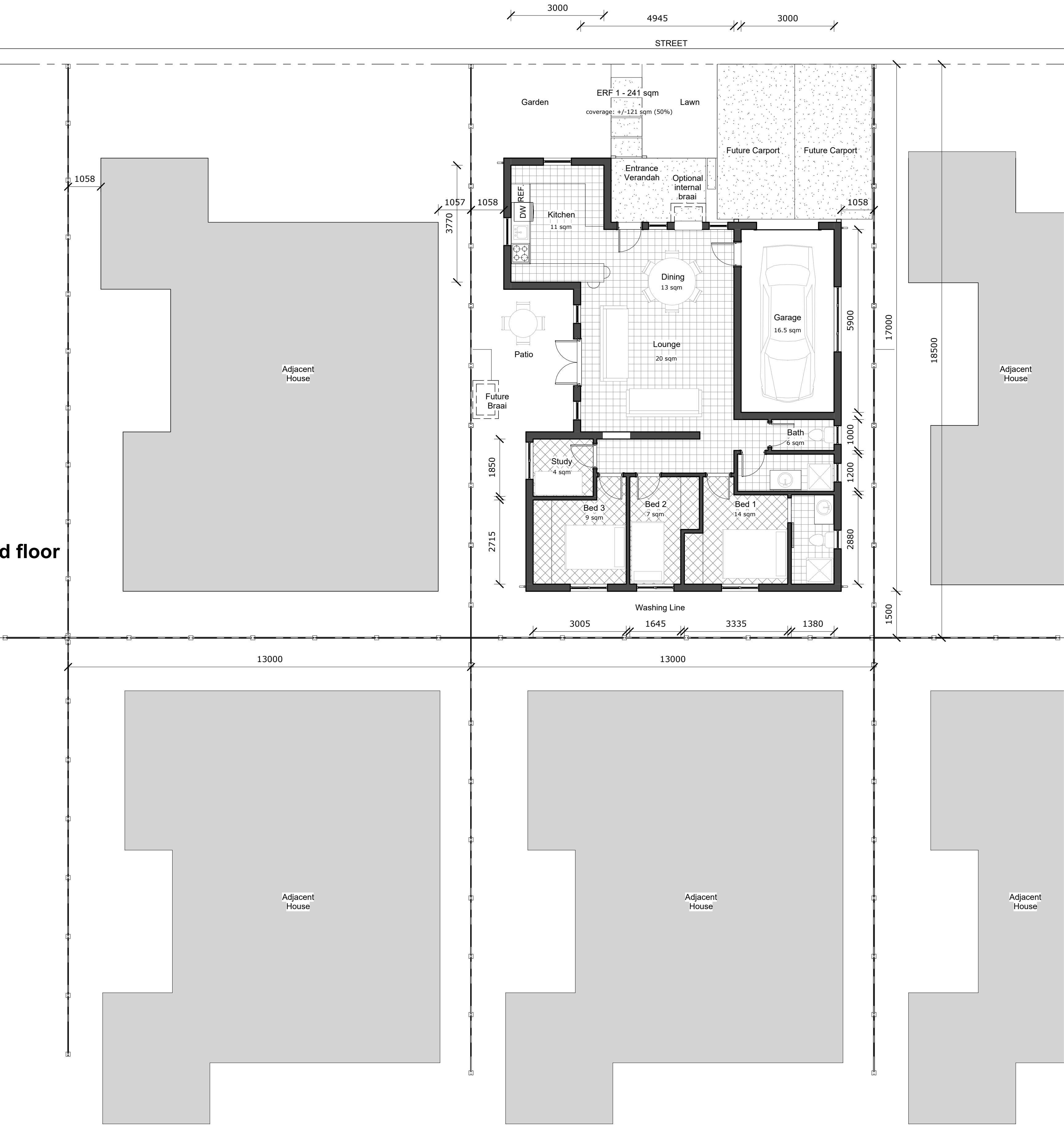
Dimensions:

Garage	16.5	sqm
Kitchen	11	sqm
Lounge	20	sqm
Dining	13	sqm
Bathroom	6	sqm
Bed 1	14	sqm
Bed 2	7	sqm
Bed 3	9	sqm
Study	4	sqm

KEY CONCEPTS

1. Generous Spatial Planning
Larger footprint enables well-defined yet spacious living zones, supporting family-oriented living.
2. Dual Living Zones
Separation of lounge and dining creates layered social spaces for both formal and informal use.
3. Indoor–Outdoor Entertainment Focus
Direct connection to braai area enhances entertainment and extends living into the outdoors.
4. Integrated Garage Access
Garage links directly into the house (via dining/kitchen), improving convenience and security. Option to accommodate 2 additional carports.
5. Private Bedroom Wing
Bedrooms positioned away from public zones, ensuring a strong privacy gradient.
6. Ensuite Living Comfort
Multiple bathrooms (including ensuite) enhance functionality for larger households.
7. Flexible Study / Work Node
Dedicated study space supports remote work, learning, or conversion into additional functions.
8. Service Efficiency
Clustered kitchen and bathrooms optimise plumbing and reduce construction complexity.
9. Lifestyle Upgrade Housing
Designed for upwardly mobile families seeking space, comfort, and long-term adaptability.
10. Defined Outdoor Utility & Leisure
Clear separation between entertainment (braai) and service areas (washing line).

Ground floor
1 : 75



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CONCEPT DESIGNS FOR ERF 7001 CLOETESVILLE, STELLENBOSCH

TYPOLOGY 5 - XX LARGE UNIT (FREE STANDING)

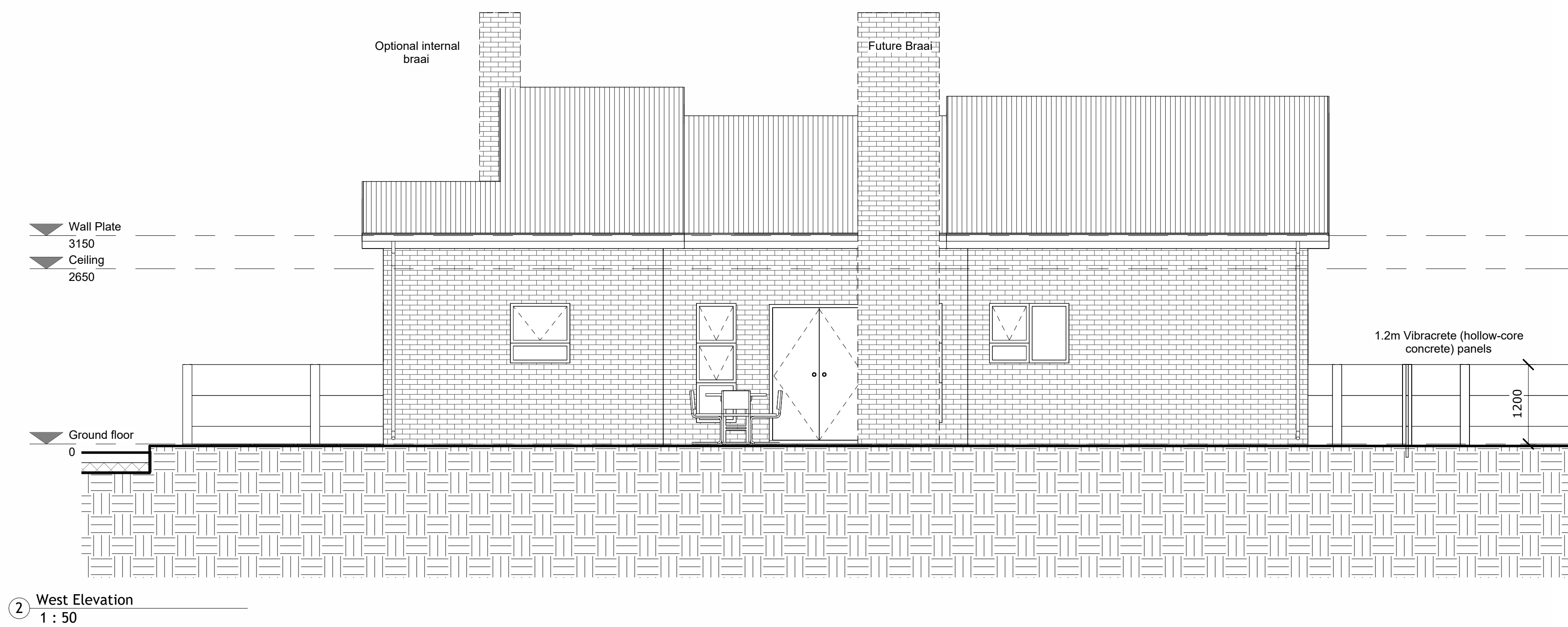
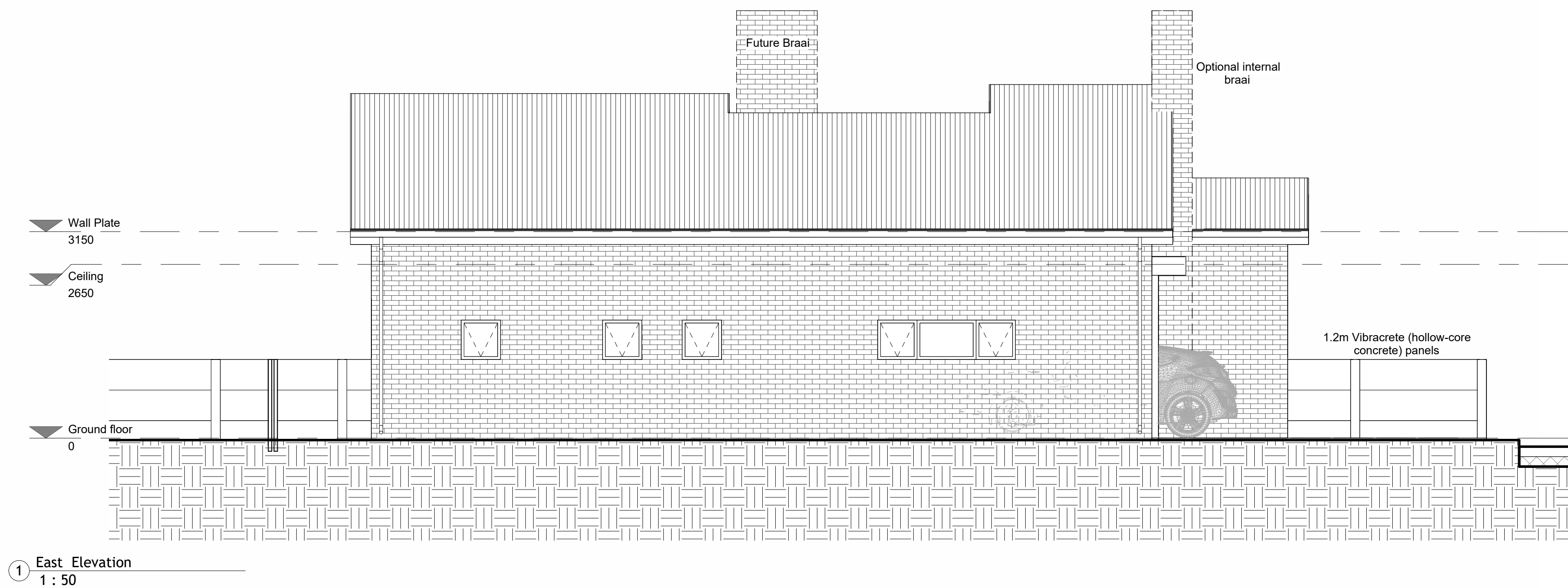
MAY 2026

Prepared by:



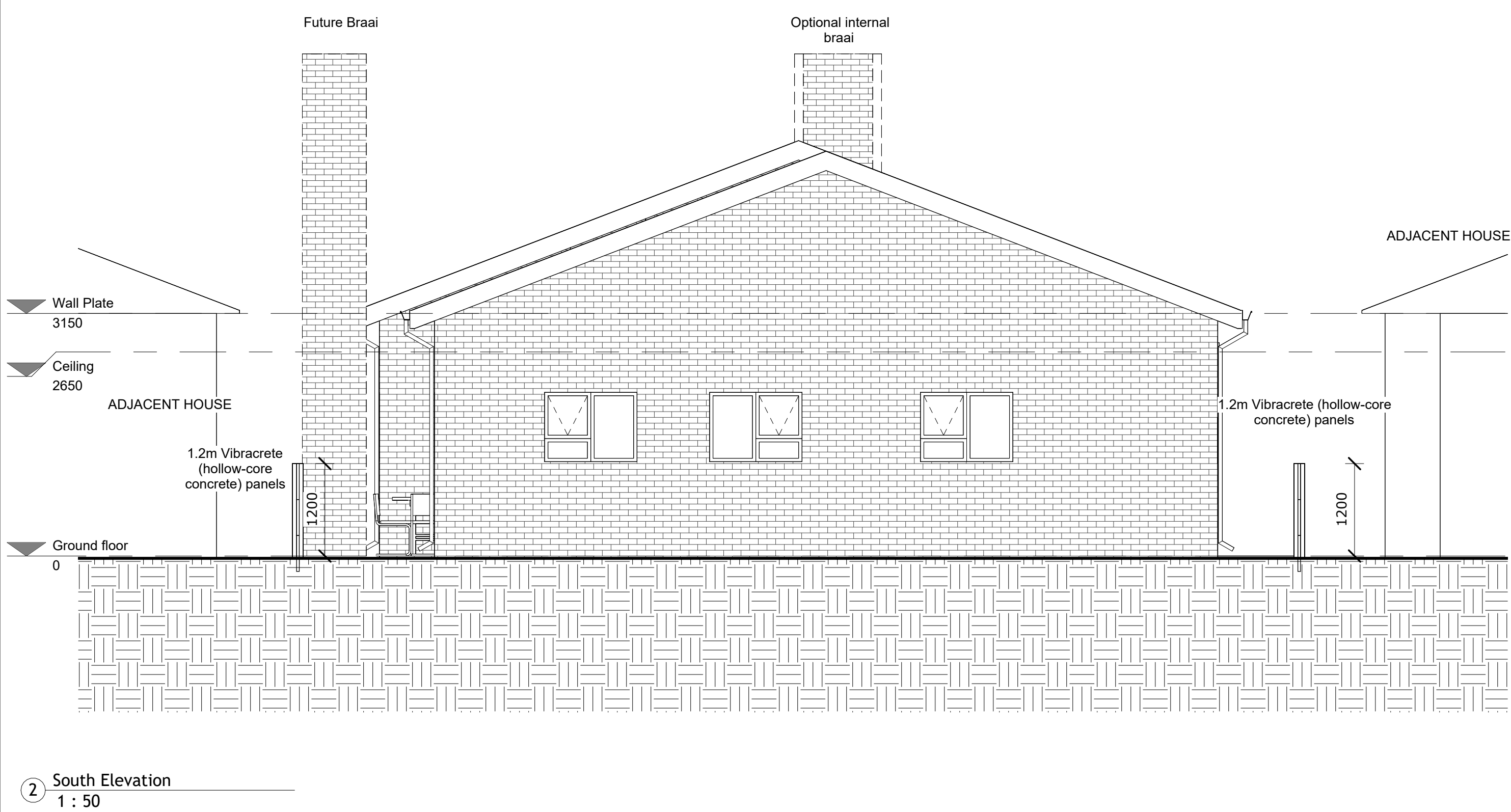
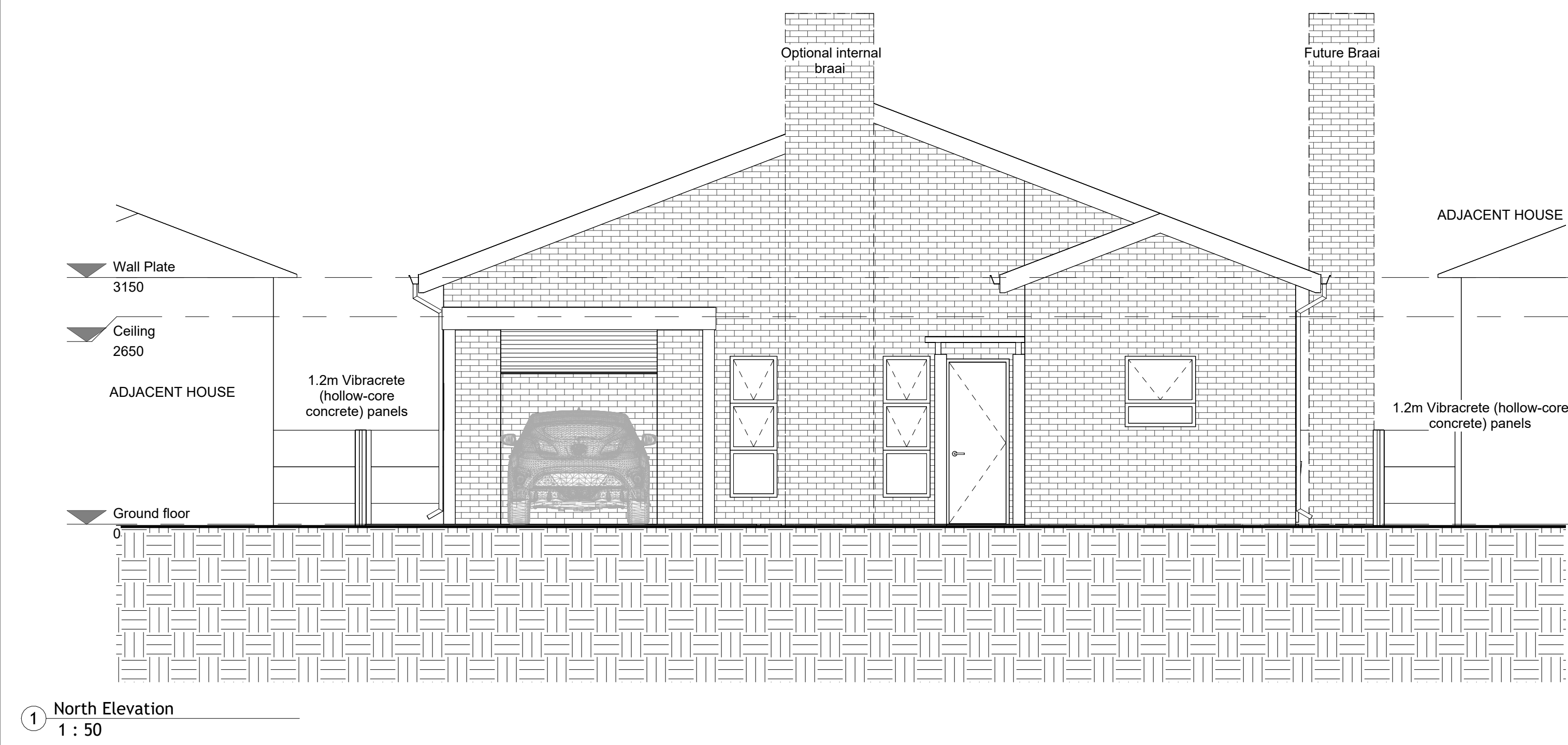
TYPOLGY 5

XX LARGE UNIT (FREE STANDING)



TYPOLGY 5

XX LARGE UNIT (FREE STANDING)



ANNEXURE D

FFE SPECIFICATION

TYPOLOGY 1



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ARCHITECTURAL

FINISHES & FIXTURES SPECIFICATION

TYOLOGY 1 – SMALL SEMI-DETACHED DUPLEX

1.1 PROJECT INFORMATION

PROJECT:	Erf 7001 GAP Housing Development
TYPOLOGY:	Typology 1 – Small Semi-Detached Duplex
LOCATION:	Erf 7001, Cloetesville, Stellenbosch
CLIENT:	Stellenbosch Municipality
DOCUMENT:	Architectural Finishes & Fixtures Specification



This document establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 1. It shall be read in conjunction with the associated drawings and all consultant documentation.

DOCUMENT NO.
ERF7001-FFS-T01

REVISION:
A

ISSUE DATE:
AUGUST 2026

Prepared by

SPACE
ARCHITECTS AND DESIGNERS

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ANNEXURE A

External Finishes and Construction Standards

ANNEXURE B

External Finishes and Areas

ANNEXURE C

Kitchen Fixtures and Finishes

ANNEXURE D

Sanitary Fixtures

SECTION 1

1.1 General Information:

<i>Description</i>	<i>Value</i>
Typology	Small Duplex
Gross Floor Area	63.5 m ²
Ground Floor	31.5 m ²
First Floor	32 m ²
Bedrooms	2
Bathrooms	1 Family Bathroom
Guest WC	1
Kitchen	Open Plan
Lounge/Dining	Open Plan
Patio	Yes
Built-in Braai	Future Provision
Carport	Future Provision
Construction Type	Double Storey Masonry

1.2 Purpose of this Specification

This specification establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 1. It shall be read together with the approved architectural drawings and all consultant documentation forming part of the future procurement documentation.

The intention of this specification is to establish a consistent standard of quality, durability and appearance suitable for municipal GAP housing developments whilst remaining commercially viable and appropriate to the approved construction budget.

1.3 Design Intent

The architectural character of Typology 1 is based on compact, efficient duplex housing providing comfortable, functional and adaptable accommodation for small families.

The selected finishes shall reflect the following design principles:

- Robust, durable and low-maintenance materials.

- Cost-effective construction.

Contemporary residential appearance.

- Simple detailing to minimise maintenance.
 - Readily available materials within the South African market.
 - Long service life under normal residential use.
 - Ease of replacement where maintenance becomes necessary.
 - Consistent appearance throughout the development.
-

1.4 Applicable Standards

Unless specifically noted otherwise, all materials, products and workmanship shall comply with the latest editions of the following:

- National Building Regulations.
- SANS 10400.
- Relevant SANS product standards.
- Occupational Health and Safety Act.
- Local Authority requirements.
- Manufacturer's written installation requirements.
- Good building practice.

Where discrepancies occur, the more stringent requirement shall apply.

1.5 Quality Standard

All finishes shall be:

- New and unused.
- First quality.
- Free from visible defects.
- Installed by suitably experienced trades.
- Installed strictly in accordance with manufacturer's recommendations.
- Protected during construction.
- Handed over clean and free of damage.

Materials showing defects, colour variation beyond acceptable tolerances or installation defects shall be replaced.

1.6 Approved Alternatives

Products specified within this document establish the required minimum performance standard.

Alternative products may be proposed provided they are equal or superior in respect of:

- durability
- appearance
- performance
- warranty
- maintenance requirements
- availability
- compliance with applicable SANS standards

Any proposed alternative shall receive written approval from the Municipality prior to procurement.

1.7 Colour Philosophy



The colour palette shall consist of neutral contemporary colours selected to:

- maximise natural daylight
- reduce long-term maintenance
- conceal normal residential wear
- create visual consistency throughout the development
- complement the architectural form

Accent colours shall be used sparingly.

1.8 Sustainability

Where practical and economically feasible, materials shall:

- be locally manufactured;
 - contain recycled content where appropriate;
 - have low maintenance requirements;
 - have low volatile organic compound (VOC) emissions where applicable;
 - be replaceable without significant demolition;
 - provide long service life under normal residential occupation.
-

1.9 Durability Requirements

Finishes shall be suitable for residential use and capable of withstanding:

- normal family occupation;
- routine cleaning;
- exposure to moisture within wet areas;
- exposure to ultraviolet radiation on external surfaces;
- minor impact associated with residential occupation.

Premature deterioration shall not be acceptable.

1.10 Coordination

All finishes shall be coordinated with:

- architectural drawings;
- structural drawings;
- electrical layouts;
- plumbing layouts;
- kitchen layouts;
- sanitaryware schedules;
- door schedules;
- window schedules;
- ironmongery schedules.

Any discrepancies shall be referred to the Architect before installation.

1.11 Workmanship

All work shall be carried out by competent tradespeople experienced in the installation of the specified materials.

Finished work shall be:

- level;
- plumb;
- square;
- true to line;
- free of visible defects;
- properly aligned;
- neatly jointed;
- fully cleaned before handover.

Defective workmanship shall be removed and replaced at the Contractor's cost.

1.12 Procurement Philosophy

This specification establishes the minimum acceptable quality standard for the development.

The Contractor may propose equivalent materials provided they comply with the performance requirements contained within this document and receive written approval prior to installation.

No substitution shall reduce:

- quality;
 - durability;
 - expected service life;
 - functional performance;
 - aesthetic intent.
-

1.13 Budget Compliance

The specification has been developed to align with the approved construction budget applicable to Typology 1 while maintaining appropriate residential quality.

Where value engineering becomes necessary, substitutions shall maintain the overall design intent and shall not compromise safety, durability, functionality or compliance with statutory requirements.

1.14 Exclusions

This specification does not include:

- structural design;
- mechanical services design;
- electrical engineering design;
- detailed kitchen manufacturing drawings;
- shop drawings;
- contractor temporary works;
- construction methodology;
- specialist supplier installation details.

These items shall be developed by the appointed contractor and relevant specialist consultants during the detailed design and construction stages.

SECTION 2

2.1 General

This Finishes Schedule establishes the minimum acceptable architectural finishes for Typology 1 and shall be read together with the Material Specifications contained within this document.

All finishes shall be suitable for affordable residential housing, providing durability, ease of maintenance, and long-term performance under normal residential occupancy.

Colours shall be selected by the Architect from the approved project colour palette prior to procurement.

All materials shall be installed strictly in accordance with the manufacturer's written recommendations and relevant SANS standards.

Equivalent products may be submitted for approval provided they satisfy the specified performance requirements.

2.2 Internal Finishes Schedule

<i>Space</i>	<i>Floor Finish</i>	<i>Skirting</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Notes</i>
<i>Entrance</i>	Ceramic floor tiles	Tile skirting	Plastered and painted	Painted gypsum ceiling	Durable, easy to maintain
<i>Lounge</i>	Ceramic floor tiles	Tile skirting	Plastered and painted	Painted gypsum ceiling	Continuous floor finish
<i>Dining</i>	Ceramic floor tiles	Tile skirting	Plastered and painted	Painted gypsum ceiling	Continuous with lounge
<i>Kitchen</i>	Ceramic floor tiles	Tile skirting	Painted plaster with ceramic tiled splashback above worktops	Moisture-resistant gypsum ceiling	Easy to clean
<i>Guest WC</i>	Non-slip ceramic floor tiles	Tile skirting	Painted plaster with ceramic tiled splashback at basin	Moisture-resistant gypsum ceiling	Moisture-resistant finishes
<i>Stair</i>	Ceramic floor tiles with anti-	Tile skirting	Plastered and painted	Painted gypsum ceiling	Durable finish

	slip stair nosings				
<i>Landing</i>	Ceramic floor tiles	Tile skirting	Plastered and painted	Painted gypsum ceiling	Continuous floor finish
<i>Bedroom 1</i>	Ceramic floor tiles	Tile skirting	Plastered and painted	Painted gypsum ceiling	Durable, low maintenance
<i>Bedroom 2</i>	Ceramic floor tiles	Tile skirting	Plastered and painted	Painted gypsum ceiling	Durable, low maintenance
<i>Family Bathroom</i>	Non-slip ceramic floor tiles	Tile skirting	Ceramic wall tiles to 2.1 m high in shower; painted plaster elsewhere	Moisture-resistant gypsum ceiling	Moisture-resistant finishes
<i>Built-in Cupboards (Bedroom 1 &2)</i>	Continue adjacent floor finish	—	White melamine-lined carcasses	—	Refer Joinery Specification in Built in Cupboards Schedule

2.3 External Finishes Schedule

<i>Area</i>	<i>Floor Finish</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance Porch</i>	Non-slip concrete paving	Cement plaster with exterior acrylic paint	Fibre cement soffit or painted concrete soffit	Falls away from building for drainage
<i>Patio</i>	Non-slip concrete paving	Cement plaster with exterior acrylic paint	Fibre cement soffit where applicable	Future built-in braai provision where indicated
<i>Future Braai Area</i>	Concrete paving	Cement plaster with exterior acrylic paint	Open to sky	Provision for future owner installation
<i>Washing Line Area</i>	Concrete paving slabs	Precast concrete boundary wall or plastered masonry wall	Open to sky	Low-maintenance finish
<i>Future Carport</i>	Concrete paving	Not applicable	Open to sky	Provision for future owner-installed carport
<i>Driveway</i>	Concrete paving blocks	Not applicable	Open to sky	Suitable for light motor vehicles

<i>Walkways</i>	Concrete paving slabs	Not applicable	Open to sky	Slip-resistant finish
-----------------	-----------------------	----------------	-------------	-----------------------

2.4 Colour Schedule

The development shall utilise a contemporary neutral palette.

<i>Element</i>	<i>Colour Intent</i>
<i>Internal Walls</i>	Warm off-white
<i>Ceilings</i>	White
<i>Timber</i>	Natural oak appearance or painted finish
<i>Kitchen Joinery</i>	Neutral light tone
<i>Bathroom Joinery</i>	Neutral light tone
<i>Bedroom Joinery</i>	Neutral light tone
<i>Aluminium</i>	Dark charcoal
<i>Roof</i>	Dark charcoal
<i>External Walls</i>	Warm neutral tone
<i>Feature Elements</i>	Medium grey accent
<i>Paving</i>	Natural grey

Final colours shall be approved by the Architect prior to procurement.

2.5 Floor Finishes

Internal Floors

Provide ceramic floor tiles to all internal living areas, bedrooms, circulation spaces and kitchen.

Floor tiles shall:

- Be suitable for heavy residential use.
- Have a matt finish.
- Be easy to clean and maintain.
- Be resistant to staining and normal domestic wear.
- Be sourced from locally available suppliers.
- Colour to Architect's approval.

Acceptable Alternative

Equivalent ceramic floor tiles of equal quality and performance.

Wet Areas

Provide non-slip ceramic floor tiles to bathrooms and guest WC.

Tiles shall:

- Be suitable for wet areas.
 - Provide slip resistance appropriate for residential bathrooms.
 - Be moisture resistant.
 - Colour to Architect's approval.
-

External Areas

Provide concrete paving or concrete paving blocks to patios, entrance porches, walkways and driveways.

Paving shall:

- Be slip resistant.
 - Be suitable for external use.
 - Be durable and low maintenance.
-

2.6 Wall Finishes

Internal Walls

Provide cement plaster finished with acrylic paint.

The finish shall:

- Provide a smooth, even surface.
- Be washable.
- Be suitable for residential occupation.
- Colour to Architect's approval.

Bathroom Walls

Provide ceramic wall tiles:

- To full height within shower enclosures.
- Splashback to basin.
- Remaining wall areas to painted plaster.

Kitchen Splashback

Provide ceramic wall tiles above kitchen worktops.

Splashbacks shall extend:

- Between worktop and underside of wall cupboards.
- Behind sink.
- Behind hob.

2.7 Ceiling Finishes

Provide painted gypsum board ceilings throughout.

Moisture-resistant gypsum board shall be provided to kitchens and bathrooms.

Ceilings shall:

- Have a smooth painted finish.
 - Be suitable for residential use.
 - Colour to Architect's approval.
-

2.8 Paint Finishes

Internal

Provide acrylic paint to plastered walls and ceilings.

Paint shall:

- Be washable.
- Be suitable for residential use.
- Be low maintenance.

External

Provide exterior acrylic paint suitable for masonry surfaces.

Paint shall:

- Resist normal weather exposure.
 - Be UV resistant.
 - Be suitable for the Stellenbosch climate.
-

2.9 External Works Finishes

Provide:

- Concrete paving to patios and walkways.
- Concrete paving blocks to driveways.
- Precast concrete or plastered masonry boundary walls where applicable.

All external finishes shall be durable, low maintenance and suitable for residential use.

2.10 General Performance Requirements

All finishes shall:

- Be durable and suitable for residential occupation.
- Be readily available within South Africa.
- Be easy to clean and maintain.
- Be replaceable without affecting adjacent finishes.
- Comply with applicable South African Standards.
- Be of first-quality manufacture.

Equivalent products of equal quality may be submitted for approval.

SECTION 3

KITCHEN SPECIFICATION

3.1 General

The kitchen shall provide a practical, functional and durable workspace suitable for affordable GAP housing developments. Materials and finishes shall be selected to provide ease of maintenance, long service life and cost-effective replacement.

The kitchen layout shall be in accordance with the approved architectural drawings.

3.2 Kitchen Joinery

Provide purpose-made kitchen cupboards manufactured from melamine-faced board.

The kitchen shall include, where indicated on the approved drawings:

- Base cupboards.
- Wall cupboards.
- Sink cupboard.
- Drawer unit.
- Appliance space.
- Open shelving where applicable.

Exposed edges shall be finished with PVC edging.

Acceptable Alternative: Equivalent moisture-resistant melamine cabinetry of equal quality.

3.3 Countertops

Provide postformed high-pressure laminate countertops on moisture-resistant substrate.

Countertops shall:

- Be moisture resistant.
- Be suitable for food preparation.
- Be easy to clean.
- Be resistant to normal domestic wear.
- Colour to Architect's approval.

Acceptable Alternative: Engineered stone where approved by the Municipality.

3.4 Splashback

Provide ceramic wall tiles above kitchen worktops.

Tiles shall be provided:

- Behind sink.
- Behind hob.
- Above continuous work surfaces.

Colour to Architect's approval.

3.5 Sink & Mixer

Provide:

- Stainless steel single inset sink.
- Single-lever chrome-plated mixer.

Fixtures shall be suitable for normal residential use and compatible with standard plumbing fittings.

Acceptable Alternative: Equivalent corrosion-resistant fixtures.

3.6 Appliances

Provide dedicated spaces and service connections for:

- Freestanding refrigerator.
- Under-counter oven.
- Hob.
- Extractor.
- Washing machine where indicated on the approved drawings.

3.7 Finishes Schedule

Component Specification

<i>Cupboards</i>	White melamine-faced board
<i>Countertop</i>	Postformed high-pressure laminate
<i>Splashback</i>	Ceramic wall tiles
<i>Sink</i>	Stainless steel single inset sink
<i>Mixer</i>	Chrome-plated single-lever mixer
<i>Handles</i>	Powder-coated steel or aluminium
<i>Kickplates</i>	PVC

3.8 Performance Requirements

Kitchen finishes and fixtures shall:

- Be suitable for residential use.
- Be durable and low maintenance.
- Be resistant to moisture and staining.
- Be readily available within South Africa.
- Be replaceable without major alteration to the joinery.
- Comply with applicable South African Standards.

Equivalent products of equal quality may be submitted for approval.

SECTION 4

BATHROOM SPECIFICATION

4.1 General

The bathroom shall provide durable, functional and low-maintenance facilities suitable for affordable GAP housing developments. Materials and fixtures shall be selected to provide ease of maintenance, water efficiency and long service life while remaining appropriate to the approved project budget.

The bathroom layout shall be in accordance with the approved architectural drawings.

4.2 Sanitary Fixtures

Provide the following sanitary fixtures:

Family Bathroom

- Close-coupled dual-flush WC
- Vanity basin with mixer
- Shower with mixer and shower outlet
- Mirror
- Towel rail
- Toilet roll holder

Guest WC

- Close-coupled dual-flush WC
- Wall-mounted or pedestal basin
- Basin mixer
- Mirror
- Toilet roll holder

All sanitary fixtures shall be suitable for normal residential use and compatible with locally available replacement parts.

4.3 Vanity Unit

Provide a compact vanity unit manufactured from white melamine-faced board with moisture-resistant edging.

The vanity shall:

- Provide practical storage.
- Accommodate the selected basin.
- Be easy to clean.

- Be suitable for residential use.

Acceptable Alternative: Equivalent moisture-resistant vanity unit of equal quality.

4.4 Shower

Provide:

- Shower with mixer and shower outlet.

Fixtures shall be durable, easy to maintain and suitable for normal residential use.

4.5 Bathroom Accessories

Provide:

- Mirror.
- Towel rail.
- Toilet roll holder.
- Robe hook

Accessories shall be corrosion-resistant and suitable for humid environments.

4.6 Finishes Schedule

<i>Component</i>	<i>Specification</i>
<i>Floor</i>	Non-slip ceramic floor tiles
<i>Walls</i>	Ceramic wall tiles to wet areas; painted plaster elsewhere
<i>Ceiling</i>	Moisture-resistant gypsum board ceiling
<i>Vanity</i>	White melamine-faced board
<i>Basin</i>	Vitreous china
<i>WC</i>	Dual-flush vitreous china suite
<i>Shower Screen</i>	Toughened safety glass where applicable
<i>Mirror</i>	Frameless polished mirror
<i>Accessories</i>	Powder-coated steel or stainless steel

4.7 Performance Requirements

Bathroom finishes and fixtures shall:

- Be suitable for residential use.
- Be moisture resistant.
- Be durable and low maintenance.
- Be easy to clean.
- Be readily available within South Africa.
- Comply with applicable South African Standards.

Equivalent products of equal quality may be submitted for approval.

Annexure A

TYPOLOGY 1 - SMALL DUPLEX

External Finishes and Construction Standards

TPOLOGY 1 – EXTERNAL FINISHES & CONSTRUCTION STANDARD

QUALITY LEVEL

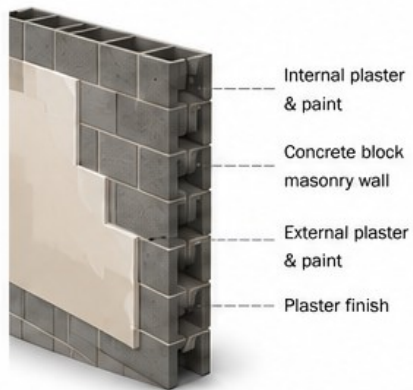
Standard Residential



Practical, durable and low maintenance finishes appropriate for GAP housing developments.

CONSTRUCTION

Conventional masonry



Conventional concrete block masonry construction with plastered and painted internal and external walls.

ROOF – CONCRETE ROOF TILES



Durable, weather resistant and low maintenance.



Concrete roof tiles
Colour: Medium to Dark Grey
(e.g. Marley Double Roman / Monier / Roof Maxx)

EXTERNAL WALLS

Cement plaster and acrylic paint
(limited face brick accents where applicable)



Cement plaster and exterior acrylic paint in light neutral tones. Face brick accents used sparingly for visual interest (optional).



Plaster & Paint
Light Neutral



Face Brick Accent
Light Brown
(Optional)



Plaster Finish
Smooth

FENCE – VIBRACRETE WALL



Vibracrete wall
Precast concrete
Colour: Natural Grey

Plaster & paint to match dwelling where required

TYPICAL APPLICATION



Boundary wall
To street and side/rear boundaries



Pedestrian gate
Steel or timber gate to match boundary wall



Corners & returns
Precast pillars at corners and at changes in direction



Height
Typical height 1.8m to comply with local requirements

COLOUR PALETTE (INDICATIVE)



External Wall Paint
Light Neutral



External Wall Paint
Warm Grey



Brick Accent
Light Brown
(Optional)



Plastered Fence
Paint
Light Neutral



Window / Door
Frames
Charcoal /
Anthracite



Roof Tile
Medium to
Dark Grey

KEY PERFORMANCE REQUIREMENTS



DURABLE

Materials selected for long-term durability and resistance to weathering.



LOW MAINTENANCE

Easy to clean and maintain with standard household methods.



WEATHER RESISTANT

Suitable for South African climate conditions including sun, wind and rain.



COST EFFECTIVE

Finishes chosen to balance quality, durability and affordability.



AESTHETIC COHERENCE

Finishes complement the architectural character and neighbourhood context.



Images and colours are indicative of the standard of finish intended for Typology 1 and may be replaced with approved equivalent products.

Annexure B

TYPOLOGY 1 - SMALL DUPLEX

External Finishes and Areas

TYOLOGY 1 – EXTERNAL FINISHES & AREAS

FUTURE BRAAI AREA



FLOOR FINISH

Concrete paving



WALL FINISH

Cement plaster & exterior acrylic paint



CEILING FINISH

Open to sky



WASHING LINE AREA



FLOOR FINISH

Concrete paving slabs



WALL FINISH

Precast concrete wall (or plastered masonry wall)



CEILING FINISH

Open to sky



DRIVEWAY



FLOOR FINISH

Interlocking concrete paving



WALL FINISH

Not applicable

CEILING FINISH

Open to sky



WALKWAYS



FLOOR FINISH

Concrete paving slabs



WALL FINISH

Not applicable

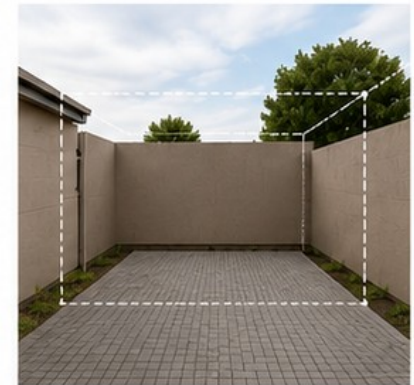


CEILING FINISH

Open to sky



FUTURE CARPORT



FLOOR FINISH

Concrete paving



WALL FINISH

Not applicable

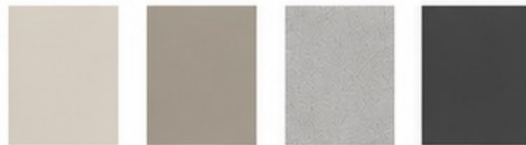


CEILING FINISH

Open to sky / future structure by owner



COLOUR PALETTE (INDICATIVE)



External Wall
Paint

Plaster /
Feature

Paving /
Concrete

Roof Tile

TYPICAL FINISHES & MATERIALS



External Wall
Plaster & Paint

Precast Concrete
Wall

Concrete Paving
Slabs

Interlocking
Concrete Paving

Stone / Pea Gravel
(where applicable)

NOTES

- All external finishes to be durable, low maintenance and suitable for local climate.
- Concrete paving to be laid on compacted base with appropriate falls for drainage.
- All wall plaster and paint to comply with SANS 10400 and manufacturer's requirements.
- Future Carport and Braai Area by owner.

Annexure C

TYPOLOGY 1 - SMALL DUPLEX

Kitchen Fixtures and Finishes

TPOLOGY 1 – KITCHEN FINISHES & FIXTURES

CUPBOARDS

White melamine-faced board



COUNTERTOP

Postformed high-pressure laminate



SPLASHBACK

Ceramic wall tiles



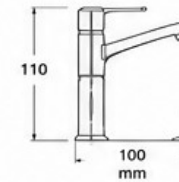
SINK

Stainless steel single inset sink



MIXER

Chrome-plated single-lever mixer



HANDLES

Powder-coated steel or aluminium

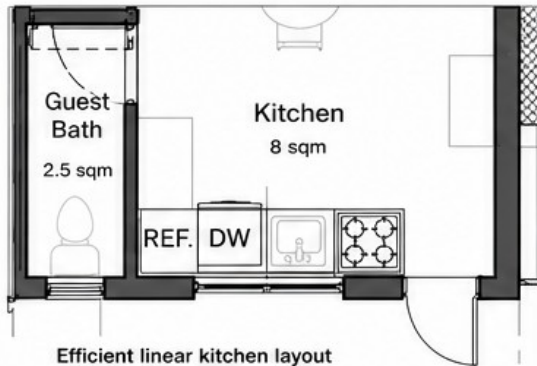


KICKPLATES

PVC



KITCHEN LAYOUT & SET-UP



Efficient linear kitchen layout with plumbing and appliances along one wall.



KITCHEN – ANGLED VIEW



FINISH PALETTE (INDICATIVE)



BENCHMARK PRODUCTS (OR APPROVED EQUIVALENT)

- Cupboards – White Melamine
- Countertop – Postformed Laminate
- Splashback Tiles – Ceramic Tiles (200x200mm or 300x300mm)
- Sink – Stainless Steel Single Inset Sink
- Mixer – Chrome-Plated Single-Lever Mixer
- Handles – Powder-Coated Steel or Aluminium
- Kickplates – PVC Kickplate – Aluminium Look or Grey

NOTES

- All finishes are durable, easy to clean and low maintenance.
- Products shown are indicative of the standard of finish intended for Typology 1 and may be replaced with approved equivalent products.
- Appliances for illustration only. Refer to project specification.

Annexure D

TYPOLOGY 1 - SMALL DUPLEX

Sanitary Fixtures

FAMILY BATHROOM

CLOSE-COUPLED
DUAL-FLUSH WC



VANITY BASIN
WITH MIXER



SHOWER WITH MIXER
AND SHOWER OUTLET



MIRROR



TOWEL RAIL



TOILET ROLL
HOLDER



GUEST WC

CLOSE-COUPLED
DUAL-FLUSH WC



WALL-MOUNTED OR
PEDESTAL BASIN



MIRROR



TOILET ROLL
HOLDER



ACCESSORIES & FINISHES



TOWEL RAIL



TOILET ROLL HOLDER



ROBE HOOK



SHOWER MIXER



SHOWER OUTLET



FLOOR WASTE

TYPICAL FINISHES



FLOOR TILES
(NON-SLIP PORCELAIN)



WALL TILES
(CERAMIC)

Images are indicative of the standard of finish intended for Typology 1 and may be replaced with approved equivalent products.

FFE SPECIFICATION

TYPOLOGY 2



STELLENBOSCH

STELLENBOSCH • PNIEL • FRANSCHHOEK

MUNISIPALITEIT • UMASIPALA • MUNICIPALITY



ARCHITECTURAL

FINISHES & FIXTURES SPECIFICATION

TYPOLGY 2 – MEDIUM SEMI-DETACHED UNIT

1.1 PROJECT INFORMATION

PROJECT:	Erf 7001 GAP Housing Development
TYPOLGY:	Typology 2 – Medium Semi-Detached Unit
LOCATION:	Erf 7001, Cloetesville, Stellenbosch
CLIENT:	Stellenbosch Municipality
DOCUMENT:	Architectural Finishes & Fixtures Specification



This document establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 2.

It shall be read in conjunction with the associated drawings and all consultant documentation.

DOCUMENT NO.
ERF7001-FFS-T02

REVISION:
A

ISSUE DATE:
AUGUST 2026

Prepared by

SPACE
ARCHITECTS AND DESIGNERS

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ANNEXURE A

External Finishes and Construction Standards

ANNEXURE B

External Finishes and Areas

ANNEXURE C

Kitchen Fixtures and Finishes

ANNEXURE D

Sanitary Fixtures

SECTION 1

1.1 General Information:

<i>Description</i>	<i>Value</i>
Typology	Typology 2 – Medium Semi-Detached Duplex
Gross Floor Area	74.5 m ²
Ground Floor	37.5 m ²
First Floor	37 m ²
Bedrooms	2
Bathrooms	1 Family Bathroom
Guest WC	1
Kitchen	Open Plan
Lounge/Dining	Open Plan
Patio	Yes
Built-in Braai	Future Provision
Carport	Future Provision
Construction Type	Double Storey Masonry

1.2 Purpose of this Specification

This specification establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 2. It shall be read together with the approved architectural drawings and all consultant documentation forming part of the future procurement documentation.

The purpose of this specification is to establish a consistent standard of quality, durability and appearance suitable for municipal GAP housing developments while remaining commercially viable and aligned with the approved project budget.

1.3 Design Intent

Typology 2 provides a larger and more flexible duplex layout designed to accommodate the needs of growing families while maintaining an efficient building footprint.

The selected finishes and fixtures shall reflect the following design principles:

- Robust, durable and low-maintenance materials.
- Cost-effective construction solutions.

- Contemporary residential appearance.
 - Simple detailing to minimise future maintenance.
 - Readily available materials within the South African market.
 - Long service life under normal residential use.
 - Ease of repair and replacement.
 - Consistent architectural character across the development.
-

1.4 Applicable Standards

Unless otherwise noted, all materials, products and workmanship shall comply with the latest editions of:

- National Building Regulations.
- SANS 10400.
- Relevant SANS product standards.
- Occupational Health and Safety Act.
- Local Authority requirements.
- Manufacturer's installation recommendations.
- Good building practice.

Where discrepancies occur, the more stringent requirement shall apply.

1.5 Quality Standard

All finishes and fixtures shall:

- Be new and unused.
- Be first quality.
- Be free from visible defects.
- Be suitable for residential use.
- Be durable and low maintenance.
- Be readily available within South Africa.
- Be handed over clean and free from damage.

Equivalent products of equal or superior quality may be considered, subject to municipal approval.

1.6 Approved Alternatives

Products referenced within this document establish the required minimum performance standard.

Alternative products may be proposed provided they are equal or superior in respect of:

- Durability.
- Appearance.
- Performance.

- Warranty.
- Maintenance requirements.
- Availability.
- Compliance with applicable South African Standards.

All alternatives shall receive written approval from the Municipality prior to procurement.

1.7 Colour Philosophy



The colour palette shall comprise neutral contemporary tones selected to:

- Maximise natural daylight.
- Reduce long-term maintenance.
- Create visual consistency throughout the development.
- Complement the architectural form.
- Provide a timeless residential appearance.

Accent colours shall be used sparingly.

1.8 Sustainability

Where practical and economically feasible, materials shall:

- Be locally manufactured where available.
 - Require minimal maintenance.
 - Be durable and replaceable.
 - Have low VOC emissions where applicable.
 - Provide a long service life under normal residential use.
-

1.9 General Performance Requirements

All selected finishes and fixtures shall:

- Be suitable for normal residential occupation.
 - Be easy to clean and maintain.
 - Resist normal moisture exposure in wet areas.
 - Be resistant to normal UV exposure externally.
 - Be readily replaceable.
 - Comply with applicable South African Standards.
-

1.10 Coordination

This specification shall be read together with:

- Approved architectural drawings.
- Door and window schedules.
- Kitchen layouts.
- Sanitaryware schedules.
- Consultant documentation.
- Preliminary QS cost estimate.

Any discrepancies shall be referred to the Architect prior to implementation.

1.11 Procurement Philosophy

This specification establishes the minimum acceptable quality standard for Typology 2.

Equivalent products may be proposed provided they achieve the required level of durability, functionality and appearance and receive written approval from the Municipality.

1.12 Budget Compliance

The specification has been prepared to align with the anticipated construction budget applicable to Typology 2, while providing an improved residential standard appropriate for the higher market position within the GAP housing programme.

Where value engineering is required, substitutions shall maintain the overall design intent and shall not compromise quality, durability or statutory compliance.

1.13 Exclusions

This specification does not include:

- Structural engineering design.
- Mechanical and electrical engineering design.
- Detailed shop drawings.
- Specialist manufacturing drawings.
- Construction methodology.
- Contractor temporary works.
- Installation procedures.

These items shall be developed by the appointed developer, contractor and specialist consultants during the detailed design and construction stages.

SECTION 2

2.1 General

This Finishes Schedule establishes the minimum acceptable architectural finishes for Typology 2 and shall be read together with the Material Specifications contained within this document.

The selected finishes are intended to provide an enhanced residential standard appropriate for the Typology 2 budget while maintaining durability, ease of maintenance and long-term value. All finishes shall be suitable for affordable GAP housing and shall comply with the approved project budget.

Equivalent products of equal quality may be submitted for approval.

2.2 Internal Finishes Schedule

<i>Space</i>	<i>Floor Finish</i>	<i>Skirting</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continue into living areas
<i>Lounge</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continuous finish
<i>Dining</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continuous finish
<i>Kitchen</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Painted plaster with ceramic tiled splashback	Moisture-resistant gypsum board ceiling	Full splashback to worktops
<i>Guest WC</i>	Non-slip ceramic floor tiles	Tile skirting	Ceramic tiled splashback to basin; painted plaster elsewhere	Moisture-resistant gypsum board ceiling	Moisture-resistant finishes

<i>Stair</i>	Ceramic floor tiles with anti-slip nosings	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Durable finish
<i>Landing</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continuous finish
<i>Bedroom 1</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Low-maintenance finish
<i>Bedroom 2</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Low-maintenance finish
<i>Family Bathroom</i>	Non-slip ceramic floor tiles	Tile skirting	Ceramic wall tiles to full shower enclosure and; painted plaster elsewhere	Moisture-resistant gypsum board ceiling	Enhanced wall tiling
<i>Built-in Cupboards (Bedroom 1 & 2)</i>	Continue adjacent floor finish	—	White melamine-lined carcasses	—	Refer Joinery Specification in Built in Cupboards Schedule

2.3 External Finishes Schedule

<i>Area</i>	<i>Floor Finish</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance Porch</i>	Non-slip concrete pavers	Cement plaster with exterior acrylic paint	Fibre cement soffit	Improved entrance finish
<i>Patio</i>	Concrete pavers	Cement plaster with exterior acrylic paint	Fibre cement soffit where applicable	Future built-in braai provision

<i>Future Braai Area</i>	Concrete paving	Cement plaster with exterior acrylic paint	Open to sky	Future owner installation
<i>Washing Line Area</i>	Concrete paving slabs	Plastered masonry or precast concrete wall	Open to sky	Low-maintenance finish
<i>Future Carport</i>	Concrete paving	Not applicable	Open to sky	Provision for future installation
<i>Driveway</i>	Interlocking concrete paving blocks	Not applicable	Open to sky	Suitable for residential vehicles
<i>Walkways</i>	Concrete paving slabs	Not applicable	Open to sky	Slip-resistant finish

2.4 Colour Schedule

<i>Element</i>	<i>Colour Intent</i>
<i>Internal Walls</i>	Warm off-white
<i>Ceilings</i>	White
<i>Kitchen Joinery</i>	Warm white
<i>Bathroom Joinery</i>	Warm white
<i>Countertops</i>	Mid-grey stone appearance
<i>Aluminium Windows</i>	Charcoal
<i>Roof</i>	Charcoal
<i>External Walls</i>	Warm light neutral
<i>Feature Walls</i>	Medium grey
<i>Paving</i>	Natural grey

Final colours shall be approved by the Architect.

2.5 Floor Finishes

Internal Floors

Provide 600 × 600 mm ceramic floor tiles throughout living areas, bedrooms, circulation spaces and kitchen.

Floor tiles shall:

- Be suitable for heavy residential use.

- Have a matt finish.
- Be easy to clean.
- Resist staining.
- Be locally available.
- Colour selected by the Architect.

Acceptable Alternative

Equivalent ceramic floor tiles of equal quality and performance.

Wet Areas

Provide non-slip ceramic floor tiles.

Tiles shall:

- Be suitable for wet areas.
 - Provide appropriate slip resistance.
 - Be moisture resistant.
-

External Areas

Provide concrete pavers or concrete paving blocks.

Paving shall:

- Be slip resistant.
 - Be durable.
 - Require minimal maintenance.
-

2.6 Wall Finishes

Internal Walls

Provide cement plaster with premium-quality washable acrylic paint.

The finish shall:

- Provide a smooth surface.
- Be washable.
- Be suitable for residential use.

Bathroom Walls

Provide ceramic wall tiles:

- Full height to shower enclosure.
- Splashback to basin.

Remaining walls shall receive painted plaster.

Kitchen Splashback

Provide ceramic wall tiles:

- Between worktop and underside of wall cupboards.

- Behind sink.
 - Behind hob.
-

2.7 Ceiling Finishes

Provide painted gypsum board ceilings throughout.

Provide moisture-resistant gypsum board ceilings to kitchens and bathrooms.

Ceilings shall:

- Have a smooth painted finish.
 - Be suitable for residential use.
-

2.8 Paint Finishes

Internal

Provide washable premium acrylic paint to walls and ceilings.

Paint shall:

- Be washable.
 - Have low VOC content.
 - Be suitable for residential use.
-

External

Provide premium exterior acrylic paint.

Paint shall:

- Resist UV exposure.
 - Be weather resistant.
 - Be suitable for the Stellenbosch climate.
-

2.9 External Works Finishes

Provide:

- Concrete pavers to entrance porch and patio.
- Concrete paving slabs to walkways.
- Interlocking concrete paving blocks to driveways.
- Plastered masonry or precast concrete boundary walls.

External finishes shall provide a durable, attractive and low-maintenance residential environment.

2.10 General Performance Requirements

All finishes shall:

- Be durable and suitable for long-term residential use.
- Be readily available within South Africa.
- Be easy to maintain.
- Be replaceable without affecting adjacent finishes.
- Comply with applicable South African Standards.
- Be of first-quality manufacture.

Equivalent products of equal quality may be submitted for approval.

SECTION 3

KITCHEN SPECIFICATION

3.1 General

The kitchen shall provide a practical, functional and durable workspace suitable for Typology 2 within the GAP Housing development. The specification introduces an enhanced level of finish and functionality over Typology 1 while maintaining affordability, ease of maintenance and long-term durability.

The kitchen layout shall be in accordance with the approved architectural drawings.

3.2 Kitchen Joinery

Provide purpose-made kitchen cupboards manufactured from moisture-resistant melamine-faced board.

The kitchen shall include, where indicated on the approved drawings:

- Base cupboards.
- Full-height wall cupboards.
- Sink cupboard.
- Drawer unit.
- Appliance space.
- Corner cupboard where applicable.

- Open shelving where indicated.

Cupboard doors shall be fitted with concealed soft-close hinges.

Exposed edges shall be finished with impact-resistant PVC edging.

Acceptable Alternative: Equivalent moisture-resistant melamine cabinetry of equal or superior quality.

3.3 Countertops

Provide postformed high-pressure laminate countertops on moisture-resistant substrate.

Countertops shall:

- Be moisture resistant.
- Be suitable for food preparation.
- Be resistant to staining and normal domestic wear.
- Be easy to clean.
- Have a contemporary stone-look finish.
- Colour selected by the Architect.

Acceptable Alternative: Engineered stone where approved by the Municipality.

3.4 Splashback

Provide ceramic wall tiles above all kitchen work surfaces.

Splashbacks shall extend:

- From countertop to underside of wall cupboards.
- Behind the sink.
- Behind the hob.

Where no wall cupboards occur, the splashback shall extend to a minimum height of 600 mm above the countertop.

Colour selected by the Architect.

3.5 Sink & Mixer

Provide:

- Large stainless steel single inset sink with integrated drainer.
- Chrome-plated single-lever gooseneck mixer.

Fixtures shall be suitable for normal residential use and compatible with standard plumbing fittings.

Acceptable Alternative: Equivalent corrosion-resistant fixtures of equal quality.

3.6 Appliances

Provide dedicated spaces and service connections for:

- Freestanding refrigerator.
- Built-in under-counter oven.
- Built-in hob.
- Extractor.
- Washing machine where indicated on the approved drawings.

Cabinetry shall allow future replacement of appliances without alteration.

3.7 Finishes Schedule

Component	Specification
<i>Cupboards</i>	Moisture-resistant white melamine-faced board
<i>Wall Cupboards</i>	Full-height wall cupboards
<i>Countertop</i>	Postformed high-pressure laminate with stone-look finish
<i>Splashback</i>	Full-height ceramic wall tiles to underside of wall cupboards
<i>Sink</i>	Large stainless steel single inset sink with drainer
<i>Mixer</i>	Chrome-plated single-lever gooseneck mixer
<i>Handles</i>	Powder-coated aluminium or stainless steel
<i>Hinges</i>	Concealed soft-close hinges
<i>Kickplates</i>	PVC

3.8 Performance Requirements

Kitchen finishes and fixtures shall:

- Be suitable for long-term residential use.
- Be durable and low maintenance.
- Be resistant to moisture and staining.
- Be easy to clean.
- Be readily available within South Africa.
- Permit replacement of individual components without major alteration to the cabinetry.
- Comply with applicable South African Standards.

Equivalent products of equal or superior quality may be submitted for approval.

SECTION 4

SANITARY SPECIFICATION

4.1 General

The bathroom shall provide durable, functional and low-maintenance facilities suitable for Typology 2 within the GAP Housing development. Materials and fixtures shall be selected to provide enhanced functionality, water efficiency and long-term durability while remaining appropriate to the approved project budget.

The bathroom layout shall be in accordance with the approved architectural drawings.

4.2 Sanitary Fixtures

Provide the following sanitary fixtures:

Family Bathroom

- Close-coupled dual-flush WC
- Vanity basin with mixer
- Semi-frameless shower enclosure with mixer and shower outlet
- Frameless polished mirror
- Towel rail
- Toilet roll holder
- Robe hook

Guest WC

- Close-coupled dual-flush WC
- Wall-mounted or pedestal basin

- Basin mixer
- Frameless polished mirror
- Toilet roll holder

All sanitary fixtures shall be suitable for normal residential use and compatible with locally available replacement parts.

4.3 Vanity Unit

Provide a compact vanity unit manufactured from moisture-resistant white melamine-faced board with PVC edging.

The vanity shall:

- Provide practical enclosed storage.
- Accommodate the selected basin.
- Be easy to clean and maintain.
- Be suitable for residential use.

Cabinet doors shall be fitted with concealed soft-close hinges.

Acceptable Alternative: Equivalent moisture-resistant vanity unit of equal or superior quality.

4.4 Shower

Provide:

- Semi-frameless toughened safety glass shower enclosure.
- Chrome-plated single-lever shower mixer.
- Fixed wall-mounted shower outlet.

Fixtures shall be durable, corrosion-resistant and suitable for normal residential use.

Acceptable Alternative: Equivalent shower enclosure and fittings of equal quality.

4.5 Bathroom Accessories

Provide:

- Frameless polished mirror.
- Powder-coated or stainless-steel towel rail.
- Wall-mounted toilet roll holder.
- Robe hook.

Accessories shall be corrosion-resistant, securely fixed and suitable for humid environments.

4.6 Finishes Schedule

<i>Component</i>	<i>Specification</i>
<i>Floor</i>	Non-slip ceramic floor tiles
<i>Walls</i>	Ceramic wall tiles to full shower enclosure, and vanity splashback; painted plaster elsewhere

<i>Ceiling</i>	Moisture-resistant gypsum board ceiling
<i>Vanity</i>	Moisture-resistant white melamine-faced board
<i>Basin</i>	Vitreous china
<i>WC</i>	Dual-flush vitreous china suite
<i>Shower</i>	Semi-frameless toughened safety glass
<i>Enclosure</i>	
<i>Shower Mixer</i>	Chrome-plated single-lever mixer
<i>Mirror</i>	Frameless polished mirror
<i>Accessories</i>	Powder-coated steel or stainless steel

4.7 Performance Requirements

Bathroom finishes and fixtures shall:

- Be suitable for long-term residential use.
- Be moisture resistant.
- Be durable and low maintenance.
- Be easy to clean.
- Be readily available within South Africa.
- Be resistant to corrosion in humid environments.
- Permit replacement of individual fixtures without major alteration.
- Comply with applicable South African Standards.

Equivalent products of equal or superior quality may be submitted for approval.

Annexure A

TPOLOGY 2 - MEDIUM DUPLEX

External Finishes and Construction Standards

TYPOLGY 2 – EXTERNAL FINISHES & CONSTRUCTION STANDARD

QUALITY LEVEL

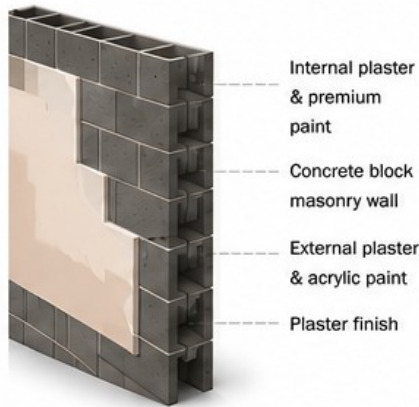
Enhanced Residential



Enhanced finishes and improved detailing to elevate residential appeal while maintaining affordability for GAP housing developments.

CONSTRUCTION

Conventional masonry



Conventional concrete block masonry construction with plastered and painted internal and external walls.

ROOF – CONCRETE ROOF TILES



Concrete roof tiles
Colour: Medium to Dark Grey
(e.g. Marley Double Roman / Monier / Roof Maxx)

Durable, weather resistant and low maintenance.

EXTERNAL WALLS

Cement plaster and acrylic paint
(limited face brick accents where applicable)



Cement plaster and exterior acrylic paint in light neutral tones.
Face brick accents and vertical screens used sparingly for visual interest.



Plaster & Paint
Light Neutral



Face Brick Accent
Light Brown
(Optional)



Plaster Finish
Smooth

FENCE – VIBRACRETE WALL



Vibracrete wall
Precast concrete
Colour: Natural Grey
Plaster & paint to match dwelling where required

TYPICAL APPLICATION



Boundary wall
To street and side/rear boundaries



Pedestrian gate
Steel or timber gate to match boundary wall



Corners & returns
Precast pillars at corners and at changes in direction



Height
Typical height 1.8m to comply with local requirements

COLOUR PALETTE (INDICATIVE)



External Wall Paint
Light Neutral



External Wall Paint
Warm Grey



Face Brick Accent
Light Brown
(Optional)



Plastered Fence
Paint
Light Neutral



Window / Door
Frames
Charcoal /
Anthracite



Roof Tile
Medium to
Dark Grey

KEY PERFORMANCE REQUIREMENTS



DURABLE

Materials selected for long-term durability and resistance to weathering.



LOW MAINTENANCE

Easy to clean and maintain with standard household methods.



WEATHER RESISTANT

Suitable for South African climate conditions including sun, wind and rain.



COST EFFECTIVE

Finishes chosen to balance quality, durability and affordability.



AESTHETIC COHERENCE

Finishes complement the architectural character and neighbourhood context.



Images and colours are indicative of the standard of finish intended for Typology 2 and may be replaced with approved equivalent products.

Annexure B

TPOLOGY 2 - MEDIUM DUPLEX

External Finishes and Areas

TYPOLGY 2 – EXTERNAL FINISHES & AREAS

ENTRANCE PORCH



FLOOR FINISH

Concrete paving blocks



WALL FINISH

Cement plaster & exterior acrylic paint



CEILING FINISH

Fibre cement soffit



PATIO



FLOOR FINISH

Concrete paving blocks



WALL FINISH

Cement plaster & exterior acrylic paint



CEILING FINISH

Fibre cement soffit (where applicable)



FUTURE BRAAI AREA



FLOOR FINISH

Concrete paving blocks



WALL FINISH

Cement plaster & exterior acrylic paint



CEILING FINISH

Open to sky



WASHING LINE AREA



FLOOR FINISH

Concrete paving slabs



WALL FINISH

Precast concrete wall (or plastered masonry wall)

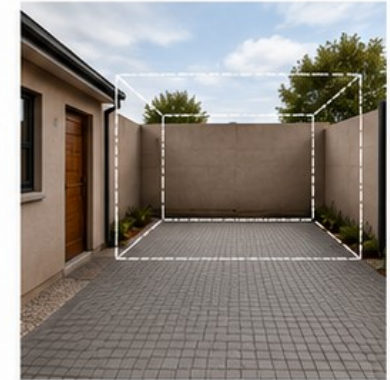


CEILING FINISH

Open to sky



FUTURE CARPORT



FLOOR FINISH

Interlocking concrete paving blocks



WALL FINISH

Not applicable



CEILING FINISH

Open to sky / future structure by owner



DRIVEWAY



FLOOR FINISH

Interlocking concrete paving blocks



WALL FINISH

Not applicable

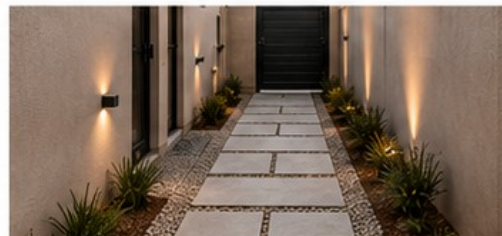


CEILING FINISH

Open to sky



WALKWAYS



FLOOR FINISH

Concrete paving slabs



WALL FINISH

Not applicable



CEILING FINISH

Open to sky



COLOUR PALETTE (INDICATIVE)



External Wall
Paint
Light Neutral



Plaster /
Feature
Warm Grey



Paving /
Concrete
Natural Grey



Roof Tile /
Frames
Charcoal

NOTES

- All external finishes to be durable, low maintenance and suitable for local climate.
- Concrete paving to be laid on compacted base with appropriate falls for drainage.
- All wall plaster and paint to comply with SANS 10400 and manufacturer's requirements.
- Future Carport and Braai Area by owner.

Annexure C

TPOLOGY 2 - MEDIUM DUPLEX

Kitchen Fixtures and Finishes

TYPOLGY 2 – KITCHEN FINISHES & FIXTURES

CUPBOARDS

White melamine-faced board



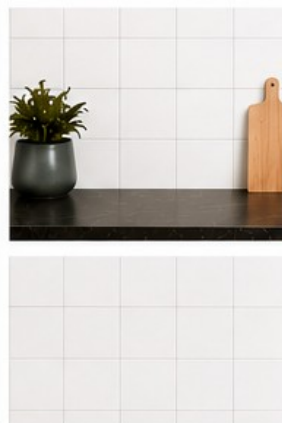
COUNTERTOP

Postformed
high-pressure laminate



SPLASHBACK

Ceramic wall tiles



SINK

Stainless steel
double inset sink



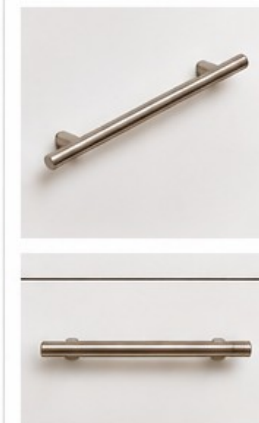
MIXER

Chrome-plated
single-lever mixer



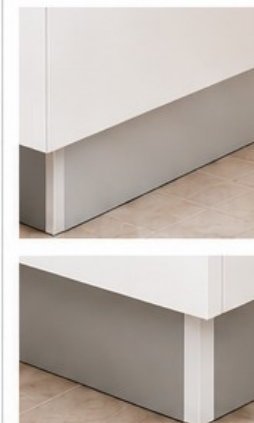
HANDLES

Powder-coated steel
or aluminium

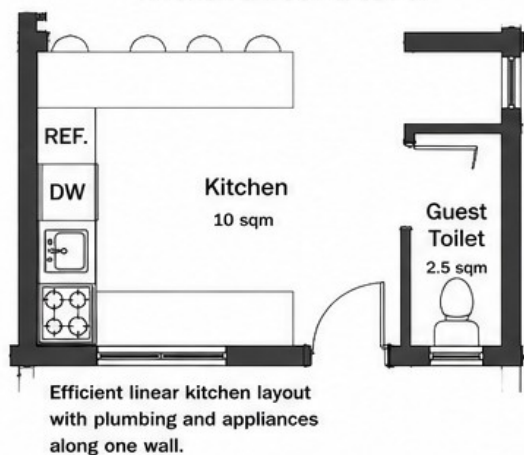


KICKPLATES

PVC



KITCHEN LAYOUT & SET-UP



KITCHEN – ANGLED VIEW



FINISH PALETTE (INDICATIVE)



BENCHMARK PRODUCTS (OR APPROVED EQUIVALENT)

- | | |
|------------------|--|
| Cupboards | – White Melamine |
| Countertop | – Postformed Laminate |
| Splashback Tiles | – Ceramic Tiles (200x200mm or 300x300mm) |
| Sink | – Stainless Steel Double Inset Sink |
| Mixer | – Chrome-Plated Single-Lever Mixer |
| Handles | – Powder-Coated Steel or Aluminium |
| Kickplates | – PVC Kickplate – Aluminium Look or Grey |

NOTES

- All finishes are durable, easy to clean and low maintenance.
- Products shown are indicative of the standard of finish intended for Typology 2 and may be replaced with approved equivalent products.
- Appliances for illustration only. Refer to project specification.

Annexure D

TPOLOGY 2 - MEDIUM DUPLEX

Sanitary Fixtures

FAMILY BATHROOM

CLOSE-COUPLED
DUAL-FLUSH WC



VANITY BASIN
WITH MIXER



SHOWER WITH MIXER
AND SHOWER OUTLET



MIRROR



TOWEL RAIL



TOILET ROLL
HOLDER



GUEST WC

CLOSE-COUPLED
DUAL-FLUSH WC



WALL-MOUNTED OR
PEDESTAL BASIN



MIRROR



TOILET ROLL
HOLDER



ACCESSORIES & FINISHES



TOWEL RAIL



TOILET ROLL HOLDER



ROBE HOOK



SHOWER MIXER



SHOWER OUTLET



FLOOR WASTE

TYPICAL FINISHES



FLOOR TILES
(NON-SLIP PORCELAIN)



WALL TILES
(CERAMIC)

FFE SPECIFICATION

TYPOLOGY 3



STELLENBOSCH

STELLENBOSCH • PNIEL • FRANSCHHOEK

MUNISIPALITEIT • UMASIPALA • MUNICIPALITY



ARCHITECTURAL FINISHES & FIXTURES SPECIFICATION

TYPOLGY 3 – LARGE FREESTANDING UNIT

1.1 PROJECT INFORMATION

PROJECT:	Erf 7001 GAP Housing Development
TYPOLGY:	Typology 3 – Large Freestanding Unit
LOCATION:	Erf 7001, Cloetesville, Stellenbosch
CLIENT:	Stellenbosch Municipality
DOCUMENT:	Architectural Finishes & Fixtures Specification



This document establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 3.

It shall be read in conjunction with the associated drawings and all consultant documentation.

DOCUMENT NO.
ERF7001-FFS-T03

REVISION:
A

ISSUE DATE:
AUGUST 2026

Prepared by

SPACE
ARCHITECTS AND DESIGNERS

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TPOLOGY 3 – ARCHITECTURAL FINISHES AND FIXTURES SPECIFICATIONS

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ANNEXURE A

External Finishes and Construction Standards

ANNEXURE B

External Finishes and Areas

ANNEXURE C

Kitchen Fixtures and Finishes

ANNEXURE D

Sanitary Fixtures

SECTION 1

1.1 General Information:

<i>Description</i>	<i>Value</i>
Typology	Typology 3 – Large Unit (Free Standing)
Gross Floor Area	± 85–92 m ²
Bedrooms	3
Bathrooms	1 Family Bathroom
En Suite	1
Kitchen	Open Plan
Lounge/Dining	Open Plan
Patio	Yes
Built-in Braai	Future Provision
Garage	1
Carport	Future Provision
Construction Type	Single Storey Masonry

1.2 Purpose of this Specification

This specification establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 3. It shall be read together with the approved architectural drawings and all consultant documentation forming part of the future procurement documentation.

The purpose of this specification is to establish a consistent standard of quality, durability and appearance suitable for municipal GAP housing developments while remaining commercially viable and aligned with the approved project budget.

1.3 Design Intent

Typology 3 provides a larger and more flexible duplex layout designed to accommodate the needs of growing families while maintaining an efficient building footprint.

The selected finishes and fixtures shall reflect the following design principles:

- Robust, durable and low-maintenance materials.
- Cost-effective construction solutions.
- Contemporary residential appearance.
- Simple detailing to minimise future maintenance.

- Readily available materials within the South African market.
 - Long service life under normal residential use.
 - Ease of repair and replacement.
 - Consistent architectural character across the development.
-

1.4 Applicable Standards

Unless otherwise noted, all materials, products and workmanship shall comply with the latest editions of:

- National Building Regulations.
- SANS 10400.
- Relevant SANS product standards.
- Occupational Health and Safety Act.
- Local Authority requirements.
- Manufacturer's installation recommendations.
- Good building practice.

Where discrepancies occur, the more stringent requirement shall apply.

1.5 Quality Standard

All finishes and fixtures shall:

- Be new and unused.
- Be first quality.
- Be free from visible defects.
- Be suitable for residential use.
- Be durable and low maintenance.
- Be readily available within South Africa.
- Be handed over clean and free from damage.

Equivalent products of equal or superior quality may be considered, subject to municipal approval.

1.6 Approved Alternatives

Products referenced within this document establish the required minimum performance standard.

Alternative products may be proposed provided they are equal or superior in respect of:

- Durability.
- Appearance.
- Performance.

- Warranty.
- Maintenance requirements.
- Availability.
- Compliance with applicable South African Standards.

All alternatives shall receive written approval from the Municipality prior to procurement.

1.7 Colour Philosophy



The colour palette shall comprise neutral contemporary tones selected to:

- Maximise natural daylight.
- Reduce long-term maintenance.
- Create visual consistency throughout the development.
- Complement the architectural form.
- Provide a timeless residential appearance.

Accent colours shall be used sparingly.

1.8 Sustainability

Where practical and economically feasible, materials shall:

- Be locally manufactured where available.
 - Require minimal maintenance.
 - Be durable and replaceable.
 - Have low VOC emissions where applicable.
 - Provide a long service life under normal residential use.
-

1.9 General Performance Requirements

All selected finishes and fixtures shall:

- Be suitable for normal residential occupation.
 - Be easy to clean and maintain.
 - Resist normal moisture exposure in wet areas.
 - Be resistant to normal UV exposure externally.
 - Be readily replaceable.
 - Comply with applicable South African Standards.
-

1.10 Coordination

This specification shall be read together with:

- Approved architectural drawings.
- Door and window schedules.
- Kitchen layouts.
- Sanitaryware schedules.
- Consultant documentation.
- Preliminary QS cost estimate.

Any discrepancies shall be referred to the Architect prior to implementation.

1.11 Procurement Philosophy

This specification establishes the minimum acceptable quality standard for Typology 3.

Equivalent products may be proposed provided they achieve the required level of durability, functionality and appearance and receive written approval from the Municipality.

1.12 Budget Compliance

The specification has been prepared to align with the anticipated construction budget applicable to Typology 3, while providing an improved residential standard appropriate for the higher market position within the GAP housing programme.

Where value engineering is required, substitutions shall maintain the overall design intent and shall not compromise quality, durability or statutory compliance.

1.13 Exclusions

This specification does not include:

- Structural engineering design.
- Mechanical and electrical engineering design.
- Detailed shop drawings.
- Specialist manufacturing drawings.
- Construction methodology.
- Contractor temporary works.
- Installation procedures.

These items shall be developed by the appointed developer, contractor and specialist consultants during the detailed design and construction stages.

SECTION 2

2.1 General

This Finishes Schedule establishes the minimum acceptable architectural finishes for Typology 3 and shall be read together with the Material Specifications contained within this document.

The selected finishes are intended to provide an enhanced residential standard appropriate for the Typology 3 budget while maintaining durability, ease of maintenance and long-term value. All finishes shall be suitable for affordable GAP housing and shall comply with the approved project budget.

Equivalent products of equal quality may be submitted for approval.

2.2 Internal Finishes Schedule

<i>Space</i>	<i>Floor Finish</i>	<i>Skirting</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continue into living areas
<i>Lounge</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continuous finish
<i>Dining</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continuous finish
<i>Kitchen</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Painted plaster with ceramic tiled splashback	Moisture-resistant gypsum board ceiling	Full splashback to worktops
<i>En-suite bathroom</i>	Non-slip ceramic floor tiles	Tile skirting	Ceramic tiled splashback to basin; painted plaster elsewhere	Moisture-resistant gypsum board ceiling	Moisture-resistant finishes

TPOLOGY 3 – ARCHITECTURAL FINISHES AND FIXTURES SPECIFICATIONS

<i>Bedroom 1</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Low-maintenance finish
<i>Bedroom 2</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Low-maintenance finish
<i>Bedroom 3</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Low-maintenance finish
<i>Family Bathroom</i>	Non-slip ceramic floor tiles	Tile skirting	Ceramic wall tiles to full shower enclosure; painted plaster elsewhere	Moisture-resistant gypsum board ceiling	Enhanced wall tiling
<i>Built-in Cupboards (Bedroom 1, 2 & 3)</i>	Continue adjacent floor finish	—	White melamine-lined carcasses	—	Refer Joinery Specification in Built in Cupboards Schedule
<i>Garage</i>	Power-floated concrete	—	Plastered and painted masonry	Painted ceiling	Durable utility finish

2.3 External Finishes Schedule

<i>Area</i>	<i>Floor Finish</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance Porch</i>	Non-slip concrete pavers	Cement plaster with exterior acrylic paint	Fibre cement soffit	Improved entrance finish
<i>Patio</i>	Concrete pavers	Cement plaster with exterior acrylic paint	Fibre cement soffit where applicable	Future built-in braai provision
<i>Future Braai Area</i>	Concrete paving	Cement plaster with exterior acrylic paint	Open to sky	Future owner installation

TPOLOGY 3 – ARCHITECTURAL FINISHES AND FIXTURES SPECIFICATIONS

<i>Washing Line Area</i>	Concrete paving slabs	Plastered masonry or precast concrete wall	Open to sky	Low-maintenance finish
<i>Future Carport</i>	Concrete paving	Not applicable	Open to sky	Provision for future installation
<i>Driveway</i>	Interlocking concrete paving blocks	Not applicable	Open to sky	Suitable for residential vehicles
<i>Walkways</i>	Concrete paving slabs	Not applicable	Open to sky	Slip-resistant finish

2.4 Colour Schedule

<i>Element</i>	<i>Colour Intent</i>
<i>Internal Walls</i>	Warm off-white
<i>Ceilings</i>	White
<i>Kitchen Joinery</i>	Warm white
<i>Bathroom Joinery</i>	Warm white
<i>Countertops</i>	Mid-grey stone appearance
<i>Aluminium Windows</i>	Charcoal
<i>Roof</i>	Charcoal
<i>External Walls</i>	Warm light neutral
<i>Feature Walls</i>	Medium grey
<i>Paving</i>	Natural grey

Final colours shall be approved by the Architect.

2.5 Floor Finishes

Internal Floors

Provide 600 × 600 mm ceramic floor tiles throughout living areas, bedrooms, circulation spaces and kitchen.

Floor tiles shall:

- Be suitable for heavy residential use.
- Have a matt finish.
- Be easy to clean.
- Resist staining.

TYPOLOGY 3 – ARCHITECTURAL FINISHES AND FIXTURES SPECIFICATIONS

- Be locally available.
- Colour selected by the Architect.

Acceptable Alternative

Equivalent ceramic floor tiles of equal quality and performance.

Wet Areas

Provide non-slip ceramic floor tiles.

Tiles shall:

- Be suitable for wet areas.
 - Provide appropriate slip resistance.
 - Be moisture resistant.
-

External Areas

Provide concrete pavers or concrete paving blocks.

Paving shall:

- Be slip resistant.
 - Be durable.
 - Require minimal maintenance.
-

2.6 Wall Finishes

Internal Walls

Provide cement plaster with premium-quality washable acrylic paint.

The finish shall:

- Provide a smooth surface.
- Be washable.
- Be suitable for residential use.

Bathroom Walls

Provide ceramic wall tiles:

- Full height to shower enclosure.
- Splashback to basin.

Remaining walls shall receive painted plaster.

Kitchen Splashback

Provide ceramic wall tiles:

- Between worktop and underside of wall cupboards.
 - Behind sink.
 - Behind hob.
-

2.7 Ceiling Finishes

Provide painted gypsum board ceilings throughout.

Provide moisture-resistant gypsum board ceilings to kitchens and bathrooms.

Ceilings shall:

- Have a smooth painted finish.
 - Be suitable for residential use.
-

2.8 Paint Finishes

Internal

Provide washable premium acrylic paint to walls and ceilings.

Paint shall:

- Be washable.
 - Have low VOC content.
 - Be suitable for residential use.
-

External

Provide premium exterior acrylic paint.

Paint shall:

- Resist UV exposure.
 - Be weather resistant.
 - Be suitable for the Stellenbosch climate.
-

2.9 External Works Finishes

Provide:

- Concrete pavers to entrance porch and patio.
- Concrete paving slabs to walkways.
- Interlocking concrete paving blocks to driveways.
- Plastered masonry or precast concrete boundary walls.

External finishes shall provide a durable, attractive and low-maintenance residential environment.

2.10 General Performance Requirements

All finishes shall:

- Be durable and suitable for long-term residential use.
- Be readily available within South Africa.

- Be easy to maintain.
- Be replaceable without affecting adjacent finishes.
- Comply with applicable South African Standards.
- Be of first-quality manufacture.

Equivalent products of equal quality may be submitted for approval.

SECTION 3

KITCHEN SPECIFICATION

3.1 General

The kitchen shall provide a practical, functional and durable workspace suitable for Typology 3 within the GAP Housing development. The specification introduces an enhanced level of finish and functionality over Typology 2 while maintaining affordability, ease of maintenance and long-term durability.

The kitchen layout shall be in accordance with the approved architectural drawings.

3.2 Kitchen Joinery

Provide purpose-made kitchen cupboards manufactured from moisture-resistant melamine-faced board.

The kitchen shall include, where indicated on the approved drawings:

- Base cupboards.
- Full-height wall cupboards.
- Sink cupboard.
- Drawer unit.
- Appliance space.
- Corner cupboard where applicable.
- Open shelving where indicated.

Cupboard doors shall be fitted with concealed soft-close hinges.

Exposed edges shall be finished with impact-resistant PVC edging.

Acceptable Alternative: Equivalent moisture-resistant melamine cabinetry of equal or superior quality.

3.3 Countertops

Provide postformed high-pressure laminate countertops on moisture-resistant substrate.

Countertops shall:

- Be moisture resistant.

- Be suitable for food preparation.
- Be resistant to staining and normal domestic wear.
- Be easy to clean.
- Have a contemporary stone-look finish.
- Colour selected by the Architect.

Acceptable Alternative: Engineered stone where approved by the Municipality.

3.4 Splashback

Provide ceramic wall tiles above all kitchen work surfaces.

Splashbacks shall extend:

- From countertop to underside of wall cupboards.
- Behind the sink.
- Behind the hob.

Where no wall cupboards occur, the splashback shall extend to a minimum height of 600 mm above the countertop.

Colour selected by the Architect.

3.5 Sink & Mixer

Provide:

- Large stainless steel single inset sink with integrated drainer.
- Chrome-plated single-lever gooseneck mixer.

Fixtures shall be suitable for normal residential use and compatible with standard plumbing fittings.

Acceptable Alternative: Equivalent corrosion-resistant fixtures of equal quality.

3.6 Appliances

Provide dedicated spaces and service connections for:

- Freestanding refrigerator.
- Built-in under-counter oven.
- Built-in hob.
- Extractor.
- Washing machine where indicated on the approved drawings.

Cabinetry shall allow future replacement of appliances without alteration.

3.7 Finishes Schedule

Component	Specification
<i>Cupboards</i>	Moisture-resistant white melamine-faced board
<i>Wall Cupboards</i>	Full-height wall cupboards

<i>Countertop</i>	Postformed high-pressure laminate with stone-look finish
<i>Splashback</i>	Full-height ceramic wall tiles to underside of wall cupboards
<i>Sink</i>	Large stainless steel single inset sink with drainer
<i>Mixer</i>	Chrome-plated single-lever gooseneck mixer
<i>Handles</i>	Powder-coated aluminium or stainless steel
<i>Hinges</i>	Concealed soft-close hinges
<i>Kickplates</i>	PVC

3.8 Performance Requirements

Kitchen finishes and fixtures shall:

- Be suitable for long-term residential use.
- Be durable and low maintenance.
- Be resistant to moisture and staining.
- Be easy to clean.
- Be readily available within South Africa.
- Permit replacement of individual components without major alteration to the cabinetry.
- Comply with applicable South African Standards.

Equivalent products of equal or superior quality may be submitted for approval.

SECTION 4

SANITARY SPECIFICATION

4.1 General

The bathroom shall provide durable, functional and low-maintenance facilities suitable for Typology 3 within the GAP Housing development. Materials and fixtures shall be selected to provide enhanced functionality, water efficiency and long-term durability while remaining appropriate to the approved project budget.

The bathroom layout shall be in accordance with the approved architectural drawings.

4.2 Sanitary Fixtures

Provide the following sanitary fixtures:

Family Bathroom

- Close-coupled dual-flush WC
- Vanity basin with mixer
- Semi-frameless shower enclosure with mixer and shower outlet
- Frameless polished mirror
- Towel rail
- Toilet roll holder
- Robe hook

En-suite bathroom

- Close-coupled dual-flush WC
- Wall-mounted or pedestal basin
- Basin mixer
- Frameless polished mirror
- Toilet roll holder

All sanitary fixtures shall be suitable for normal residential use and compatible with locally available replacement parts.

4.3 Vanity Unit

Provide a compact vanity unit manufactured from moisture-resistant white melamine-faced board with PVC edging.

The vanity shall:

- Provide practical enclosed storage.
- Accommodate the selected basin.
- Be easy to clean and maintain.

- Be suitable for residential use.

Cabinet doors shall be fitted with concealed soft-close hinges.

Acceptable Alternative: Equivalent moisture-resistant vanity unit of equal or superior quality.

4.4 Shower

Provide:

- Semi-frameless toughened safety glass shower enclosure.
- Chrome-plated single-lever shower mixer.
- Fixed wall-mounted shower outlet.

Fixtures shall be durable, corrosion-resistant and suitable for normal residential use.

Acceptable Alternative: Equivalent shower enclosure and fittings of equal quality.

4.5 Bathroom Accessories

Provide:

- Frameless polished mirror.
- Powder-coated or stainless-steel towel rail.
- Wall-mounted toilet roll holder.
- Robe hook.

Accessories shall be corrosion-resistant, securely fixed and suitable for humid environments.

4.6 Finishes Schedule

<i>Component</i>	<i>Specification</i>
<i>Floor</i>	Non-slip ceramic floor tiles
<i>Walls</i>	Ceramic wall tiles to full shower enclosure, above bath and vanity splashback; painted plaster elsewhere
<i>Ceiling</i>	Moisture-resistant gypsum board ceiling
<i>Vanity</i>	Moisture-resistant white melamine-faced board
<i>Basin</i>	Vitreous china
<i>WC</i>	Dual-flush vitreous china suite
<i>Shower Enclosure</i>	Semi-frameless toughened safety glass
<i>Shower Mixer</i>	Chrome-plated single-lever mixer
<i>Mirror</i>	Frameless polished mirror
<i>Accessories</i>	Powder-coated steel or stainless steel

4.7 Performance Requirements

Bathroom finishes and fixtures shall:

TPOLOGY 3 – ARCHITECTURAL FINISHES AND FIXTURES SPECIFICATIONS

- Be suitable for long-term residential use.
- Be moisture resistant.
- Be durable and low maintenance.
- Be easy to clean.
- Be readily available within South Africa.
- Be resistant to corrosion in humid environments.
- Permit replacement of individual fixtures without major alteration.
- Comply with applicable South African Standards.

Equivalent products of equal or superior quality may be submitted for approval.

Annexure A

TPOLOGY 3 – LARGE FREESTANDING UNIT

External Finishes and Construction Standards



STANDARD RESIDENTIAL QUALITY

DURABLE
Built to last with
quality materials

**LOW
MAINTENANCE**
Easy to clean
and maintain

**CLIMATE
APPROPRIATE**
Suitable for
South African
conditions

**COST
EFFECTIVE**
Smart finishes
that balance
quality and
affordability

TPOLOGY 3 – EXTERNAL FINISHES & CONSTRUCTION STANDARD



A durable, low maintenance and cost-effective external finish standard designed for affordable family housing. Materials are selected for longevity, ease of maintenance and suitability to the South African climate.



CONSTRUCTION & MATERIALS

CONSTRUCTION

Conventional masonry



- Concrete block masonry
- Internal plaster & paint
- External plaster & paint
- Plaster finish

ROOF – TILES

Charcoal Grey



- Concrete roof tiles
- Colour: Charcoal Grey
- Including standard flashings and accessories
- Durable, lightweight and weather resistant

EXTERNAL WALLS

Plaster with feature brick



- Cement plaster & acrylic paint
- Light neutral tone
- Face brick accents used sparingly for interest
- Plaster finish: Smooth

COLOUR & TEXTURE PALETTE



Plaster & Paint
Light Neutral



Face Brick Accent
Light Brown
(Optional)

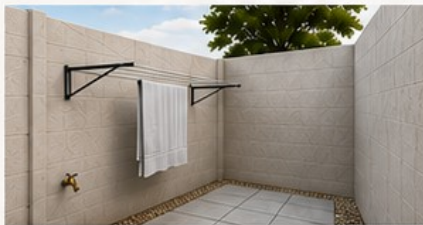


Roof Tiles
Charcoal Grey



Plaster Finish
Smooth

WASHING LINE AREA



FLOOR FINISH
Concrete paving slabs



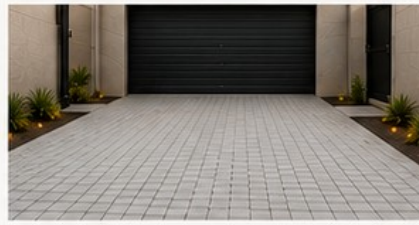
WALL FINISH
Cement plaster &
exterior acrylic paint



CEILING FINISH
Open to sky



DRIVEWAY



FLOOR FINISH
Interlocking concrete paving



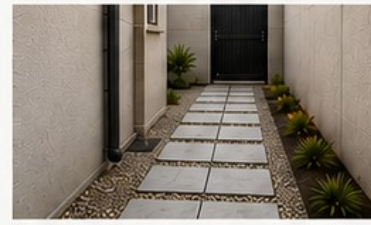
WALL FINISH
Cement plaster &
exterior acrylic paint



CEILING FINISH
Open to sky



WALKWAYS



FLOOR FINISH
Concrete paving slabs



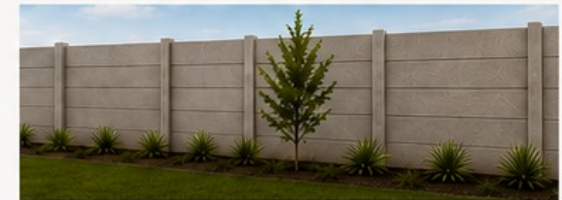
WALL FINISH
Cement plaster &
exterior acrylic paint



CEILING FINISH
Open to sky



FENCE – VIBRACRETE WALL



Precast concrete
vibracrete wall
Colour: Natural Grey

Plaster & paint
to match dwelling
where required

COLOUR PALETTE (INDICATIVE)



External Wall Paint
Light Neutral



Exterior Feature
Plaster
Warm Light Grey



Face Brick Accent
Light Brown
(Optional)



Paving / Concrete
Light Grey



Roof Tiles
Charcoal Grey

NOTES

- All external finishes to be durable, low maintenance and suitable for local climate.
- Concrete paving to be laid on compacted base with appropriate falls for drainage.
- All wall plaster and paint to comply with SANS 10400 and manufacturer's requirements.
- Future carport and braai area by owner.



DURABLE
Materials selected for
long-term durability
and resistance to
weathering.



LOW MAINTENANCE
Easy to clean and
maintain with
standard household
methods.



WEATHER RESISTANT
Suitable for South African
climate conditions
including sun, wind
and rain.



COST EFFECTIVE
Finishes chosen to
balance quality,
durability and
affordability.

KEY PERFORMANCE REQUIREMENTS

i Images and colours are indicative of the standard of finish intended for Typology 3 and may be replaced with approved equivalent products.

Annexure B

TYPOLOGY 3 – LARGE FREESTANDING UNIT

External Finishes and Areas



STANDARD RESIDENTIAL QUALITY

DURABLE
Built to last with
quality materials

**LOW
MAINTENANCE**
Easy to clean
and maintain

**CLIMATE
APPROPRIATE**
Suitable for
South African
conditions

**COST
EFFECTIVE**
Smart finishes
that balance
quality and
affordability

TPOLOGY 3 – EXTERNAL FINISHES & CONSTRUCTION STANDARD



A durable, low maintenance and cost-effective external finish standard designed for affordable family housing. Materials are selected for longevity, ease of maintenance and suitability to the South African climate.



CONSTRUCTION & MATERIALS

CONSTRUCTION

Conventional masonry



- Concrete block masonry
- Internal plaster & paint
- External plaster & paint
- Plaster finish

ROOF – TILES

Charcoal Grey



- Concrete roof tiles
- Colour: Charcoal Grey
- Including standard flashings and accessories
- Durable, lightweight and weather resistant

EXTERNAL WALLS

Plaster with feature brick



- Cement plaster & acrylic paint
- Light neutral tone
- Face brick accents used sparingly for interest
- Plaster finish: Smooth

COLOUR & TEXTURE PALETTE



Plaster & Paint
Light Neutral



Face Brick Accent
Light Brown
(Optional)

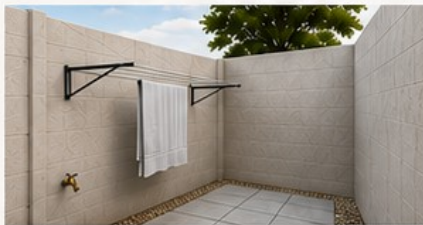


Roof Tiles
Charcoal Grey



Plaster Finish
Smooth

WASHING LINE AREA



FLOOR FINISH
Concrete paving slabs



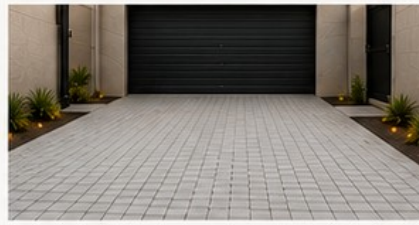
WALL FINISH
Cement plaster &
exterior acrylic paint



CEILING FINISH
Open to sky



DRIVEWAY



FLOOR FINISH
Interlocking concrete paving



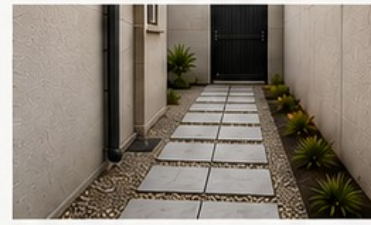
WALL FINISH
Cement plaster &
exterior acrylic paint



CEILING FINISH
Open to sky



WALKWAYS



FLOOR FINISH
Concrete paving slabs



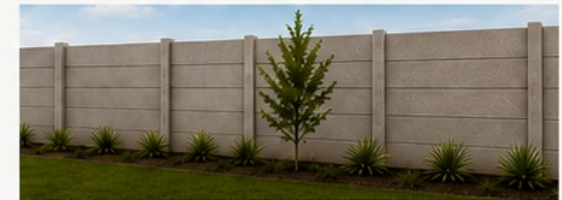
WALL FINISH
Cement plaster &
exterior acrylic paint



CEILING FINISH
Open to sky



FENCE – VIBRACRETE WALL



Precast concrete
vibracrete wall
Colour: Natural Grey

Plaster & paint
to match dwelling
where required

COLOUR PALETTE (INDICATIVE)



External Wall Paint
Light Neutral



Exterior Feature
Plaster
Warm Light Grey



Face Brick Accent
Light Brown
(Optional)



Paving / Concrete
Light Grey



Roof Tiles
Charcoal Grey

NOTES

- All external finishes to be durable, low maintenance and suitable for local climate.
- Concrete paving to be laid on compacted base with appropriate falls for drainage.
- All wall plaster and paint to comply with SANS 10400 and manufacturer's requirements.
- Future carport and braai area by owner.



DURABLE
Materials selected for
long-term durability
and resistance to
weathering.



LOW MAINTENANCE
Easy to clean and
maintain with
standard household
methods.



WEATHER RESISTANT
Suitable for South African
climate conditions
including sun, wind
and rain.



COST EFFECTIVE
Finishes chosen to
balance quality,
durability and
affordability.

KEY PERFORMANCE REQUIREMENTS

i Images and colours are indicative of the standard of finish intended for Typology 3 and may be replaced with approved equivalent products.

Annexure C

TYPOLOGY 3 – LARGE FREESTANDING UNIT

Kitchen Fixtures and Finishes

TYPOLGY 3 – KITCHEN FINISHES & FIXTURES

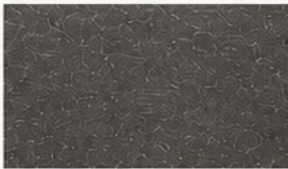
CUPBOARDS

White melamine-faced board



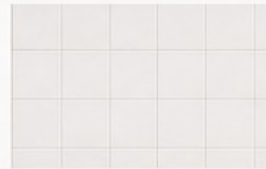
COUNTERTOP

Postformed
high-pressure laminate



SPLASHBACK

Ceramic wall tiles



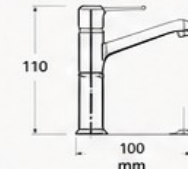
SINK

Stainless steel
double inset sink



MIXER

Chrome-plated
single-lever mixer



HANDLES

Powder-coated steel
or aluminium

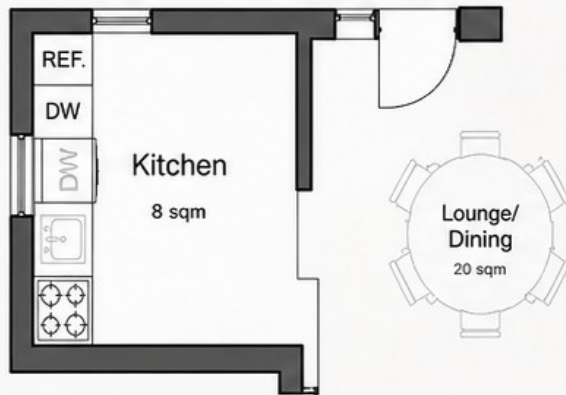


KICKPLATES

PVC



KITCHEN LAYOUT & SET-UP



Open plan kitchen creating a natural flow to dining and living spaces.

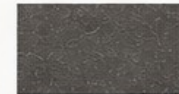
KITCHEN – PERSPECTIVE VIEW



FINISH PALETTE (INDICATIVE)



Cupboards
White Melamine



Countertop
Dark Stone Look



Splashback Tiles
White



Floor Tiles
Light Grey



Wall Paint
Light Neutral



Handles
Brushed Metal



Kickplates
Aluminium Look or Grey

BENCHMARK PRODUCTS (OR APPROVED EQUIVALENT)

- Cupboards** - White Melamine
- Countertop** - Postformed Laminate – Dark Stone Look
- Splashback Tiles** - Ceramic Tiles (200x200mm or 300x300mm)

- Sink** - Stainless Steel Double Inset Sink
- Mixer** - Chrome-Plated Single-Lever Mixer
- Handles** - Powder-Coated Steel or Aluminium
- Kickplates** - PVC Kickplate – Aluminium Look or Grey

NOTES

- All finishes are durable, easy to clean and low maintenance.
- Products shown are indicative of the standard of finish intended for Typology 3 and may be replaced with approved equivalent products.
- Appliances for illustration only. Refer to project specification.

Annexure D

TYPOLOGY 3 – LARGE FREESTANDING UNIT

Sanitary Fixtures

FAMILY BATHROOM

CLOSE-COUPLED
DUAL-FLUSH WC



VANITY BASIN
WITH MIXER



SHOWER WITH MIXER
AND SHOWER OUTLET



MIRROR



TOWEL RAIL



TOILET ROLL
HOLDER



ENSUITE BATHROOM

CLOSE-COUPLED
DUAL-FLUSH WC



WALL-MOUNTED VANITY BASIN
WITH MIXER



SHOWER WITH MIXER
AND SHOWER OUTLET



MIRROR



TOILET ROLL
HOLDER



ACCESSORIES & FINISHES



TOWEL RAIL



TOILET ROLL HOLDER



ROBE HOOK



SHOWER MIXER

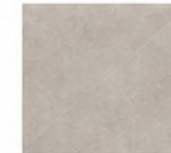


SHOWER OUTLET



FLOOR WASTE

TYPICAL FINISHES



FLOOR TILES
(NON-SLIP PORCELAIN)



WALL TILES
(CERAMIC)

FFE SPECIFICATION

TYPOLOGY 4



STELLENBOSCH

STELLENBOSCH • PNIEL • FRANSCHHOEK

MUNISIPALITEIT • UMASIPALA • MUNICIPALITY



ARCHITECTURAL

FINISHES & FIXTURES SPECIFICATION

TYPOLGY 4 – XL FREESTANDING UNIT

1.1 PROJECT INFORMATION

PROJECT:	Erf 7001 GAP Housing Development
TYPOLGY:	Typology 4 – XL Freestanding Unit
LOCATION:	Erf 7001, Cloetesville, Stellenbosch
CLIENT:	Stellenbosch Municipality
DOCUMENT:	Architectural Finishes & Fixtures Specification



This document establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 4.

It shall be read in conjunction with the associated drawings and all consultant documentation.

DOCUMENT NO.
ERF7001-FFS-T04

REVISION:
A

ISSUE DATE:
AUGUST 2026

Prepared by

SPACE
— ARCHITECTS AND DESIGNERS —

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ANNEXURE A

External Finishes and Construction Standards

ANNEXURE B

External Finishes and Areas

ANNEXURE C

Kitchen Fixtures and Finishes

ANNEXURE D

Sanitary Fixtures

SECTION 1

1.1 General Information:

<i>Description</i>	<i>Value</i>
Typology	Typology 4 – Large Unit (Free Standing)
Gross Floor Area	± 92.5 - 110 m ²
Bedrooms	3
Bathrooms	1 Family Bathroom
En Suite	1
Kitchen	Open Plan
Lounge/Dining	Open Plan
Patio	Yes
Built-in Braai	Future Provision
Garage	1
Carport	Future Provision
Construction Type	Single Storey Masonry

1.2 Purpose of this Specification

This specification establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 4. It shall be read together with the approved architectural drawings and all consultant documentation forming part of the future procurement documentation.

The specification is intended to establish a consistent standard of quality, durability and contemporary residential appearance appropriate to Typology 4, while remaining commercially viable and aligned with the approved project budget.

1.3 Design Intent

Typology 4 provides a larger free-standing family dwelling with an enhanced level of accommodation and finishes relative to the preceding typologies.

The selected finishes and fixtures shall reflect the following principles:

- Durable, robust and low-maintenance materials.
 - Enhanced residential quality appropriate to the Typology 4 market position.
 - Contemporary architectural character.
 - Simple, practical detailing with good long-term performance.
 - Readily available materials within the South African market.
 - Ease of maintenance, repair and replacement.
 - Consistency with the overall architectural language of the development.
-

1.4 Applicable Standards

Unless otherwise noted, all materials, products and workmanship shall comply with the latest editions of:

- National Building Regulations.
- SANS 10400.
- Relevant SANS product standards.
- Occupational Health and Safety Act.
- Local Authority requirements.
- Manufacturer's installation recommendations.
- Good building practice.

Where discrepancies occur, the more stringent requirement shall apply.

1.5 Quality Standard

All finishes and fixtures shall:

- Be new and unused.
- Be first quality.
- Be free from visible defects.
- Be suitable for residential use.
- Be durable and low maintenance.
- Be readily available within South Africa.
- Be handed over clean and free from damage.

Equivalent products of equal or superior quality may be considered, subject to municipal approval.

1.6 Approved Alternatives

Products referenced within this document establish the required minimum performance standard.

Alternative products may be proposed provided they are equal or superior in respect of:

- Durability.
- Appearance.

- Performance.
- Warranty.
- Maintenance requirements.
- Availability.
- Compliance with applicable South African Standards.

All alternatives shall receive written approval from the Municipality prior to procurement.

1.7 Colour Philosophy



The colour palette shall comprise neutral contemporary tones selected to:

- Maximise natural daylight.
- Reduce long-term maintenance.
- Create visual consistency throughout the development.
- Complement the architectural form.
- Provide a timeless residential appearance.

Accent colours shall be used sparingly.

1.8 Sustainability

Where practical and economically feasible, materials shall:

- Be locally manufactured where available.
 - Require minimal maintenance.
 - Be durable and replaceable.
 - Have low VOC emissions where applicable.
 - Provide a long service life under normal residential use.
-

1.9 General Performance Requirements

All selected finishes and fixtures shall:

- Be suitable for normal residential occupation.
- Be easy to clean and maintain.
- Resist normal moisture exposure in wet areas.
- Be resistant to normal UV exposure externally.
- Be readily replaceable.
- Comply with applicable South African Standards.

1.10 Coordination

This specification shall be read together with:

- Approved architectural drawings.
- Door and window schedules.
- Kitchen layouts.
- Sanitaryware schedules.
- Consultant documentation.
- Preliminary QS cost estimate.

Any discrepancies shall be referred to the Architect prior to implementation.

1.11 Procurement Philosophy

This specification establishes the minimum acceptable quality standard for Typology 4. Equivalent products may be proposed provided they achieve the required level of durability, functionality and appearance and receive written approval from the Municipality.

1.12 Budget Compliance

The specification has been prepared to align with the anticipated construction budget applicable to Typology 4, while providing an improved residential standard appropriate for the higher market position within the GAP housing programme.

Where value engineering is required, substitutions shall maintain the overall design intent and shall not compromise quality, durability or statutory compliance.

1.13 Exclusions

This specification does not include:

- Structural engineering design.
- Mechanical and electrical engineering design.
- Detailed shop drawings.
- Specialist manufacturing drawings.
- Construction methodology.
- Contractor temporary works.
- Installation procedures.

These items shall be developed by the appointed developer, contractor and specialist consultants during the detailed design and construction stages

SECTION 2

2.1 General

This Finishes Schedule establishes the minimum acceptable architectural finishes for Typology 4 and shall be read together with the Material Specifications contained within this document.

The selected finishes are intended to provide an enhanced residential standard appropriate for the Typology 4 budget while maintaining durability, ease of maintenance and long-term value. All finishes shall be suitable for affordable GAP housing and shall comply with the approved project budget.

Equivalent products of equal quality may be submitted for approval.

2.2 Internal Finishes Schedule

<i>Space</i>	<i>Floor Finish</i>	<i>Skirting</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continue into living areas
<i>Lounge</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continuous finish
<i>Dining</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Continuous finish
<i>Kitchen</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Painted plaster with ceramic tiled splashback	Moisture-resistant gypsum board ceiling	Full splashback to worktops
<i>Bedroom 1</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Low-maintenance finish
<i>Bedroom 2</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Low-maintenance finish

				board ceiling	
<i>Bedroom 3</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with acrylic paint	Painted gypsum board ceiling	Low-maintenance finish
<i>Family Bathroom</i>	Non-slip ceramic floor tiles	Tile skirting	Ceramic wall tiles to full shower enclosure and above bath; painted plaster elsewhere	Moisture-resistant gypsum board ceiling	Enhanced wall tiling
<i>Built-in Cupboards (Bedroom 1, 2 & 3)</i>	Continue adjacent floor finish	—	White melamine-lined carcasses	—	Refer Joinery Specification in Built in Cupboards Schedule
<i>Garage</i>	Power-floated concrete	—	Plastered and painted masonry	Painted ceiling	Durable utility finish

2.3 External Finishes Schedule

<i>Area</i>	<i>Floor Finish</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance Porch</i>	Non-slip concrete pavers	Cement plaster with exterior acrylic paint	Fibre cement soffit	Improved entrance finish
<i>Patio</i>	Concrete pavers	Cement plaster with exterior acrylic paint	Fibre cement soffit where applicable	Future built-in braai provision
<i>Future Braai Area</i>	Concrete paving	Cement plaster with exterior acrylic paint	Open to sky	Future owner installation
<i>Washing Line Area</i>	Concrete paving slabs	Plastered masonry or precast concrete wall	Open to sky	Low-maintenance finish
<i>Future Carport</i>	Concrete paving	Not applicable	Open to sky	Provision for future installation

<i>Driveway</i>	Interlocking concrete paving blocks	Not applicable	Open to sky	Suitable for residential vehicles
<i>Walkways</i>	Concrete paving slabs	Not applicable	Open to sky	Slip-resistant finish

2.4 Colour Schedule

<i>Element</i>	<i>Colour Intent</i>
<i>Internal Walls</i>	Warm off-white
<i>Ceilings</i>	White
<i>Kitchen Joinery</i>	Warm white
<i>Bathroom Joinery</i>	Warm white
<i>Countertops</i>	Mid-grey stone appearance
<i>Aluminium Windows</i>	Charcoal
<i>Roof</i>	Charcoal
<i>External Walls</i>	Warm light neutral
<i>Feature Walls</i>	Medium grey
<i>Paving</i>	Natural grey

Final colours shall be approved by the Architect.

2.5 Floor Finishes

Internal Floors

Provide 600 × 600 mm ceramic floor tiles throughout living areas, bedrooms, circulation spaces and kitchen.

Floor tiles shall:

- Be suitable for heavy residential use.
- Have a matt finish.
- Be easy to clean.
- Resist staining.
- Be locally available.
- Colour selected by the Architect.

Acceptable Alternative

Equivalent ceramic floor tiles of equal quality and performance.

Wet Areas

Provide non-slip ceramic floor tiles.

Tiles shall:

- Be suitable for wet areas.
 - Provide appropriate slip resistance.
 - Be moisture resistant.
-

External Areas

Provide concrete pavers or concrete paving blocks.

Paving shall:

- Be slip resistant.
 - Be durable.
 - Require minimal maintenance.
-

2.6 Wall Finishes

Internal Walls

Provide cement plaster with premium-quality washable acrylic paint.

The finish shall:

- Provide a smooth surface.
- Be washable.
- Be suitable for residential use.

Bathroom Walls

Provide ceramic wall tiles:

- Full height to shower enclosure.
- Splashback to basin.

Remaining walls shall receive painted plaster.

Kitchen Splashback

Provide ceramic wall tiles:

- Between worktop and underside of wall cupboards.
 - Behind sink.
 - Behind hob.
-

2.7 Ceiling Finishes

Provide painted gypsum board ceilings throughout.

Provide moisture-resistant gypsum board ceilings to kitchens and bathrooms.

Ceilings shall:

- Have a smooth painted finish.
- Be suitable for residential use.

2.8 Paint Finishes

Internal

Provide washable premium acrylic paint to walls and ceilings.

Paint shall:

- Be washable.
 - Have low VOC content.
 - Be suitable for residential use.
-

External

Provide premium exterior acrylic paint.

Paint shall:

- Resist UV exposure.
 - Be weather resistant.
 - Be suitable for the Stellenbosch climate.
-

2.9 External Works Finishes

Provide:

- Concrete pavers to entrance porch and patio.
- Concrete paving slabs to walkways.
- Interlocking concrete paving blocks to driveways.
- Plastered masonry or precast concrete boundary walls.

External finishes shall provide a durable, attractive and low-maintenance residential environment.

2.10 General Performance Requirements

All finishes shall:

- Be durable and suitable for long-term residential use.
- Be readily available within South Africa.
- Be easy to maintain.
- Be replaceable without affecting adjacent finishes.
- Comply with applicable South African Standards.
- Be of first-quality manufacture.

Equivalent products of equal quality may be submitted for approval.

SECTION 3

KITCHEN SPECIFICATION

3.1 General

The kitchen shall provide a practical, functional and durable workspace suitable for Typology 4 within the GAP Housing development. The specification introduces an enhanced level of finish and functionality over Typology 3 while maintaining affordability, ease of maintenance and long-term durability.

The kitchen layout shall be in accordance with the approved architectural drawings.

3.2 Kitchen Joinery

Provide purpose-made kitchen cupboards manufactured from moisture-resistant melamine-faced board.

The kitchen shall include, where indicated on the approved drawings:

- Base cupboards.
- Full-height wall cupboards.
- Sink cupboard.
- Drawer unit.
- Appliance space.
- Corner cupboard where applicable.
- Open shelving where indicated.

Cupboard doors shall be fitted with concealed soft-close hinges.

Exposed edges shall be finished with impact-resistant PVC edging.

Acceptable Alternative: Equivalent moisture-resistant melamine cabinetry of equal or superior quality.

3.3 Countertops

Provide postformed high-pressure laminate countertops on moisture-resistant substrate.

Countertops shall:

- Be moisture resistant.
- Be suitable for food preparation.
- Be resistant to staining and normal domestic wear.
- Be easy to clean.
- Have a contemporary stone-look finish.
- Colour selected by the Architect.

Acceptable Alternative: Engineered stone where approved by the Municipality.

3.4 Splashback

Provide ceramic wall tiles above all kitchen work surfaces.

Splashbacks shall extend:

- From countertop to underside of wall cupboards.
- Behind the sink.
- Behind the hob.

Where no wall cupboards occur, the splashback shall extend to a minimum height of 600 mm above the countertop.

Colour selected by the Architect.

3.5 Sink & Mixer

Provide:

- Large stainless steel single inset sink with integrated drainer.
- Chrome-plated single-lever gooseneck mixer.

Fixtures shall be suitable for normal residential use and compatible with standard plumbing fittings.

Acceptable Alternative: Equivalent corrosion-resistant fixtures of equal quality.

3.6 Appliances

Provide dedicated spaces and service connections for:

- Freestanding refrigerator.
- Built-in under-counter oven.
- Built-in hob.
- Extractor.
- Washing machine where indicated on the approved drawings.

Cabinetry shall allow future replacement of appliances without alteration.

3.7 Finishes Schedule

Component	Specification
<i>Cupboards</i>	Moisture-resistant white melamine-faced board
<i>Wall Cupboards</i>	Full-height wall cupboards
<i>Countertop</i>	Postformed high-pressure laminate with stone-look finish
<i>Splashback</i>	Full-height ceramic wall tiles to underside of wall cupboards
<i>Sink</i>	Large stainless steel single inset sink with drainer
<i>Mixer</i>	Chrome-plated single-lever gooseneck mixer
<i>Handles</i>	Powder-coated aluminium or stainless steel
<i>Hinges</i>	Concealed soft-close hinges
<i>Kickplates</i>	PVC

3.8 Performance Requirements

Kitchen finishes and fixtures shall:

- Be suitable for long-term residential use.
- Be durable and low maintenance.
- Be resistant to moisture and staining.
- Be easy to clean.
- Be readily available within South Africa.
- Permit replacement of individual components without major alteration to the cabinetry.
- Comply with applicable South African Standards.

Equivalent products of equal or superior quality may be submitted for approval.

SECTION 4

SANITARY SPECIFICATION

4.1 General

The bathroom shall provide durable, functional and low-maintenance facilities suitable for Typology 4 within the GAP Housing development. Materials and fixtures shall be selected to provide enhanced functionality, water efficiency and long-term durability while remaining appropriate to the approved project budget.

The bathroom layout shall be in accordance with the approved architectural drawings.

4.2 Sanitary Fixtures

Provide the following sanitary fixtures:

Family Bathroom

- Close-coupled dual-flush WC
- Vanity basin with mixer
- Semi-frameless shower enclosure with mixer and shower outlet
- Frameless polished mirror
- Towel rail
- Toilet roll holder
- Robe hook

En-suite WC

- Close-coupled dual-flush WC
- Wall-mounted or pedestal basin
- Basin mixer
- Frameless polished mirror
- Toilet roll holder

All sanitary fixtures shall be suitable for normal residential use and compatible with locally available replacement parts.

4.3 Vanity Unit

Provide a compact vanity unit manufactured from moisture-resistant white melamine-faced board with PVC edging.

The vanity shall:

- Provide practical enclosed storage.
- Accommodate the selected basin.
- Be easy to clean and maintain.
- Be suitable for residential use.

Cabinet doors shall be fitted with concealed soft-close hinges.

Acceptable Alternative: Equivalent moisture-resistant vanity unit of equal or superior quality.

4.4 Shower

Provide:

- Semi-frameless toughened safety glass shower enclosure.
- Chrome-plated single-lever shower mixer.
- Fixed wall-mounted shower outlet.

Fixtures shall be durable, corrosion-resistant and suitable for normal residential use.

Acceptable Alternative: Equivalent shower enclosure and fittings of equal quality.

4.5 Bathroom Accessories

Provide:

- Frameless polished mirror.
- Powder-coated or stainless-steel towel rail.
- Wall-mounted toilet roll holder.
- Robe hook.

Accessories shall be corrosion-resistant, securely fixed and suitable for humid environments.

4.6 Finishes Schedule

<i>Component</i>	<i>Specification</i>
<i>Floor</i>	Non-slip ceramic floor tiles
<i>Walls</i>	Ceramic wall tiles to full shower enclosure and vanity splashback; painted plaster elsewhere
<i>Ceiling</i>	Moisture-resistant gypsum board ceiling
<i>Vanity</i>	Moisture-resistant white melamine-faced board
<i>Basin</i>	Vitreous china
<i>WC</i>	Dual-flush vitreous china suite
<i>Shower Enclosure</i>	Semi-frameless toughened safety glass

<i>Shower Mixer</i>	Chrome-plated single-lever mixer
<i>Mirror</i>	Frameless polished mirror
<i>Accessories</i>	Powder-coated steel or stainless steel

4.7 Performance Requirements

Bathroom finishes and fixtures shall:

- Be suitable for long-term residential use.
- Be moisture resistant.
- Be durable and low maintenance.
- Be easy to clean.
- Be readily available within South Africa.
- Be resistant to corrosion in humid environments.
- Permit replacement of individual fixtures without major alteration.
- Comply with applicable South African Standards.

Equivalent products of equal or superior quality may be submitted for approval.

Annexure A

TPOLOGY 4 – X LARGE FREESTANDING UNIT

External Finishes and Construction Standards



TPOLOGY 4 – EXTERNAL FINISHES & CONSTRUCTION STANDARD



A durable, low maintenance and cost-effective external finish standard designed for affordable family housing. Materials are selected for longevity, ease of maintenance and suitability to the South African climate.



STANDARD RESIDENTIAL QUALITY



DURABLE

Built to last with quality materials



LOW MAINTENANCE

Easy to clean and maintain



CLIMATE APPROPRIATE

Suitable for South African conditions



COST EFFECTIVE

Smart finishes that balance quality and affordability.

FENCE & BOUNDARY – VIBRACRETE WALL



Precast concrete vibracrete wall
Colour: Natural Grey

Plaster & paint to match dwelling where required

EXTERNAL COLOUR PALETTE (INDICATIVE)



External Wall Paint
Light Neutral



External Wall Paint
Warm Grey



Face Brick Accent
Light Grey
(Optional)



Plastered Surface
Light Neutral



Window & Door
Frames
Charcoal



Roof Tiles
Charcoal Grey

CONSTRUCTION & MATERIALS

CONSTRUCTION

Conventional masonry



- Concrete block masonry
- Internal plaster & paint
- External plaster & paint
- Plaster finish

ROOF – TILES

Charcoal Grey



- Concrete roof tiles
- Colour: Charcoal Grey
- Including standard flashings and accessories
- Durable, lightweight and weather resistant

EXTERNAL WALLS

Plaster with feature brick



- Cement plaster & acrylic paint
- Light neutral tone
- Face brick accents used sparingly for interest
- Plaster finish: Smooth

COLOUR & TEXTURE PALETTE



Plaster & Paint
Light Neutral



Face Brick Accent
Light Grey
(Optional)



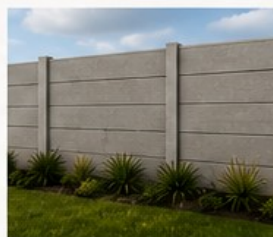
Roof Tiles
Charcoal Grey



Plaster Finish
Smooth

TYPICAL APPLICATIONS

BOUNDARY WALL



CORNERS & RETURNS

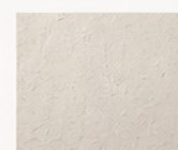


HEIGHT



Typical height
1.8m to comply
with local
requirements

FINISH



Smooth plaster
and paint finish

KEY PERFORMANCE REQUIREMENTS



DURABLE

Materials selected for long-term durability and resistance to weathering.



LOW MAINTENANCE

Easy to clean and maintain with standard household methods.



WEATHER RESISTANT

Suitable for South African climate conditions including sun, wind and rain.



COST EFFECTIVE

Finishes chosen to balance quality, durability and affordability.



AESTHETIC COHERENCE

Finishes complement the architectural character and neighbourhood context.



Images and colours are indicative of the standard of finish intended for Typology 4 and may be replaced with approved equivalent products.

Annexure B

TYPOLOGY 4 – X LARGE FREESTANDING UNIT

External Finishes and Areas



STANDARD RESIDENTIAL QUALITY



DURABLE

Built to last with quality materials



LOW MAINTENANCE

Easy to clean and maintain



CLIMATE APPROPRIATE

Suitable for South African conditions



COST EFFECTIVE

Smart finishes that balance quality and affordability

TPOLOGY 4 – EXTERNAL FINISHES & CONSTRUCTION STANDARD



A durable, low maintenance and cost-effective external finish standard designed for affordable family housing. Materials are selected for longevity, ease of maintenance and suitability to the South African climate.



CONSTRUCTION & MATERIALS

CONSTRUCTION

Conventional masonry



- Concrete block masonry
- Internal plaster & paint
- External plaster & paint
- Plaster finish

ROOF – TILES

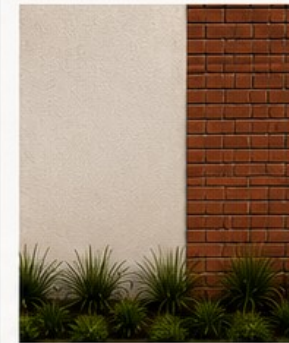
Charcoal Grey



- Concrete roof tiles
- Colour: Charcoal Grey
- Including standard flashings and accessories
- Durable, lightweight and weather resistant

EXTERNAL WALLS

Plaster with face brick accents

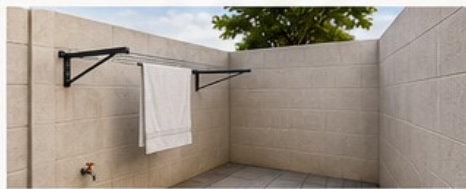


- Cement plaster & acrylic paint
- Light neutral tone
- Face brick accents used sparingly for interest
- Plaster finish: Smooth

COLOUR & TEXTURE PALETTE

- Plaster & Paint
Light Neutral
- Face Brick Accent
Light Brown (Optional)
- Roof Tiles
Charcoal Grey
- Plaster Finish
Smooth

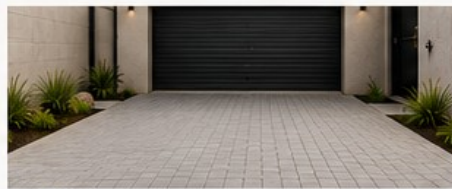
WASHING LINE AREA



- FLOOR FINISH**
Concrete paving slabs
- WALL FINISH**
Cement plaster & exterior acrylic paint
- CEILING FINISH**
Open to sky



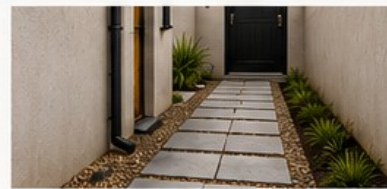
DRIVEWAY



- FLOOR FINISH**
Interlocking concrete paving
- WALL FINISH**
Cement plaster & exterior acrylic paint
- CEILING FINISH**
Open to sky



WALKWAYS



- FLOOR FINISH**
Concrete paving slabs
- WALL FINISH**
Cement plaster & exterior acrylic paint
- CEILING FINISH**
Open to sky



FENCE – VIBRACRETE WALL



- FLOOR FINISH**
Precast concrete vibracrete wall
Colour: Natural Grey
- WALL FINISH**
Plaster & paint to match dwelling where required

COLOUR PALETTE (INDICATIVE)

- External Wall Paint
Light Neutral
- Feature Plaster
Light Warm Grey
- Face Brick Accent
Light Brown (Optional)
- Paving / Concrete
Light Grey
- Roof Tiles
Charcoal Grey

NOTES

- All external finishes to be durable, low maintenance and suitable for local climate.
- Concrete paving to be laid on compacted base with appropriate falls for drainage.
- All wall plaster and paint to comply with SANS 10400 and manufacturer's requirements.
- Future carport and braai area by owner.



DURABLE
Materials selected for long-term durability and resistance to weathering.

KEY PERFORMANCE REQUIREMENTS



LOW MAINTENANCE
Easy to clean and maintain with standard household methods.



WEATHER RESISTANT
Suitable for South African climate conditions including sun, wind and rain.



COST EFFECTIVE
Finishes chosen to balance quality, durability and affordability.

Images and colours are indicative of the standard of finish intended for Typology 4 and may be replaced with approved equivalent products.

Annexure C

TYPOLOGY 4 – X LARGE FREESTANDING UNIT

Kitchen Fixtures and Finishes

TPOLOGY 4 – KITCHEN FINISHES & FIXTURES

CUPBOARDS

White melamine-faced board



COUNTERTOP

Postformed high-pressure laminate



SPLASHBACK

Ceramic wall tiles



SINK

Stainless steel double inset sink



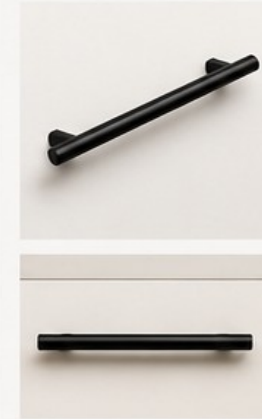
MIXER

Chrome-plated single-lever mixer



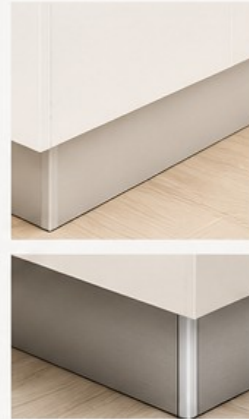
HANDLES

Black powder-coated steel or aluminium

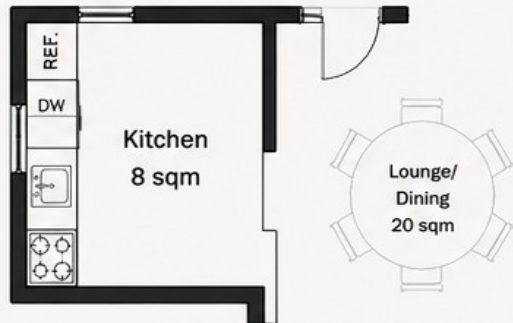


KICKPLATES

PVC



KITCHEN LAYOUT & SET-UP



Open plan kitchen creating a natural flow to dining and living spaces.

KITCHEN – PERSPECTIVE VIEW



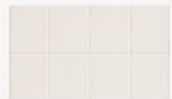
FINISH PALETTE (INDICATIVE)



Cupboards
White Melamine



Countertop
Dark Stone Look



Splashback Tiles
White



Floor Tiles
Light Grey



Wall Paint
Light Neutral



Handles
Black Powder-Coated



Kickplates
Aluminium Look or Grey

BENCHMARK PRODUCTS (OR APPROVED EQUIVALENT)

- Cupboards – White Melamine
- Countertop – Postformed Laminate – Dark Stone Look
- Splashback Tiles – Ceramic Tiles (200x200mm or 300x300mm)

- Sink – Stainless Steel Double Inset Sink
- Mixer – Chrome-Plated Single-Lever Mixer
- Handles – Black Powder-Coated Steel or Aluminium
- Kickplates – PVC Kickplate – Aluminium Look or Grey

NOTES

- All finishes are durable, easy to clean and low maintenance.
- Products shown are indicative of the standard of finish intended for Typology 4 and may be replaced with approved equivalent products.
- Appliances for illustration only. Refer to project specification.

Annexure D

TPOLOGY 4 – X LARGE FREESTANDING UNIT

Sanitary Fixtures

FAMILY BATHROOM

CLOSE-COUPLED
DUAL-FLUSH WC



VANITY BASIN
WITH MIXER



SHOWER WITH MIXER
AND SHOWER OUTLET



MIRROR



TOWEL RAIL



TOILET ROLL
HOLDER



ENSUITE BATHROOM

CLOSE-COUPLED
DUAL-FLUSH WC



WALL-MOUNTED VANITY BASIN
WITH MIXER



SHOWER WITH MIXER
AND SHOWER OUTLET



MIRROR



TOILET ROLL
HOLDER



ACCESSORIES & FINISHES



TOWEL RAIL



TOILET ROLL HOLDER



ROBE HOOK



SHOWER MIXER

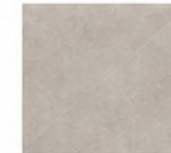


SHOWER OUTLET



FLOOR WASTE

TYPICAL FINISHES



FLOOR TILES
(NON-SLIP PORCELAIN)



WALL TILES
(CERAMIC)

FFE SPECIFICATION

TYPOLOGY 5



STELLENBOSCH

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ARCHITECTURAL

FINISHES & FIXTURES SPECIFICATION

TYPOLGY 5 – XXLARGE FREE-STANDING UNIT

1.1 PROJECT INFORMATION

PROJECT:	Erf 7001 GAP Housing Development
TYPOLGY:	Typology 5 – XXLarge Free-Standing Unit
LOCATION:	Erf 7001, Cloetesville, Stellenbosch
CLIENT:	Stellenbosch Municipality
DOCUMENT:	Architectural Finishes & Fixtures Specification



This document establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 5. It shall be read in conjunction with the associated drawings and all consultant documentation.

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A

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Prepared by

SPACE
— ARCHITECTS AND DESIGNERS —

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SECTION 1 — GENERAL

1.1 General Information

<i>Description</i>	<i>Value</i>
<i>Typology</i>	Typology 5 – XX Large Unit (Free Standing)
<i>Gross Floor Area</i>	±110–121 m ²
<i>Bedrooms</i>	3
<i>Study</i>	1
<i>Family Bathroom</i>	1
<i>En-Suite Bathroom</i>	1
<i>Kitchen</i>	Open Plan
<i>Lounge / Dining</i>	Open Plan
<i>Patio</i>	Yes
<i>Built-in Braai</i>	Future Provision
<i>Garage</i>	Single Garage
<i>Carport</i>	Future Provision
<i>Construction Type</i>	Single-Storey Masonry

1.2 Purpose of this Specification

This specification establishes the minimum architectural standards for finishes, fixtures and selected building components for Typology 5. It shall be read together with the approved architectural drawings and all relevant consultant documentation forming part of the future procurement documentation.

The specification is intended to establish a consistent standard of quality, durability and appearance appropriate for municipal GAP housing while remaining commercially viable and aligned with the approved project budget.

Typology 5 provides increased dwelling size, accommodation and amenity. The increased value of the typology is therefore primarily reflected in the size and functionality of the dwelling rather than substantially higher-cost finishes.

1.3 Design Intent

Typology 5 is a larger free-standing family dwelling providing three bedrooms, a study, family bathroom, en-suite bathroom, open-plan living accommodation, patio, garage and provision for future additions.

The selected finishes and fixtures shall reflect the following principles:

- Robust, durable and low-maintenance materials.
- Cost-effective construction.
- Contemporary residential appearance.

- Simple detailing to minimise future maintenance.
- Readily available materials within the South African market.
- Long service life under normal residential use.
- Ease of repair and replacement.

Consistent architectural character across the development.

The general material standard shall remain broadly consistent with the other typologies, with additional value provided through increased accommodation, space and functionality.

1.4 Applicable Standards

Unless otherwise noted, materials, products and workmanship shall comply with the latest applicable editions of:

- National Building Regulations.
- SANS 10400.
- Relevant SANS product standards.
- Occupational Health and Safety Act.
- Local Authority requirements.
- Manufacturer's installation recommendations.
- Good building practice.
- Where discrepancies occur, the more stringent applicable requirement shall apply.

1.5 Quality Standard

All finishes and fixtures shall:

- Be new and unused.
- Be first quality.
- Be free from visible defects.
- Be suitable for residential use.
- Be durable and low maintenance.
- Be readily available within South Africa.
- Be installed in accordance with the manufacturer's recommendations.
- Be handed over clean and free from damage.

1.6 Approved Alternatives

Products referenced within this specification establish the minimum required standard.

Equivalent products may be proposed provided they achieve equal or superior:

- Durability.
- Appearance.

- Performance.
- Warranty.
- Maintenance requirements.
- Availability.
- Compliance with applicable South African Standards.

Alternatives shall be subject to approval by the Municipality prior to procurement.

1.7 Colour Philosophy



The colour palette shall comprise neutral contemporary tones selected to:

- Maximise natural daylight.
- Reduce long-term maintenance.
- Create consistency throughout the development.
- Complement the architectural character.
- Provide a simple and timeless residential appearance.
- Accent colours and feature materials shall be used selectively.

1.8 Sustainability

Where practical and economically feasible, materials shall:

- Be locally manufactured or readily locally available.
- Require minimal maintenance.
- Be durable and replaceable.
- Have low VOC emissions where applicable.
- Provide a long service life under normal residential use.

1.9 General Performance Requirements

All finishes and fixtures shall:

- Be suitable for normal family residential occupation.
- Be easy to clean and maintain.
- Resist normal moisture exposure within wet areas.
- Resist normal UV and weather exposure externally.

- Be readily repairable or replaceable.
- Comply with applicable South African Standards.

1.10 Coordination

This specification shall be read together with:

- Approved architectural drawings.
- Door and window schedules.
- Kitchen layouts.
- Sanitaryware schedules.
- Electrical and plumbing layouts.
- Consultant documentation.
- Preliminary QS cost estimate.
- Any discrepancies shall be referred to the Architect prior to implementation.

1.11 Procurement Philosophy

This specification establishes the minimum acceptable quality standard for Typology 5.

The finish standard is intentionally based on durable, readily available and cost-effective residential materials rather than premium finishes.

Equivalent products may be proposed provided they achieve the required durability, functionality and appearance and receive approval prior to installation.

1.12 Budget Compliance

The specification has been developed to align with the anticipated construction budget for Typology 5. The increased value of Typology 5 is primarily provided through increased floor area, additional bedrooms, a study, en-suite bathroom, garage and associated residential amenities rather than substantial escalation in the cost of individual finishes.

Where value engineering is required, substitutions shall maintain the overall design intent and shall not compromise safety, durability, functionality or statutory compliance.

1.13 Exclusions

This specification does not include:

- Structural engineering design.
- Mechanical and electrical engineering design.
- Detailed shop drawings.
- Specialist manufacturing drawings.

- Contractor temporary works.
- Construction methodology.
- Specialist installation procedures.

These shall be developed by the relevant consultants, contractor and specialist suppliers where applicable.

SECTION 2 — FINISHES

2.1 General

This Finishes Schedule establishes the minimum acceptable architectural finishes for Typology 5. The finishes are intended to provide a durable, contemporary and cost-effective residential standard consistent with the overall development.

Finishes shall prioritise durability, ease of maintenance, local availability and cost efficiency. Equivalent products of equal or superior quality may be submitted for approval.

2.2 Internal Finishes Schedule

<i>Space</i>	<i>Floor Finish</i>	<i>Skirting</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with washable acrylic paint	Painted gypsum board ceiling	Continue into living areas
<i>Lounge</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with washable acrylic paint	Painted gypsum board ceiling	Continuous finish
<i>Dining</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with washable acrylic paint	Painted gypsum board ceiling	Continuous with lounge
<i>Kitchen</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Painted plaster with ceramic tiled splashback	Moisture-resistant gypsum board ceiling	Tiled splashback to worktop areas
<i>Study</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with washable acrylic paint	Painted gypsum board ceiling	Consistent with bedrooms
<i>Bedroom 1</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with washable acrylic paint	Painted gypsum board ceiling	BIC provision
<i>Bedroom 2</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with washable acrylic paint	Painted gypsum board ceiling	BIC provision

<i>Bedroom 3</i>	600 × 600 mm ceramic floor tiles	Tile skirting	Cement plaster with washable acrylic paint	Painted gypsum board ceiling	BIC provision
<i>Family Bathroom</i>	Non-slip ceramic floor tiles	Tile skirting	Ceramic tiles to shower, basin wet areas; painted plaster elsewhere	Moisture-resistant gypsum board ceiling	Wet-area finish
<i>En-Suite Bathroom</i>	Non-slip ceramic floor tiles	Tile skirting	Ceramic tiles to shower and basin wet areas; painted plaster elsewhere	Moisture-resistant gypsum board ceiling	Wet-area finish
<i>Built-in Cupboards (Bedroom 1, 2 & 3)</i>	Continue adjacent floor finish	—	White melamine-lined carcasses	—	Refer Joinery Specification in Built in Cupboards Schedule
<i>Garage</i>	Power-floated concrete	—	Plastered and painted masonry	Painted ceiling	Durable utility finish

2.3 External Finishes Schedule

<i>Area</i>	<i>Floor Finish</i>	<i>Wall Finish</i>	<i>Ceiling Finish</i>	<i>Remarks</i>
<i>Entrance / Verandah</i>	Concrete paving blocks	Cement plaster with exterior acrylic paint	Fibre cement soffit where applicable	Durable entrance finish
<i>Patio</i>	Concrete paving blocks	Cement plaster with exterior acrylic paint	Open to sky / soffit where applicable	Outdoor living area
<i>Future Braai Area</i>	Concrete paving	Cement plaster with exterior acrylic paint	Open to sky	Future owner installation
<i>Washing Line Area</i>	Concrete paving slabs	Precast concrete or plastered masonry boundary wall	Open to sky	Low maintenance
<i>Garage</i>	Power-floated concrete	Plastered and painted masonry	Painted soffit/ceiling as applicable	Vehicle use

<i>Future Carport</i>	Concrete paving	Not applicable	Future structure by owner	Provision for future installation
<i>Driveway</i>	Interlocking concrete paving blocks	Not applicable	Open to sky	Residential vehicle loading
<i>Walkways</i>	Concrete paving slabs	Not applicable	Open to sky	Slip-resistant finish

2.4 Colour Schedule

<i>Element</i>	<i>Colour Intent</i>
<i>Internal Walls</i>	Warm off-white
<i>Ceilings</i>	White
<i>Kitchen Joinery</i>	Warm white
<i>Bathroom Joinery</i>	Warm white
<i>Built-in Cupboards</i>	White / warm neutral
<i>Countertops</i>	Mid-grey or charcoal stone-look
<i>Aluminium Windows</i>	Charcoal
<i>Roof</i>	Charcoal
<i>External Walls</i>	Warm light neutral
<i>Feature Elements</i>	Medium grey / restrained accent
<i>Paving</i>	Natural grey

Final colours shall be selected by the Architect.

2.5 Floor Finishes

Internal Floors

Provide 600 × 600 mm ceramic floor tiles to living areas, dining area, bedrooms, study, circulation spaces and kitchen.

Tiles shall:

- Be suitable for heavy residential use.
- Have a matt finish.
- Be resistant to staining and normal domestic wear.
- Be easy to clean and maintain.
- Be readily available from South African suppliers.
- Be selected from the approved colour palette.
- Acceptable Alternative: Equivalent ceramic tiles of equal or superior quality and performance.
- Wet Areas

- Provide non-slip ceramic floor tiles to the family bathroom and en-suite bathroom.
- Tiles shall:
- Be suitable for wet areas.
- Provide slip resistance appropriate for residential bathrooms.
- Be moisture resistant.
- Be easy to clean.

Garage

Provide power-floated concrete floor finish suitable for residential vehicle use. Floor shall be durable, level, easy to maintain and laid to appropriate falls where drainage is required.

External Areas

Provide concrete paving blocks or concrete paving slabs as scheduled.

Paving shall:

- Be durable.
- Be slip resistant.
- Be suitable for external residential use.
- Require minimal maintenance.

2.6 Wall Finishes

Internal Walls

Provide cement plaster finished with washable acrylic paint.

The finish shall:

- Provide a smooth, even surface.
- Be washable.
- Be suitable for normal residential occupation.
- Be selected from the approved colour palette.
- Bathroom Walls
- Provide ceramic wall tiles:
- Full height within shower enclosures.
- Splashback to vanity/basin.
- Remaining wall areas shall receive painted plaster.
- Kitchen Splashback
- Provide ceramic wall tiles:
- Between countertop and underside of wall cupboards.
- Behind sink.
- Behind hob.
- To other worktop areas where indicated.

- Where no wall cupboard occurs, provide splashback to a minimum height of approximately 600 mm above the countertop.

2.7 Ceiling Finishes

Provide painted gypsum board ceilings to habitable internal spaces.

Provide moisture-resistant gypsum board ceilings to kitchen, family bathroom and en-suite bathroom.

Ceilings shall:

- Have a smooth painted finish.
- Be suitable for residential use.
- Be finished in white unless otherwise approved.

2.8 Paint Finishes

Internal

- Provide washable acrylic paint to plastered walls.
- Paint shall:
- Be washable.
- Be suitable for residential use.
- Have low VOC content where economically feasible.
- Provide a durable, even finish.

External

- Provide exterior acrylic paint suitable for masonry surfaces.
- Paint shall:
- Resist UV exposure.
- Be weather resistant.
- Be suitable for the Stellenbosch climate.
- Be suitable for normal external cleaning and maintenance.

2.9 External Works Finishes

Provide:

- Concrete paving blocks to entrance and patio areas.
- Interlocking concrete paving blocks to driveway.
- Concrete paving slabs to walkways and washing line area.
- Precast concrete or plastered masonry boundary walls where applicable.
- External works shall provide a durable, practical and low-maintenance residential environment.

2.10 General Performance Requirements

All finishes shall:

- Be durable and suitable for long-term residential use.
- Be readily available within South Africa.
- Be easy to clean and maintain.
- Be repairable and replaceable.
- Comply with applicable South African Standards.
- Be of first-quality manufacture.

Equivalent products of equal or superior quality may be submitted for approval.

SECTION 3 — KITCHEN SPECIFICATION

3.1 General

The Typology 5 kitchen shall provide a practical, functional and durable workspace appropriate for a three-bedroom family dwelling.

The kitchen shall maintain the general material standard established across the development while providing sufficient cabinetry, preparation space and appliance accommodation appropriate to the larger dwelling.

The kitchen layout shall be in accordance with the approved architectural drawings.

3.2 Kitchen Joinery

Provide purpose-made kitchen cupboards manufactured from moisture-resistant melamine-faced board.

Provide, where indicated:

- Base cupboards.
- Wall cupboards.
- Sink cupboard.
- Drawer unit.
- Appliance spaces.
- Corner cupboards where applicable.
- Pantry/storage cupboard where space permits.
- Open shelving only where indicated.
- Cupboard doors shall be fitted with concealed hinges, with soft-close operation where achievable within the approved budget.
- Exposed edges shall receive impact-resistant PVC edging.
- Acceptable Alternative: Equivalent moisture-resistant melamine cabinetry of equal or superior quality.

3.3 Countertops

Provide postformed high-pressure laminate countertops on moisture-resistant substrate.

Countertops shall:

- Be moisture resistant.
- Be suitable for food preparation.
- Resist staining and normal domestic wear.
- Be easy to clean.
- Have a contemporary stone-look finish.
- Be selected from the approved colour palette.

The use of engineered stone is not required as the base specification and shall only be considered where demonstrated to fall within the approved budget.

3.4 Splashback

Provide ceramic wall tiles above kitchen work surfaces.

Splashbacks shall extend:

- From countertop to underside of wall cupboards.
- Behind sink.
- Behind hob.
- Along continuous worktop areas.
- Where no wall cupboards occur, the splashback shall extend approximately 600 mm above the countertop.

3.5 Sink & Mixer

Provide:

- Large stainless-steel single-bowl inset sink with integrated drainer.
- Chrome-plated single-lever gooseneck mixer.
- Fixtures shall be durable, corrosion resistant and compatible with standard locally available plumbing fittings.

3.6 Appliances

Provide dedicated spaces and service connections for:

- Freestanding refrigerator.
- Built-in under-counter oven.
- Built-in hob.
- Extractor.
- Dishwasher where indicated.
- Washing machine where indicated on the approved drawings.

Cabinetry shall permit future replacement of appliances without substantial alteration.

3.7 Kitchen Finishes Schedule

<i>Component</i>	<i>Specification</i>
<i>Cupboards</i>	Moisture-resistant melamine-faced board
<i>Carcasses</i>	White melamine-faced board
<i>Wall Cupboards</i>	Full-height where indicated
<i>Countertop</i>	Postformed high-pressure laminate with stone-look finish
<i>Splashback</i>	Ceramic wall tiles
<i>Sink</i>	Large stainless-steel double-bowl inset sink with drainer
<i>Mixer</i>	Chrome-plated single-lever gooseneck mixer

<i>Handles</i>	Powder-coated aluminium or stainless steel
<i>Hinges</i>	Concealed hinges; soft-close where budget permits
<i>Kickplates</i>	PVC

3.8 Performance Requirements

Kitchen finishes and fixtures shall:

- Be suitable for long-term residential use.
 - Be durable and low maintenance.
 - Resist moisture and staining.
 - Be easy to clean.
 - Be readily available within South Africa.
 - Permit replacement of individual components without major alteration.
 - Comply with applicable South African Standards.
 - Equivalent products of equal or superior quality may be submitted for approval.
-

SECTION 4 — BATHROOM SPECIFICATION

4.1 General

Typology 5 comprises a family bathroom and en-suite bathroom. Bathrooms shall provide durable, functional, water-efficient and low-maintenance facilities appropriate for family residential use.

The general sanitaryware and finish standard shall remain consistent with the overall development, with the increased value of Typology 5 provided primarily through the inclusion of the additional en-suite bathroom. Bathroom layouts shall be in accordance with the approved architectural drawings.

4.2 Sanitary Fixtures

Family Bathroom

Provide:

- Close-coupled dual-flush WC.
- Vanity basin with mixer.
- Shower with mixer and shower outlet where indicated.
- Toughened safety glass shower screen/enclosure where applicable.
- Frameless polished mirror.
- Towel rail.
- Toilet roll holder.
- Robe hook.
- En-Suite Bathroom

Provide:

- Close-coupled dual-flush WC.
- Vanity basin with mixer.
- Shower with mixer and shower outlet.
- Toughened safety glass shower enclosure/screen.
- Frameless polished mirror.
- Towel rail.
- Toilet roll holder.
- Robe hook.
- All sanitary fixtures shall be suitable for normal residential use and compatible with readily available replacement parts.

4.3 Vanity Units

Provide compact vanity units manufactured from moisture-resistant melamine-faced board with PVC edging.

Vanities shall:

- Provide practical enclosed storage.
- Accommodate the selected basin.
- Be easy to clean and maintain.
- Be suitable for humid residential environments.
- Provide concealed hinges, with soft-close operation where achievable within the approved budget.

4.4 Showers

Provide:

- Toughened safety glass shower enclosure or screen.
- Chrome-plated single-lever shower mixer.
- Fixed wall-mounted shower outlet.
- Floor waste and appropriate falls.
- Fixtures shall be durable, corrosion resistant and suitable for normal residential use.

4.5 Bathroom Accessories

Provide:

- Frameless polished mirror.
- Towel rail.
- Wall-mounted toilet roll holder.
- Robe hook.

Accessories shall be corrosion resistant, securely fixed and suitable for humid environments.

4.6 Bathroom Finishes Schedule

<i>Component</i>	<i>Specification</i>
<i>Floor</i>	Non-slip ceramic floor tiles
<i>Walls</i>	Ceramic wall tiles to wet areas; painted plaster elsewhere
<i>Ceiling</i>	Moisture-resistant gypsum board ceiling
<i>Vanity</i>	Moisture-resistant melamine-faced board
<i>Basin</i>	Vitreous china
<i>WC</i>	Close-coupled dual-flush vitreous china suite
<i>Shower Screen / Enclosure</i>	Toughened safety glass
<i>Shower Mixer</i>	Chrome-plated single-lever mixer
<i>Basin Mixer</i>	Chrome-plated single-lever mixer
<i>Mirror</i>	Frameless polished mirror
<i>Accessories</i>	Powder-coated steel or stainless steel

4.7 Performance Requirements

Bathroom finishes and fixtures shall:

- Be suitable for long-term residential use.
 - Be moisture resistant.
 - Be durable and low maintenance.
 - Be easy to clean.
 - Be readily available within South Africa.
 - Be corrosion resistant where exposed to humid conditions.
 - Permit replacement of individual fixtures without major alteration.
 - Comply with applicable South African Standards.
 - Equivalent products of equal or superior quality may be submitted for approval.
-

TYPOLOGY 5 — COST CONTROL PRINCIPLE

Typology 5 shall maintain a broadly consistent material and finish standard with the preceding typologies. The increased selling value of the dwelling shall principally be reflected through increased floor area, additional accommodation, the study, en-suite bathroom, larger living spaces, garage and associated amenities.

The specification therefore intentionally avoids unnecessary escalation to premium finishes such as engineered stone countertops, luxury flooring, bespoke joinery or high-end sanitaryware. Where budget permits, priority shall instead be given to functional improvements including:

- Adequate kitchen storage and worktop space.
- Built-in cupboards to bedrooms.
- Vanity storage to both bathrooms.
- Durable shower screens.
- Quality ironmongery.
- Practical external paving.
- Durable and washable internal finishes.

This approach is intended to maintain a coherent architectural standard across the development while protecting the construction budget and overall commercial viability of Typology 5.

Annexure A

TPOLOGY 5 – XX LARGE FREESTANDING UNIT

External Finishes and Construction Standards



TPOLOGY 5 – EXTERNAL FINISHES & CONSTRUCTION STANDARD

STANDARD
RESIDENTIAL
QUALITY



DURABLE
Built to last with
quality materials



**LOW
MAINTENANCE**
Easy to clean
and maintain



**CLIMATE
APPROPRIATE**
Suitable for
South African
conditions



**COST
EFFECTIVE**
Smart finishes
that balance
quality and
affordability.



A durable, low maintenance and cost-effective external finish standard designed for affordable family housing. Materials are selected for longevity, ease of maintenance and suitability to the South African climate.



FENCE & BOUNDARY – VIBRACRETE WALL



Precast concrete
vibracrete wall
Colour: Natural Grey

Plaster & paint
to match dwelling
where required

EXTERNAL COLOUR PALETTE (INDICATIVE)



External Wall Paint
Light Neutral



External Wall Paint
Warm Grey



Face Brick Accent
Light Brown
(Optional)



Plastered Surface
Light Neutral



Window & Door
Frames
Charcoal



Roof Tiles
Charcoal Grey

CONSTRUCTION & MATERIALS

CONSTRUCTION

Conventional masonry



- Concrete block masonry
- Internal plaster & paint
- External plaster & paint
- Plaster finish

ROOF – TILES

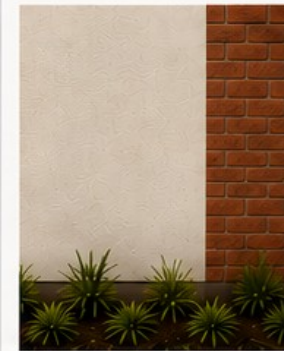
Charcoal Grey



- Concrete roof tiles
- Colour: Charcoal Grey
- Including standard flashings and accessories
- Durable, lightweight and weather resistant

EXTERNAL WALLS

Plaster with feature accents



- Cement plaster & acrylic paint
- Light neutral tone
- Face brick accents used sparingly for interest (optional)
- Plaster finish: Smooth

COLOUR & TEXTURE PALETTE



Plaster & Paint
Light Neutral



Face Brick Accent
Light Brown
(Optional)



Roof Tiles
Charcoal Grey



Plaster Finish
Smooth

TYPICAL APPLICATIONS

BOUNDARY WALL



CORNERS & RETURNS

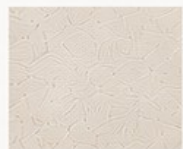


HEIGHT



Typical height
1.8m to comply
with local
requirements

FINISH



Smooth plaster
and paint finish

KEY PERFORMANCE REQUIREMENTS



DURABLE

Materials selected for
long-term durability
and resistance to
weathering.



LOW MAINTENANCE

Easy to clean and
maintain with
standard household
methods.



WEATHER RESISTANT

Suitable for South African
climate conditions
including sun, wind
and rain.



COST EFFECTIVE

Finishes chosen to
balance quality,
durability and
affordability.



AESTHETIC COHERENCE

Finishes complement the
architectural character
and neighbourhood
context.



Images and colours are indicative of the standard of finish intended for Typology 5 and may be replaced with approved equivalent products.

Annexure B

TPOLOGY 5 – XX LARGE FREESTANDING UNIT

External Finishes and Areas

TPOLOGY 5

EXTERNAL FINISHES & AREAS

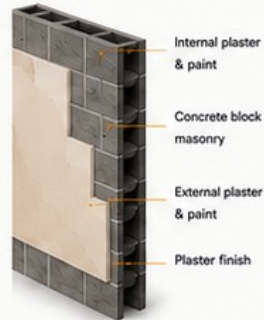


A durable, low maintenance and cost-effective external finish standard designed for affordable family housing in South Africa. Materials selected for longevity, ease of maintenance and suitability to local climate conditions.

CONSTRUCTION & MATERIALS

CONSTRUCTION

Conventional masonry



- Concrete block masonry
- Internal plaster & paint
- External plaster & paint
- Plaster finish

ROOF – TILES

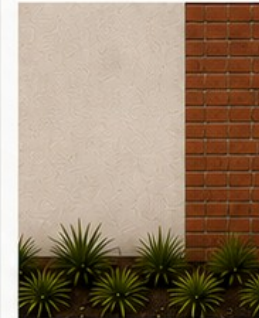
Charcoal Grey



- Concrete roof tiles
- Colour: Charcoal Grey
- Including standard flashings and accessories
- Durable, lightweight and weather resistant

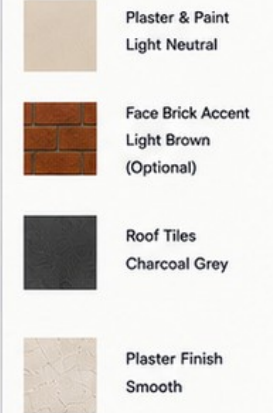
EXTERNAL WALLS

Plaster with face brick accents

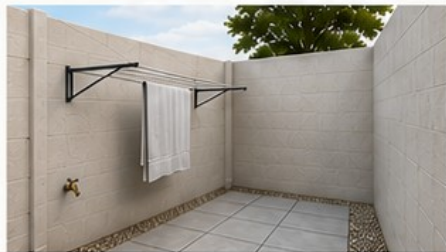


- Cement plaster & acrylic paint
- Light neutral tone
- Face brick accents used sparingly for interest (optional)
- Plaster finish: Smooth

COLOUR & TEXTURE PALETTE



WASHING LINE AREA



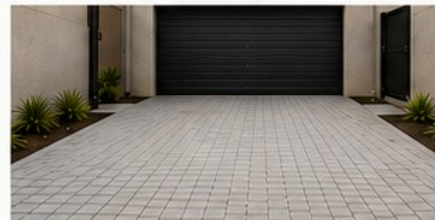
FLOOR FINISH
Concrete paving slabs

WALL FINISH
Cement plaster & exterior acrylic paint

CEILING FINISH
Open to sky



DRIVEWAY



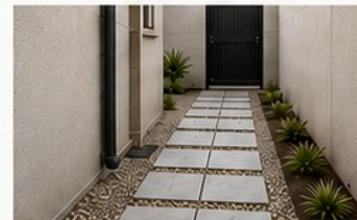
FLOOR FINISH
Interlocking concrete paving

WALL FINISH
Cement plaster & exterior acrylic paint

CEILING FINISH
Open to sky



WALKWAYS



FLOOR FINISH
Concrete paving slabs

WALL FINISH
Cement plaster & exterior acrylic paint

CEILING FINISH
Open to sky



FENCE – VIBRACRETE WALL

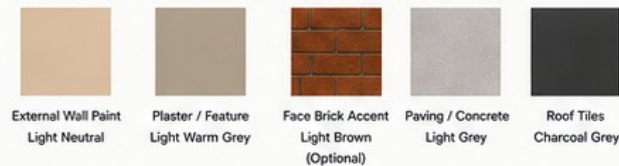


Precast concrete vibracrete wall
Colour: Natural Grey

Plaster & paint to match dwelling where required



COLOUR PALETTE (INDICATIVE)



NOTES

- All external finishes to be durable, low maintenance and suitable for local climate.
- Concrete paving to be laid on compacted base with appropriate falls for drainage.
- All wall plaster and paint to comply with SANS 10400 and manufacturer's requirements.
- Future Carport and Braai Area by owner.



DURABLE
Materials selected for long-term durability and resistance to weathering.



LOW MAINTENANCE
Easy to clean and maintain with standard household methods.



WEATHER RESISTANT
Suitable for South African climate conditions including sun, wind and rain.



COST EFFECTIVE
Finishes chosen to balance quality, durability and affordability.

Annexure C

TPOLOGY 5 – XX LARGE FREESTANDING UNIT

Kitchen Fixtures and Finishes

TYPOLGY 5 – KITCHEN FINISHES & FIXTURES

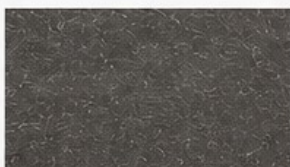
CUPBOARDS

White melamine-faced board



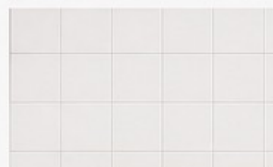
COUNTERTOP

Postformed
high-pressure laminate



SPLASHBACK

Ceramic wall tiles



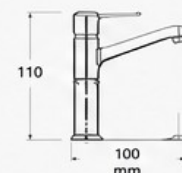
SINK

Stainless steel
double inset sink



MIXER

Chrome-plated
single-lever mixer



HANDLES

Powder-coated steel
or aluminium



KICKPLATES

PVC



KITCHEN LAYOUT & SET-UP



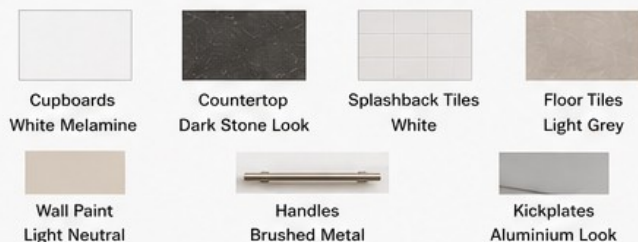
Open plan kitchen with peninsula creating a natural flow to dining and living spaces.



KITCHEN – ANGLED VIEW



FINISH PALETTE (INDICATIVE)



BENCHMARK PRODUCTS (OR APPROVED EQUIVALENT)

- Cupboards - White Melamine
- Countertop - Postformed Laminate
- Splashback Tiles - Ceramic Tiles (200x200mm or 300x300mm)
- Sink - Stainless Steel Double Inset Sink
- Mixer - Chrome-Plated Single-Lever Mixer
- Handles - Powder-Coated Steel or Aluminium
- Kickplates - PVC Kickplate – Aluminium Look or Grey

NOTES

- All finishes are durable, easy to clean and low maintenance.
- Products shown are indicative of the standard of finish intended for Typology 5 and may be replaced with approved equivalent products.
- Appliances for illustration only. Refer to project specification.

Annexure D

TPOLOGY 5 – XX LARGE FREESTANDING UNIT

Sanitary Fixtures

FAMILY BATHROOM

CLOSE-COUPLED
DUAL-FLUSH WC



VANITY BASIN
WITH MIXER



SHOWER WITH MIXER
AND SHOWER OUTLET



MIRROR



TOWEL RAIL



TOILET ROLL
HOLDER



ENSUITE BATHROOM

CLOSE-COUPLED
DUAL-FLUSH WC



WALL-MOUNTED VANITY BASIN
WITH MIXER



SHOWER WITH MIXER
AND SHOWER OUTLET



MIRROR



TOILET ROLL
HOLDER



ACCESSORIES & FINISHES



TOWEL RAIL



TOILET ROLL HOLDER



ROBE HOOK



SHOWER MIXER

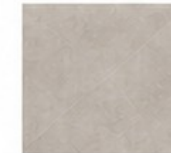


SHOWER OUTLET



FLOOR WASTE

TYPICAL FINISHES



FLOOR TILES
(NON-SLIP PORCELAIN)



WALL TILES
(CERAMIC)

FFE SPECIFICATION

Built-in Cupboards



STELLENBOSCH

STELLENBOSCH • PNIEL • FRANSCHHOEK

MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

COMPARATIVE BUILT IN CUPBOARDS SCHEDULE TYPOLOGIES 1–5

PREPARED FOR:

Stellenbosch Municipality

17 August 2026

PREPARED BY:



COMPARATIVE BUILT IN CUPBOARDS SCHEDULE
TYPOLOGIES 1–5

Contents

General.....	3
Cupboard Construction	3
Comparative Specification	4
Internal Fittings	5
Hardware	5
Workmanship and Installation	5
Performance Requirements.....	6

COMPARATIVE BUILT IN CUPBOARDS SCHEDULE
TYPOLOGIES 1–5

General

Provide purpose-made built-in cupboards (BICs) to bedrooms where indicated on the approved architectural drawings.

Built-in cupboards shall provide practical, durable and low-maintenance storage suitable for residential use. Final dimensions and configurations shall be coordinated with the approved architectural drawings and verified on site prior to manufacture.

Cupboard Construction

Built-in cupboards shall generally comprise:

- Melamine-faced board carcasses and doors.
- Plain flat-panel hinged doors.
- PVC edging to all exposed board edges.
- Concealed hinges.
- Internal shelving and hanging rails.
- Handles as specified and coordinated with the architectural ironmongery schedule.
- Matching melamine kickboards/plinths.
- Overhead cupboards and drawer units only where indicated for the applicable typology.

All boards shall be suitable for residential joinery applications and shall be free from chips, warping, delamination and other visible defects.

COMPARATIVE BUILT IN CUPBOARDS SCHEDULE
 TYPOLOGIES 1–5

Comparative Specification

COMPONENT	TYPOLGY 1	TYPOLGY 2	TYPOLGY 3	TYPOLGY 4	TYPOLGY 5
CARCASS	White melamine- faced board	White melamine- faced board	White melamine- faced board	White melamine- faced board	White melamine- faced board
CARCASS THICKNESS	16 mm	16 mm	18 mm	18 mm	18 mm
DOOR STYLE	Plain flat panel	Plain flat panel	Plain flat panel	Plain flat panel	Plain flat panel
DOOR FINISH	White melamine	White melamine	White melamine	White melamine	White melamine
EDGE FINISH	PVC edging	PVC edging	PVC edging	PVC edging	PVC edging
HANDLES	Knob / D-pull	Bar handle	Bar handle	Bar handle	Bar handle
HINGES	Concealed	Concealed	Concealed	Concealed	Concealed
INTERNAL CONFIGURAT ION	1 shelf + hanging rail	1 shelf + hanging rail	2 shelves + hanging rail	2 shelves + hanging rail	2 shelves + hanging rail
OVERHEAD CUPBOARDS	N/A	N/A	Optional where indicated	Where indicated	Where indicated
DRAWER UNIT	N/A	N/A	N/A	Optional where indicated	Where indicated / space permitting
KICKBOARD	White melamine	White melamine	White melamine	White melamine	White melamine

Internal Fittings

Provide hanging rails manufactured from corrosion-resistant metal, securely fixed between cupboard divisions.

Shelves shall be adequately supported and suitable for normal residential storage loads. Where drawers are indicated, provide proprietary drawer runners suitable for regular residential use.

Internal arrangements shall maximise practical storage while remaining simple and economical to manufacture.

Hardware

Handles, hinges, drawer runners and other fittings shall:

- Be durable and suitable for frequent residential use.
- Be securely fixed.
- Have a consistent finish throughout each dwelling.
- Be readily replaceable using locally available components.
- Be coordinated with the overall architectural finishes and ironmongery.

Workmanship and Installation

The Contractor shall verify all opening dimensions on site prior to manufacture.

Completed cupboards shall be:

- Plumb, level and securely fixed.
- Neatly fitted against adjoining walls and floors.
- Free from excessive or inconsistent gaps.
- Properly aligned at doors and drawer fronts.
- Free from visible damage, chips and exposed unfinished board edges.
- Fully operational upon handover.

Where walls or floors are uneven, suitable fillers or scribes shall be provided to achieve a neat, finished installation.

Performance Requirements

Built-in cupboards shall:

- Be durable and suitable for normal residential occupation.
- Be easy to clean and maintain.
- Use materials suitable for interior residential joinery.
- Be resistant to normal wear under intended use.
- Use readily available replacement hardware and components.
- Coordinate with adjacent floor, wall and skirting finishes.
- Comply with applicable South African standards and manufacturer's requirements.

Equivalent materials and products of equal or better quality and performance may be submitted for the Architect's approval prior to manufacture.

COMPARATIVE BUILT-IN CUPBOARDS SCHEDULE – TYPOLOGIES 1 TO 5

**BEDROOM
BUILT-IN
CUPBOARDS
(INDICATIVE)**



Images are indicative of the standard intended for each typology and may be replaced with approved equivalent products.

TYPOLOGY 1
COST EFFECTIVE



TYPOLOGY 2 STANDARD



TYPOLOGY 3 STANDARD PLUS



TYPOLOGY 4 ENHANCED STANDARD



TYPOLOGY 5 ENHANCED STANDARD



Element	Typology 1 Cost Effective	Typology 2 Standard	Typology 3 Standard Plus	Typology 4 Enhanced Standard	Typology 5 Enhanced Standard
Carcass Material	White melamine-faced board	White melamine-faced board	White melamine-faced board	White melamine-faced board	White melamine-faced board
Carcass Thickness	16 mm	16 mm	18 mm	18 mm	18 mm
Door Style	Plain flat panel	Plain flat panel	Plain flat panel	Plain flat panel	Plain flat panel
Door Finish	White melamine	White melamine	White melamine	White melamine	White melamine
Exposed Edge Finish	PVC edging	PVC edging	PVC edging	PVC edging	PVC edging
Handles	Knob / D-pull (Brushed nickel)	Bar handle (Brushed nickel)	Bar handle (Brushed nickel)	Bar handle (Brushed nickel)	Bar handle (Brushed nickel)
Hinges	Concealed hinge	Concealed hinge	Concealed hinge	Concealed hinge	Concealed hinge
Internal Configuration	1 Shelf + 1 Hanging Rail	1 Shelf + 1 Hanging Rail	2 Shelves + 1 Hanging Rail	2 Shelves + 1 Hanging Rail	2 Shelves + 1 Hanging Rail + 3 Drawers (where space allows)
Top Cupboard (Overhead)	N/A	N/A	Optional (selected rooms)	Included	Included
Drawer Unit	N/A	N/A	N/A	Optional (selected rooms)	Included (where space allows)
Kickboard / Plinth	White melamine	White melamine	White melamine	White melamine	White melamine
Overall Standard	Cost Effective	Standard	Standard Plus	Enhanced Standard	Enhanced Standard

GENERAL NOTES

- All built-in cupboards (BICs) to be manufactured to comply with SANS 10400 and relevant SANS standards.
- All board materials to be E1 low-emission or better.
- Hardware and fittings to be of good quality, durable and suitable for residential use.
- Contractor to verify dimensions on site prior to manufacture.
- Finished installation to be neat, plumb and level with consistent gaps and alignment.
- Where no drawers are indicated, provide additional shelving as required.
- All handles and hardware to be coordinated with the overall ironmongery schedule.

FINISH PALETTE (INDICATIVE)



White
(Doors & Carcass)



Light Wood
(Optional Shelves)



Brushed Nickel
(Handles)

APPLICABLE TO ALL TYPOLOGIES



**Durable &
Low
Maintenance**



Quality
Standard
Materials



Approved
Equivalent
Accepted



Sustainable &
Responsible
Choice

ARCHITECTURAL INTENT



Built-in cupboards are designed to provide practical storage, maximise available space and ensure a consistent and tidy appearance throughout the home.

FFE SPECIFICATION

Door and Window Schedule



STELLENBOSCH

STELLENBOSCH • PNIEL • FRANSCHHOEK

MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

COMPARATIVE DOORS & WINDOWS SCHEDULE TYPOLOGIES 1–5

PREPARED FOR:

Stellenbosch Municipality

17 August 2026

PREPARED BY:



ELEMENT	TYOLOGY 1	TYOLOGY 2	TYOLOGY 3	TYOLOGY 4	TYOLOGY 5
MAIN ENTRANCE DOOR	Solid/semi-solid timber door, painted	Solid/semi-solid timber door, painted	Solid timber/engineered timber door	Solid timber/engineered timber door	Solid timber/engineered timber door
ENTRANCE DOOR FINISH	Painted neutral	Painted neutral	Natural timber-look / stained	Natural timber-look / stained	Natural timber-look / stained
INTERNAL DOORS	Hollow-core flush	Hollow-core flush	Hollow-core flush	Semi-solid/hollow-core flush	Semi-solid/hollow-core flush
INTERNAL DOOR FINISH	Painted white	Painted white	Painted white	Painted white	Painted white
BATHROOM DOORS	Hollow-core flush	Hollow-core flush	Hollow-core flush	Hollow-core flush	Hollow-core flush
DOOR FRAMES	Pressed steel	Pressed steel	Pressed steel	Pressed steel	Pressed steel
FRAME FINISH	Painted	Painted	Painted	Painted	Painted
EXTERNAL WINDOWS	Powder-coated aluminium	Powder-coated aluminium	Powder-coated aluminium	Powder-coated aluminium	Powder-coated aluminium
WINDOW COLOUR	Charcoal / dark grey	Charcoal / dark grey	Charcoal / dark grey	Charcoal / dark grey	Charcoal / dark grey
TYPICAL WINDOW TYPE	Top-hung / fixed combination	Top-hung / fixed combination	Top-hung / fixed combination	Top-hung / fixed combination	Top-hung / fixed combination
LIVING/DINING GLAZING	Standard-size aluminium window	Standard-size aluminium window	Larger aluminium window where shown	Larger aluminium window where shown	Larger aluminium window where shown
BEDROOM WINDOWS	Aluminium opening window	Aluminium opening window	Aluminium opening window	Aluminium opening window	Aluminium opening window
BATHROOM/WC WINDOWS	Aluminium top-hung	Aluminium top-hung	Aluminium top-hung	Aluminium top-hung	Aluminium top-hung

BATHROOM GLAZING	Obscure glass	Obscure glass	Obscure glass	Obscure glass	Obscure glass
GENERAL GLAZING	Clear safety glazing where required	Clear safety glazing where required	Clear safety glazing where required	Clear safety glazing where required	Clear safety glazing where required
GARAGE DOOR	N/A	N/A	Sectional type	Sectional type	Sectional type
GARAGE DOOR FINISH	N/A	N/A	Charcoal	Charcoal	Charcoal
OVERALL STANDARD	Cost Effective	Standard	Standard Plus	Enhanced Standard	Enhanced Standard

COMPARATIVE DOORS & WINDOWS SCHEDULE – TYPOLOGIES 1 TO 5

COMPONENT REFERENCE

MAIN ENTRANCE DOOR (External)



INTERNAL DOOR (General)



ALUMINIUM WINDOW (Standard Opening)



BATHROOM WINDOW (Privacy)



LIVING / DINING WINDOW (Larger Glazing)



GARAGE DOOR (Sectional)



Images are indicative of the standard intended for each typology and may be replaced with approved equivalent products.

ELEMENT

TYOLOGY 1 COST EFFECTIVE

TYOLOGY 2 STANDARD

TYOLOGY 3 STANDARD PLUS

TYOLOGY 4 ENHANCED STANDARD

TYOLOGY 5 ENHANCED STANDARD

Main Entrance Door	Solid / semi-solid timber door	Solid / semi-solid timber door	Solid timber / engineered timber door	Solid timber / engineered timber door	Solid timber / engineered timber door
Entrance Door Finish	Painted neutral	Painted neutral	Natural timber-look / stained	Natural timber-look / stained	Natural timber-look / stained
Internal Doors	Hollow-core flush	Hollow-core flush	Hollow-core flush	Semi-solid / hollow-core flush	Semi-solid / hollow-core flush
Internal Door Finish	Painted white	Painted white	Painted white	Painted white	Painted white
Bathroom Doors	Hollow-core flush	Hollow-core flush	Hollow-core flush	Hollow-core flush	Hollow-core flush
Door Frames	Pressed steel	Pressed steel	Pressed steel	Pressed steel	Pressed steel
Frame Finish	Painted	Painted	Painted	Painted	Painted
External Windows	Powder-coated aluminium	Powder-coated aluminium	Powder-coated aluminium	Powder-coated aluminium	Powder-coated aluminium
Window Colour	Charcoal / dark grey	Charcoal / dark grey	Charcoal / dark grey	Charcoal / dark grey	Charcoal / dark grey
Typical Window Type	Top-hung / fixed combination	Top-hung / fixed combination	Top-hung / fixed combination	Top-hung / fixed combination	Top-hung / fixed combination
Living / Dining Glazing	Standard-size aluminium window	Standard-size aluminium window	Larger aluminium window where shown	Larger aluminium window where shown	Larger aluminium window where shown
Bedroom Windows	Aluminium opening window	Aluminium opening window	Aluminium opening window	Aluminium opening window	Aluminium opening window
Bathroom / WC Windows	Aluminium top-hung	Aluminium top-hung	Aluminium top-hung	Aluminium top-hung	Aluminium top-hung
Bathroom Glazing	Obscure glass	Obscure glass	Obscure glass	Obscure glass	Obscure glass
General Glazing	Clear safety glazing where required	Clear safety glazing where required	Clear safety glazing where required	Clear safety glazing where required	Clear safety glazing where required
Garage Door	N/A	N/A	Sectional type	Sectional type	Sectional type
Garage Door Finish	N/A	N/A	Charcoal	Charcoal	Charcoal
Overall Standard	Cost Effective	Standard	Standard Plus	Enhanced Standard	Enhanced Standard



GENERAL NOTES

- All doors and windows to comply with the requirements of SANS 10400.
- External windows and doors to be powder-coated aluminium suitable for local climatic conditions.
- Glazing to be clear safety glass where required by regulation. Obscure glass to bathrooms and WCs.
- Hardware and ironmongery to be as per Ironmongery Schedule.
- All products to be installed in strict accordance with manufacturer's instructions and good building practice.
- Products indicated establish the required quality, appearance and performance standard. Approved equivalents may be accepted subject to approval.

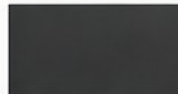
FINISH GUIDE (INDICATIVE)



Internal Doors
Painted White



Entrance Doors
Timber Look



Aluminium Frames
Charcoal / Dark Grey



Garage Doors
Charcoal
(Typ. 3 - 5 only)

APPLICABLE TO ALL TYPOLOGIES



Durable &
Low
Maintenance



Weather &
Corrosion
Resistant



Secure &
Compliant



SANS 10400
Compliant
Where
Applicable



IMPORTANT

Final selection to be coordinated with the architectural drawings, structural opening sizes and overall project specification prior to procurement.

FFE SPECIFICATION

Ironmongery Schedule



STELLENBOSCH

STELLENBOSCH • PNIEL • FRANSCHHOEK

MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

COMPARATIVE IRONMONGERY SCHEDULE TYPOLOGIES 1–5

PREPARED FOR:

Stellenbosch Municipality

17 August 2026

PREPARED BY:



ITEM	TYOLOGY 1	TYOLOGY 2	TYOLOGY 3	TYOLOGY 4	TYOLOGY 5
MAIN ENTRANCE DOOR	Standard lever handle set	Lever handle set	Contempo rary lever handle set	Contemporary lever handle set	Premium contempora ry lever handle set
ENTRANCE LOCK	3-lever mortice lock	3-lever mortice lock	Mortice lock + cylinder	Mortice lock + cylinder	Security- rated mortice lock + cylinder
INTERNAL DOORS	Standard lever handles	Standard lever handles	Contempo rary lever handles	Contemporary lever handles	Premium lever handles
BEDROOM LOCKS	Passage set	Passage set	Passage set	Passage set	Passage set
BATHROOM / WC	Privacy lockset	Privacy lockset	Privacy lockset with indicator	Privacy lockset with indicator	Premium privacy set with indicator
HANDLE MATERIAL	Aluminium / equivalent	Aluminium / equivalent	Stainless steel / equivalent	Stainless steel	Stainless steel
HANDLE FINISH	Satin aluminium	Satin aluminium	Satin stainless steel	Satin stainless steel / matt black	Satin stainless steel / matt black
HINGES	Galvanised / plated steel	Plated steel	Stainless steel	Stainless steel	Stainless steel
DOOR STOPS	Standard rubber stop	Standard door stop	Stainless steel door stop	Stainless steel door stop	Stainless steel door stop
EXTERNAL DOOR HARDWARE	Corrosion- resistant	Corrosion- resistant	Stainless / corrosion- resistant	Stainless / corrosion- resistant	Grade 304 stainless steel or equivalent

WINDOW HANDLES	Manufacturer standard	Manufacturer standard	Manufacturer standard	Coordinated finish	Coordinated premium finish
WINDOW STAYS	Manufacturer standard	Manufacturer standard	Manufacturer standard	Manufacturer standard	Manufacturer standard
SECURITY	Basic locking	Basic locking	Enhanced cylinder locking	Enhanced cylinder locking	Enhanced security locking
OVERALL STANDARD	Basic / Cost Effective	Standard	Mid-Range	Enhanced	Premium Residential

General specification notes

All ironmongery: To be suitable for the door/window type and intended use, complete with all screws, fixings, spindles, cylinders, strike plates and accessories required for a complete installation.

External ironmongery: Corrosion-resistant and suitable for external exposure and local climatic conditions.

Finish coordination: Door and window ironmongery finishes to be coordinated with the respective typology's sanitary fittings, kitchen hardware, aluminium frames and general finishes.

Approved equivalents: Products indicated establish the required **quality, appearance and performance standard**. Equivalent products may be accepted subject to approval.

Accessibility: Lever handles preferred throughout. Hardware to comply with applicable requirements of **SANS 10400**, including Part S where accessible facilities are applicable.

Final selection: Ironmongery to be coordinated with the final door and window schedules prior to procurement.

COMPARATIVE IRONMONGERY SCHEDULE – TYPOLOGIES 1 TO 5

QUALITY, APPEARANCE & PERFORMANCE STANDARDS PROGRESSIVELY IMPROVE FROM TYPOLOGY 1 TO TYPOLOGY 5

IRONMONGERY ITEMS	INTERNAL LEVER HANDLE (Typical Internal Door)	ENTRANCE HANDLE SET (Main Entrance Door)	BATHROOM PRIVACY SET (with Indicator)	HINGE (100 x 75 mm)	DOOR STOP (Wall Mounted)	WINDOW HANDLE (Aluminium Window)
 Images are indicative of the standard intended for each typology and may be replaced with approved equivalent products.	T1 					
	T2 					
	T3 					
	T4 					
	T5 					

IRONMONGERY ITEMS	TYPOLGY 1 COST EFFECTIVE	TYPOLGY 2 STANDARD	TYPOLGY 3 MID-RANGE	TYPOLGY 4 ENHANCED	TYPOLGY 5 PREMIUM RESIDENTIAL
Main Entrance Door Handle	Standard lever handle set	Lever handle set	Contemporary lever handle set	Contemporary lever handle set	Premium contemporary lever handle set
Entrance Lock	3-lever mortice lock	3-lever mortice lock	Mortice lock + cylinder	Mortice lock + cylinder	Security-rated mortice lock + cylinder
Internal Doors	Standard lever handles	Standard lever handles	Contemporary lever handles	Contemporary lever handles	Premium lever handles
Bedroom Locks	Passage set	Passage set	Passage set	Passage set	Passage set
Bathroom / WC	Privacy lockset	Privacy lockset	Privacy lockset with indicator	Privacy lockset with indicator	Premium privacy set with indicator
Handle Material	Aluminium / equivalent	Aluminium / equivalent	Stainless steel / equivalent	Stainless steel	Stainless steel (Grade 304)
Handle Finish	Satin aluminium	Satin aluminium	Satin stainless steel	Satin stainless steel / matt black	Satin stainless steel / matt black
Hinges	Galvanised / plated steel	Plated steel	Stainless steel	Stainless steel	Stainless steel (Heavy duty where required)
Door Stops	Standard rubber stop	Standard door stop	Stainless steel door stop	Stainless steel door stop	Stainless steel door stop
Window Handles	Manufacturer standard	Manufacturer standard	Manufacturer standard	Coordinated finish	Coordinated premium finish
Security	Basic locking	Basic locking	Enhanced cylinder locking	Enhanced cylinder locking	Enhanced security locking
Overall Standard	Basic / Cost Effective	Standard	Mid-Range	Enhanced	Premium Residential

- GENERAL NOTES**
- All ironmongery to be suitable for the door or window type and intended use, complete with all screws, fixings, spindles, cylinders, strike plates and accessories required for a complete installation.
 - External ironmongery to be corrosion-resistant and suitable for external exposure.
 - Finishes to be coordinated with the overall typology finishes, kitchen hardware, aluminium frames and sanitary fittings.
 - Products indicated establish the required quality, appearance and performance standard. Equivalent products may be accepted subject to approval.
 - Lever handles preferred throughout. Hardware to comply with applicable requirements of SANS 10400, including Part S where applicable.
 - Final selection to be coordinated with door and window schedules prior to procurement.

FINISH GUIDE
(Indicative)



Satin Aluminium
(Typ. 1 & 2)



Satin Stainless Steel
(Typ. 3)



Matt Black
(Typ. 4)



Satin Stainless Steel
(Premium – Typ. 5)

APPLICABLE TO ALL TYPOLOGIES



Durable & Corrosion Resistant



Quality Performance Standard



Approved Equivalent Accepted



SANS 10400 Compliant Where Applicable

FFE SPECIFICATION

Electrical Fixtures



STELLENBOSCH

STELLENBOSCH • PNIEL • FRANSCHHOEK

MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

ELECTRICAL FIXTURES TYPOLOGIES 1–5

PREPARED FOR:

Stellenbosch Municipality

17 August 2026

PREPARED BY

S P  C E
— ARCHITECTS AND DESIGNERS —

**ELECTRICAL
FIXTURES**

SWITCHES	White moulded	White moulded	White moulded	White / charcoal	White / charcoal
SOCKET OUTLETS	White moulded	White moulded	White moulded	White / charcoal	White / charcoal
USB / CHARGING OUTLET	—	—	Selected locations	Selected locations	Selected locations
GENERAL CEILING LIGHTS	Surface-mounted LED	Surface-mounted LED	LED downlights / surface fittings	LED downlights	LED downlights
KITCHEN LIGHTING	General ceiling light	General ceiling light	LED downlights	LED downlights	LED downlights
UNDER-CABINET LIGHTING	—	—	Optional	Selected locations	Selected locations
BATHROOM LIGHTING	Ceiling-mounted LED	Ceiling-mounted LED	LED ceiling/downlight	LED downlight	LED downlight
EXTERNAL WALL LIGHTS	Basic weatherproof fitting	Weatherproof fitting	Contemporary wall light	Contemporary wall light	Contemporary wall light
GARAGE LIGHTING	N/A	N/A	LED surface fitting	LED surface fitting	LED surface fitting
OVERALL STANDARD	Cost Effective	Standard	Standard Plus	Enhanced Standard	Enhanced Standard

COMPARATIVE ELECTRICAL FIXTURES SCHEDULE – TYPOLOGIES 1 TO 5

ELECTRICAL FIXTURES (INDICATIVE)	LIGHT SWITCH (1 LEVER)	SOCKET OUTLET (16A)	USB / CHARGING OUTLET	CEILING LIGHT (DOWNLIGHT)	SURFACE CEILING LIGHT (GENERAL)	EXTERNAL WALL LIGHT (WEATHERPROOF)	BATHROOM LIGHT (IP RATED)	DISTRIBUTION BOARD (INTERNAL)
 Images are indicative of the standard intended for each typology and may be replaced with approved equivalent products.								

ELEMENT	TYPOLGY 1 COST EFFECTIVE	TYPOLGY 2 STANDARD	TYPOLGY 3 STANDARD PLUS	TYPOLGY 4 ENHANCED STANDARD	TYPOLGY 5 ENHANCED STANDARD	 GENERAL NOTES - All electrical fixtures to comply with the requirements of SANS 10142-1 and SANS 10400. - All fittings and accessories to be of good quality and suitable for the intended purpose. - LED light sources to be used throughout for energy efficiency. - Final locations, quantities, wiring, load requirements and technical specifications to the Electrical Engineer's drawings and specifications. - Products indicated establish the required quality, appearance and performance standard. Approved equivalents may be accepted subject to approval. - Where not indicated (–), standard moulded fittings apply.
Light Switch (1 Lever)	White moulded	White moulded	White moulded	White / Charcoal	White / Charcoal	
Socket Outlet (16A)	White moulded	White moulded	White moulded	White / Charcoal	White / Charcoal	
USB / Charging Outlet	–	–	Selected locations (kitchen / bedroom)	Selected locations (kitchen / bedroom)	Selected locations (kitchen / bedroom)	
Ceiling Light (Downlight)	N/A	N/A	LED downlight	LED downlight	LED downlight	
Surface Ceiling Light (General)	Surface-mounted LED	Surface-mounted LED	Surface-mounted LED / LED batten (where applicable)	Surface-mounted LED / LED batten (where applicable)	Surface-mounted LED / LED batten (where applicable)	
External Wall Light (Weatherproof)	Basic weatherproof wall light	Weatherproof wall light	Contemporary wall light	Contemporary wall light	Contemporary wall light	
Bathroom Light (IP Rated)	Ceiling-mounted LED (IP44 min.)	Ceiling-mounted LED (IP44 min.)	LED ceiling / downlight (IP44 min.)	LED ceiling / downlight (IP44 min.)	LED ceiling / downlight (IP44 min.)	
Distribution Board (Internal)	Flush-mounted DB with cover	Flush-mounted DB with cover	Flush-mounted DB with cover	Flush-mounted DB with cover	Flush-mounted DB with cover	
Overall Standard	Cost Effective	Standard	Standard Plus	Enhanced Standard	Enhanced Standard	

COLOUR / FINISH PALETTE (INDICATIVE)			ARCHITECTURAL FIXTURE STANDARD	APPLICABLE TO ALL TYPOLOGIES				
			 Fixtures shown establish the intended visible appearance, finish and quality standard only. Electrical installations, connections, capacities, layouts and technical requirements are to the relevant Engineer's drawings and specifications.	 Safe & Compliant	 Energy Efficient	 Quality Standard	 Approved Equivalent Accepted	 Suitable for Local Climatic Conditions
White (Standard)	Charcoal (Optional)	Light Grey (Optional)						

ANNEXURE E

Draft LAA

LAND AVAILABILITY AGREEMENT (LAA)

entered into by and between



STELLENBOSCH
STELLENBOSCH • PNIEL • FRANSCHHOEK

MUNICIPALITY • UMASIPALA • MUNISIPALITEIT

duly represented by *[insert name]*, in the capacity as the *[insert name]*

and

[Successful Bidder]

insert company logo

insert company registration

duly represented by *insert name*

in his capacity as the *insert capacity* and duly authorized to sign this Agreement

in relation to

ERF 7001, CLOETESVILLE, STELLENBOSCH

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1. DEFINITIONS AND INTERPRETATION

- 1.1. in this Agreement, unless otherwise required or indicated by the context, the singular includes the plural and vice versa; words denoting any gender include the others; words indicating natural persons include juristic persons and bodies corporate, and vice versa.
- 1.2. the following words or phrases shall bear the following special meaning assigned to them below, and shall be interpreted as such for this Agreement, even if such interpretation is contrary to the ordinary grammatical meaning of the words and phrases
- 1.3. suppose a definition imposes substantive rights and obligations on a Party. In that case, such rights and obligations shall be given effect to and shall be enforceable, notwithstanding that they are contained in a definition.
- 1.4. any definition, wherever it appears in this Agreement and Annexures, shall bear the same meaning and apply throughout this Agreement unless otherwise stated or inconsistent with the context in which it appears.
- 1.5. if there is any conflict between any definitions in this Agreement, then, for purposes of interpreting any clause of the Agreement or paragraph of any Annexure, the definition appearing in that clause or paragraph shall prevail over any other conflicting definition appearing elsewhere in the Agreement.
- 1.6. where any number of days is prescribed, those days shall be reckoned exclusively of the first and inclusively of the last day unless the last day falls on a day which is not a Business Day, in which event the last day shall be the next succeeding Business Day.
- 1.7. where the day upon or by which any act is required to be performed is not a Business Day, the Parties shall be deemed to have intended such act to be performed upon or by the next succeeding Business Day.
- 1.8. the use of any expression covering a process available under South African law (including, for example, a winding up) shall, if any of the Parties is subject to the Applicable Laws of any other jurisdiction, be interpreted in relation to that Party as including any equivalent or analogous proceeding under the Applicable Laws of such other jurisdiction.
- 1.9. the rule of construction that if general words or terms are used in association with specific words or terms which are a species of a particular genus or class, the meaning of the general words or terms shall be restricted to that same class

(i.e. the *eiusdem generis* rule) shall not apply, and whenever the word “including” is used followed by specific examples, such examples shall not be interpreted so as to limit the meaning of any word or term to the same genus or class as the examples given.

- 1.10. the expiration or termination of this Agreement shall not affect such of the provisions of this Agreement which are expressly provided to operate after any such expiration or termination, or which of necessity must continue to have effect after such expiration or termination, notwithstanding that the relevant provisions themselves do not provide for this.
- 1.11. each of the provisions of this Agreement has been negotiated by the Parties and drafted for the benefit of the Parties. Accordingly, the rule of construction that the contract shall be interpreted against or to the disadvantage of the party responsible for the drafting or preparation of this Agreement (i.e. the *contra proferentem* rule) shall not apply.
- 1.12. the following terms shall have the meanings respectively assigned to them hereunder, namely:
 - 1.12.1. “**Agreement**” means this agreement contained herein, including all annexures thereto.
 - 1.12.2. “**Applicable Law**” means all statutes, regulations, by-laws, ordinances, policies, and other laws of South Africa and the Western Cape Province, as amended from time to time, that apply to the Development, the Municipality, or the Developer.
 - 1.12.3. “**Annexures**” means the annexures attached to this Agreement, being **ANNEXURE A** (Pricing Model), **ANNEXURE B** (Performance Guarantees), **ANNEXURE C** (Development Programme), and **ANNEXURE D** (Empowerment Targets), as amended or replaced with the written approval of the Municipality.
 - 1.12.4. “**Building Guidelines**” means the design framework, building standards, and architectural controls approved by the Municipality for the Development.
 - 1.12.5. “**Business Day**” means any day other than a Saturday, Sunday, or official public holiday in the Republic of South Africa.

- 1.12.6. **“Call for Proposal”** or **“CFP”** means the competitive process initiated by the Municipality to invite proposals from private developers for the development of upper market GAP-housing on Erf 7001, Cloetesville.
- 1.12.7. **“Confidential Information”** means all information of any nature disclosed by one Party to another under this Agreement that is not public knowledge, including financial, technical, operational, or commercial information, except where disclosure is required by law.
- 1.12.8. **“Default”** means any breach, non-performance, or failure by a Party to comply with its obligations under this Agreement, including a failure to achieve milestones under the Development Programme.
- 1.12.9. **“Developer”** or **“Partner”** means [*insert name of developer*] (PTY) LTD appointed by the Municipality through the CFP process, responsible for financing, designing, constructing, marketing, and selling the Units in accordance with this Agreement.
- 1.12.10. **“Development”** means the housing development project on Erf 7001, Cloetesville, comprising the construction of Units, internal engineering services, and related infrastructure, in accordance with the approved housing mix, Building Guidelines, and Development Programme.
- 1.12.11. **“Development Programme”** means the schedule of key milestones, timelines, and completion dates approved by the Municipality, annexed as **ANNEXURE C**, and as may be amended with the Municipality’s written approval.
- 1.12.12. **“Development Rights”** means the rights granted by the Municipality to the Developer under this Agreement to develop the Property in accordance with the approved Development, subject to the conditions herein.
- 1.12.13. **“Domicilium”** means the chosen address for delivery of notices in terms of this Agreement, as set out in clause 24, which must be a physical street address.
- 1.12.14. **“Empowerment Targets”** means the economic transformation and local development obligations imposed on the Developer and its Contractor under **ANNEXURE D**, including subcontracting to Targeted Enterprises, use of Local Labour, and skills development requirements.

- 1.12.15. **“End-User Buyer”** or **“Purchaser”** means a natural person who purchases a Unit developed on the Property in accordance with this Agreement.
- 1.12.16. **“Force Majeure”** means any event or circumstance beyond the reasonable control of a Party, including natural disasters, war, strikes, lockouts, epidemics, or changes in law, which prevents or delays performance under this Agreement.
- 1.12.17. **“Health and Safety Legislation”** means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), the Construction Regulations, 2014, and all amendments thereto.
- 1.12.18. **“Housing Mix”** means the approved distribution of Units across pricing bands, typologies, and erf sizes, as approved by the Municipality and forming part of this Agreement.
- 1.12.19. **“Municipality”** means Stellenbosch Municipality, a local authority established in terms of the Municipal Structures Act, 1998 (Act No. 117 of 1998), as represented by its duly authorised officials.
- 1.12.20. **“Municipal Finance Management Act”** or **“MFMA”** means the Local Government: Municipal Finance Management Act, 2003 (Act No. 56 of 2003), as amended.
- 1.12.21. **“NHBRC”** means the National Home Builders Registration Council established under the Housing Consumers Protection Measures Act, 1998 (Act No. 95 of 1998).
- 1.12.22. **“Parties”** means collectively the Municipality and the Developer, and **“Party”** means either one of them as the context may require.
- 1.12.23. **“Pricing Bands”** means the price categories for Units as approved by the Municipality and forming part of the Housing Mix in Clause 5.
- 1.12.24. **“Pricing Model”** means the pricing structure for Units developed under this Agreement, annexed as **ANNEXURE A**, as may be amended with the written approval of the Municipality.
- 1.12.25. **“Professional Team”** means the consultants, engineers, architects, and other professionals appointed by the Developer to plan, design, and oversee the Development.

- 1.12.26. **“Property”** means Erf 7001, Cloetesville, situated within Stellenbosch Municipality, together with all rights, title, and interest therein, subject to all existing servitudes, conditions of title, and statutory obligations.
- 1.12.27. **“Signature Date”** means the date of last signature of this Agreement by the Parties.
- 1.12.28. **“Subdivision”** means the approved division of the Property into separate erven as authorised by the Municipality in terms of the Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013) and relevant by-laws.
- 1.12.29. **“Units”** means the individual residential units constructed by the Developer on the Property in accordance with the Housing Mix and sold to End-User Buyers.

2. RECORDAL

- 2.1. The Municipality issued the Call for Proposal, inviting proposals from private developers to partner with the Municipality in developing upper-market GAP-housing on Erf 7001, Cloetesville.
- 2.2. The Partner is a private developer that was elected through a Call for Proposal (CFP) to allocate the subject land, which will be awarded for upper-market GAP-housing development.
- 2.3. All statutory development rights for the Property are in place, including rezoning, subdivision, environmental authorisation, and traffic impact assessment, as reflected in the CFP annexures.
- 2.4. The Municipality holds ownership of the Property. No bulk land sale is contemplated. Land will remain in municipal ownership until the transfer of individual Units to end-users.
- 2.5. This Agreement is subject to the Municipal Immovable Property Disposal Policy and the Municipal Asset Transfer Regulations, as well as the Municipal Finance Management Act and applicable Supply Chain Management prescripts.
- 2.6. The Parties wish to record terms upon which the Municipality grants Development Rights to the Successful Developer, to be further detailed in a Project Agreement.

3. TERM

- 3.1. This Agreement shall commence on the Signature Date and shall remain in force until all Units have been transferred to end-user buyers, unless terminated earlier in accordance with its provisions.
- 3.2. The Parties may extend the duration of this Agreement by written agreement, provided that such extension is compliant with Applicable Law.

4. SM DEVELOPMENT CONDITIONS

- 4.1. The Municipality grants [*insert name of developer*] development rights in respect of the Property for the sole purpose of implementing the Development, in accordance with the approved Subdivision Layout, Design Framework, and Building Guidelines.
- 4.2. [*insert name of developer*] shall finance, design, and construct all internal services and top structures at its own cost, while the Municipality shall remain responsible only for bulk service connections as budgeted in the municipal MTERF.
- 4.3. Ownership of the Property shall remain vested in the Municipality until transfer of individual Units to end-user buyers. Bulk transfers or encumbrances of the Property are prohibited.
- 4.4. [*insert name of developer*] shall ensure that all statutory requirements, including NHBRC enrolment and municipal approvals, are satisfied before occupation or transfer of Units.

5. HOUSING MIX

- 5.1. [*insert name of developer*] shall construct the Units in accordance with the housing mix approved by the Municipality, which reflects a distribution of Units across the defined pricing bands, housing typologies, and erven sizes.
- 5.2. The approved housing mix shall form part of this Agreement and may only be amended with the prior written consent of the Municipality.
- 5.3. [*insert name of developer*] shall ensure that the sales, marketing, and allocation processes strictly align with the housing mix so that buyers are qualified in relation to the Unit type and price band for which they apply.

6. DEVELOPER OBLIGATIONS

- 6.1. *[insert name of developer]* shall be responsible for the full financing, design, and construction of all internal services and top structures required for the Development. These obligations shall extend to ensuring that all services are constructed in compliance with municipal standards, applicable legislation, and the approved Development Programme.
- 6.2. *[insert name of developer]* shall at all times comply with Applicable Law, including all planning approvals, environmental authorisations, and statutory registrations. *[insert the name of developer]* shall bear the cost of obtaining such approvals and shall provide the Municipality with certified copies of approvals when issued.
- 6.3. *[insert name of developer]* shall furnish the Municipality with monthly progress reports detailing the status of design, construction, financial expenditure, achievement of Empowerment Targets, and any risks or delays. Such reports shall be submitted in a format reasonably required by the Municipality.
- 6.4. *[insert name of developer]* shall ensure compliance with Empowerment Targets by engaging suitably qualified local subcontractors, employing local labour where possible, and providing skills transfer and training opportunities. These commitments shall be measured against **ANNEXURE D** and monitored by the Municipality.

7. TRANSFER OF UNITS

- 7.1. The Municipality shall remain the registered owner of the Property until such time as individual Units are transferred to end-user buyers. *[insert name of developer]* shall not register any bulk transfer of the Property or encumber it in any manner inconsistent with this Agreement.
- 7.2. *[insert name of developer]* shall procure the enrolment of all Units with the NHBRC prior to commencement of construction and shall ensure that the Municipality duly approves all building plans before transfer.
- 7.3. Transfer of individual Units shall be effected in the name of the end-user buyers, represented by conveyancers appointed by the *[insert name of developer]*, and all costs of transfer shall be borne by *[insert name of developer]*.
- 7.4. No transfer shall take place unless the Unit complies with approved building standards, has received all final inspections, and the Municipality has issued written confirmation that the Unit is fit for occupation and transfer.

8. MARKETING AND SALE OF UNITS

- 8.1. *[insert name of developer]* shall be solely responsible for the marketing and sale of the Units, subject to municipal oversight to ensure compliance with pricing, allocation, and consumer protection requirements.
- 8.2. Buyer qualification shall be undertaken by the *[insert name of developer]*, with priority given first to qualifying residents of Cloetesville, followed by qualifying applicants from the greater Stellenbosch area. *[insert name of developer]* may not conclude sales with unqualified buyers without the Municipality's written consent.
- 8.3. The Units shall be marketed at prices within the range approved by the Municipality and set out in Clause 5. *[insert name of developer]* shall not deviate from these pricing bands without the prior written approval of the Municipality.
- 8.4. *[insert name of developer]* shall conduct all marketing in compliance with the Consumer Protection Act, 2008, and any regulations applicable to housing sales. The Municipality shall have the right to review promotional materials to ensure that they are not misleading and do not misrepresent the Development.
- 8.5. *[insert name of developer]* shall ensure that sales agreements are concluded in writing with end-user buyers and that all terms are consistent with this Agreement. Copies of all signed sales agreements shall be made available to the Municipality upon request.

9. DEVELOPMENT RIGHTS

- 9.1. The Municipality grants development rights to *[insert name of developer]* solely for the implementation of this Development and for no other purpose. These rights shall not be transferable, ceded, or assigned without the prior written approval of the Municipality.
- 9.2. Development rights shall at all times remain subject to compliance with the Development Programme, statutory approvals, and all conditions of this Agreement.
- 9.3. Should the *[insert name of developer]* fail to achieve milestones or commit a material breach of this Agreement, the Municipality shall have the right to withdraw the development rights and reclaim control of the Property. In such an event, the Municipality may appoint another party to complete the Development.

- 9.4. The withdrawal of development rights shall not affect any claims that the Municipality may have against *[insert name of developer]* for damages or non-performance.

10. PROPERTY CONDITIONS

- 10.1. *[insert name of developer]* acknowledges that the Property is made available as is, subject to all servitudes, conditions of title, and statutory obligations. The Municipality shall not be liable for any claim arising from the physical condition of the Property.
- 10.2. *[insert name of developer]* shall comply with all conditions attached to the subdivision approval and with any servitudes registered against the Property. *[insert name of developer]* shall, at its own cost, implement all mitigation measures required by any specialist studies forming part of the development approvals.
- 10.3. *[insert name of developer]* shall not use the Property for any purpose other than the Development contemplated by this Agreement. Any deviation shall constitute a material breach.
- 10.4. The Parties acknowledge that the Department of Environmental Affairs and Development Planning has confirmed that no listed activity in terms of the NEMA EIA Regulations, 2014 (as amended), is triggered by the proposed Development and that Environmental Authorisation is therefore not required for Erf 7001. Notwithstanding the above, *[insert name of developer]* shall remain bound by the duty of care under section 28(1) of NEMA and shall take all reasonable measures to prevent pollution or environmental degradation, or to minimise and rectify any such harm if it cannot reasonably be avoided.
- 10.5. *[insert name of developer]* shall ensure that construction activities comply with the Western Cape Noise Control Regulations and the National Dust Control Regulations. The Developer shall further implement best-practice environmental management measures to prevent nuisance, protect surrounding communities, and safeguard municipal infrastructure.
- 10.6. Should any future activity or amendment to the Development trigger a listed activity under the NEMA EIA Regulations, *[insert name of developer]* shall be obliged to apply for and obtain Environmental Authorisation prior to commencing such activity.

11. PROVISION OF INFORMATION

- 11.1. *[insert name of developer]* shall provide the Municipality with such information as may reasonably be required to monitor compliance with this Agreement. This shall include financial records, programme updates, and proof of statutory approvals.
- 11.2. The Municipality shall be entitled, on reasonable notice, to inspect *[insert name of developer]* offices and records relevant to the Development. *[insert the name of developer]* shall provide reasonable access and assistance for such inspections.
- 11.3. *[insert name of developer]* shall promptly notify the Municipality in writing of any material event, risk, or delay that may affect the timely completion of the Development or compliance with the Empowerment Targets.

12. DEVELOPMENT PROGRAMME

- 12.1. The Development shall be implemented strictly in accordance with the Development Programme annexed hereto as **ANNEXURE C**. The Programme shall contain key milestones, timelines, and completion dates.
- 12.2. Any amendment to the Development Programme shall require the prior written approval of the Municipality, which approval shall not be unreasonably withheld. The Municipality may require adjustments where delays occur that materially impact municipal planning.
- 12.3. A final Development Programme referred to in Subclause 12.1. must be submitted to the Municipality within fourteen (14) days of receipt of the award by the *[insert name of developer]*. Such Programme shall be subject to review and approval by the Municipality.
- 12.4. *[insert name of developer]* shall remain liable for adherence to the Programme, and failure to achieve milestones may trigger remedies set out in Clause 19 of this Agreement.
- 12.5. The Municipality may, in its discretion, allow extensions to the Programme in the event of force majeure, provided that the Developer submits a substantiated claim for such extension.

13. QUALITY

- 13.1. *[insert name of developer]* shall ensure that all Units and services are constructed in accordance with the National Building Regulations, SANS

standards, and the NHBRC technical requirements. The Developer shall at all times adhere to the approved Design Framework and Building Guidelines provided by the Municipality.

- 13.2. The Municipality shall be entitled to inspect the Development at any stage of construction to confirm compliance with the required standards. Such inspections shall not relieve *[insert name of developer]* of its obligations but shall serve as additional oversight to protect end-user buyers and municipal interests.
- 13.3. Where defects or non-compliance are identified by the Municipality, *[insert name of developer]* shall, at its own cost, rectify such defects before transfer of the affected Units. No Unit may be transferred without written confirmation by the Municipality that all defects have been addressed.
- 13.4. *[insert name of developer]* shall establish a quality control plan and maintain adequate supervision on site to ensure that construction is carried out in a professional manner. This plan shall be made available to the Municipality upon request.

14. CONTRACTOR AND PROFESSIONAL TEAM

- 14.1. *[insert name of developer]* warrants that, as at the Signature Date, it possesses the requisite skills, resources, and capacity to implement the Development in accordance with this Agreement and has secured a professional team capable of fulfilling all design and construction obligations.
- 14.2. *[insert name of developer]* shall remain responsible for the appointment, coordination, and performance of all contractors and members of its professional team. All such appointments shall comply with Applicable Law and the individuals or firms so appointed shall at all times remain duly registered and in good standing with their relevant statutory or professional bodies.
- 14.3. The Municipality shall have the right, acting reasonably, to request proof of the professional standing of contractors and consultants engaged by *[insert name of developer]* and may withhold its approval of any appointment that fails to meet statutory or regulatory requirements or presents a risk to the proper execution of the Development.
- 14.4. *[insert name of developer]* may not replace, substitute, or materially alter the composition of its appointed contractor or professional team without the prior written approval of the Municipality. Such approval shall not be unreasonably

withheld or delayed, provided that the replacement appointees meet the same professional and statutory requirements.

- 14.5. Notwithstanding any approval or oversight exercised by the Municipality, *[insert name of developer]* shall remain solely responsible and liable for the acts and omissions of its contractors and professional team. The Municipality shall not incur any liability arising from such appointments, and *[insert name of developer]* shall indemnify the Municipality against all losses arising from non-performance, negligence, or breach by its appointed contractors or consultants.

15. ENGINEERING SERVICES

- 15.1. *[insert name of developer]* shall be responsible for the design, financing, and construction of all internal engineering services required for the Development, including water, sewerage, stormwater, and electricity reticulation. Such services shall comply with municipal standards and be subject to inspection by the Municipality.
- 15.2. The Municipality shall remain responsible for providing bulk service connections to the boundaries of the Property, in accordance with its approved budget and service delivery obligations. The timing of such bulk services shall be coordinated with the Development Programme.
- 15.3. *[insert name of developer]* shall not connect any internal services to municipal bulk infrastructure without the prior written approval of the Municipality. Unauthorised connections shall constitute a material breach of this Agreement.
- 15.4. Upon completion of the internal services, *[insert name of developer]* shall provide as-built drawings, compliance certificates, and quality assurance documentation to the Municipality for final acceptance and takeover.

16. EMPOWERMENT TARGETS

- 16.1. *[insert name of developer]* shall comply with the Empowerment Targets set out in Annexure D. These targets shall include subcontracting to qualifying small enterprises, local labour employment, and the provision of training and mentorship opportunities.
- 16.2. The Municipality shall monitor compliance with Empowerment Targets on a monthly basis. *[insert name of developer]* shall submit supporting documentation, including employment records, training registers, and subcontracting agreements, as proof of compliance.

- 16.3. Failure to achieve Empowerment Targets shall entitle the Municipality to impose corrective measures, including requiring the *[insert name of developer]* to submit a revised empowerment plan or deducting penalties as provided for in this Agreement.
- 16.4. *[insert name of developer]* acknowledges that the Empowerment Targets are a material obligation of this Agreement and that persistent failure to meet such targets shall constitute a breach capable of termination under Clause 19.

17. INSURANCES

- 17.1. *[insert name of developer]* shall procure and maintain, at its own cost, insurance policies customary to projects of this nature, including Contract Works Insurance, Public Liability Insurance, and Professional Indemnity Insurance. The level of cover shall be commensurate with the value of the Development and acceptable to the Municipality.
- 17.2. *[insert name of developer]* shall also maintain post-completion cover as required by the NHBRC, including latent defects insurance and a minimum 12 month maintenance guarantee on all completed units.
- 17.3. Evidence of insurance cover shall be provided to the Municipality prior to commencement of works and renewed as necessary.
- 17.4. Failure to maintain adequate insurance shall constitute a material breach of this Agreement, entitling the Municipality to suspend or terminate the Developer's rights.

18. HEALTH AND SAFETY

- 18.1. *[insert name of developer]* shall, at its sole cost and risk, comply in all respects with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), the Construction Regulations, 2014, and any amendments or subordinate legislation thereto (collectively "the Health and Safety Legislation").
- 18.2. *[insert name of developer]* acknowledges and accepts full responsibility as "employer" for the purposes of the Health and Safety Legislation. *[insert name of developer]* shall ensure that all contractors, subcontractors, employees, and consultants appointed in connection with the Development comply with the Health and Safety Legislation at all times.
- 18.3. *[insert name of developer]* shall appoint only competent and suitably qualified contractors, subcontractors, and professional service providers to undertake

the Development. *[insert name of developer]* shall keep, and upon written request provide, documentary proof of such appointments and competencies in accordance with the Health and Safety Legislation.

- 18.4. *[insert name of developer]* shall ensure that all risks associated with construction activities on the Property are identified, assessed, and controlled in accordance with the Health and Safety Legislation. *[insert name of developer]* shall implement and maintain all necessary preventative and protective measures throughout the execution of the Development.
- 18.5. *[insert name of developer]* shall procure that its appointed contractor prepares, implements, and maintains a project- and site-specific Health and Safety Plan, compliant with the Health and Safety Legislation. All costs associated with the preparation, approval, implementation, and maintenance of such plan shall be borne exclusively by the Developer.
- 18.6. *[insert name of developer]* shall establish and maintain appropriate systems and procedures to monitor compliance with the Health and Safety Legislation and shall immediately rectify any instance of non-compliance. The Municipality shall have no obligation to monitor, enforce, or otherwise intervene in such compliance.
- 18.7. *[insert name of developer]* shall ensure that all health and safety incidents, injuries, or fatalities are reported, recorded, and managed strictly in accordance with the Health and Safety Legislation. *[insert name of developer]* shall be solely responsible for all statutory notifications and remedial or corrective measures arising therefrom.
- 18.8. All costs, expenses, and liabilities incurred in complying with the Health and Safety Legislation, including (without limitation) training, medical surveillance, audits, personal protective equipment, and permits, shall be for the sole account of *[insert name of developer]* and shall under no circumstances be recoverable from the Municipality.
- 18.9. *[insert name of developer]* indemnifies, defends, and holds harmless the Municipality, its councillors, officials, employees, and agents against any loss, claim, damage, penalty, or liability of whatsoever nature arising directly or indirectly from any breach or non-compliance with the Health and Safety Legislation by the *[insert name of developer]*, its contractors, subcontractors, employees, or consultants.

- 18.10. The obligations set out in this Schedule shall endure for the duration of the Development and shall survive termination of this Agreement to the extent necessary to give effect thereto.

19. DEFAULT AND TERMINATION

- 19.1. In the event that *[insert name of developer]* fails to achieve key milestones in the Development Programme or breaches any material obligation under this Agreement, the Municipality shall issue a written notice of default requiring *[insert name of developer]* to remedy such default within 30 (thirty) business days.
- 19.2. If *[insert name of developer]* fails to remedy the default within 30 (thirty) business days, the Municipality shall be entitled, without prejudice to any other rights, to terminate this Agreement and withdraw development rights.
- 19.3. Termination shall entitle the Municipality to take possession of the Property and appoint another party to complete the Development. The Municipality may also call on any Guarantees provided under this Agreement.
- 19.4. Termination of this Agreement shall not affect any claim the Municipality may have against the *[insert name of developer]* for damages, costs, or losses arising from non-performance.

20. CONFIDENTIALITY

- 20.1. Each of the Parties shall at all times keep the existence and contents of this Agreement confidential and shall use reasonable efforts to keep confidential any information relating to the other Parties or their operations or affairs which it has acquired or may acquire in relation to the other Parties or their operations or affairs prior to or pursuant to this Agreement, save for any information:
- 20.1.1. which is publicly available or becomes publicly available through no act or default of any Party; or
- 20.1.2. which was in the possession of a Party prior to its disclosure otherwise than as a result of any breach by that Party of any obligation of confidentiality owed to any other person whether pursuant to this Agreement or otherwise; or
- 20.1.3. which is disclosed to a Party by a person which person did not acquire the information under an obligation of confidentiality; or

- 20.1.4. which is independently acquired by a Party as a result of work carried out by a person to whom no disclosure of such information has been made; or
- 20.1.5. which is required or requested to be disclosed by any court of competent jurisdiction or any governmental, banking, taxation or other regulatory authority or similar body, the rules of any relevant stock exchange or pursuant to any applicable law or regulation; or
- 20.1.6. which is required to be disclosed in connection with, and for the purposes of, any litigation, arbitration, administrative or other investigations, proceedings or disputes, and each Party shall not use or disclose such information except with the prior written consent of the other Parties or in accordance with an order of a court of competent jurisdiction or in order to comply with any law or governmental regulations by which any Party concerned is bound or as may be lawfully requested or otherwise required or accessed by any governmental authority.

21. REPRESENTATION AND WARRANTIES

- 21.1. Each Party represents and warrants to the other Party that:
 - 21.1.1. it has the legal capacity and, if applicable, has taken all necessary corporate action required to empower and authorise it to enter into this Agreement.
 - 21.1.2. this Agreement constitutes an agreement valid and binding on it and enforceable against it in accordance with its terms.
 - 21.1.3. the execution of this Agreement and the performance of its obligations hereunder do not and shall not:
 - 21.1.3.1 contravene any law or regulation to which it is subject;
 - 21.1.3.2 contravene any provision of its constitutional documents, if applicable; or
 - 21.1.3.3 conflict with or constitute a breach of any of the provisions of any other agreement, obligation, restriction or undertaking which is binding on it;

- 21.1.4. to the best of its knowledge and belief, it is not aware of the existence of any fact or circumstance that may impair its ability to comply with all of its obligations in terms of this Agreement.
 - 21.1.5. It is entering into this Agreement as principal (and not as agent or in any other capacity).
 - 21.1.6. The natural person who signs and executes this Agreement on its behalf is validly and duly authorised to do so.
 - 21.1.7. No other party is acting as a fiduciary for it; and
 - 21.1.8. it is not relying upon any statement or representation by or on behalf of the other Party, except those expressly set forth in this Agreement.
- 22.2 Each of the representations and warranties given by the Parties in terms of Clause 18.1 shall:
- 22.2.1 be a separate warranty and will in no way be limited or restricted by inference from the terms of any other warranty or by any other words in this Agreement.
 - 22.2.2 continue and remain in force notwithstanding the completion of any or all the transactions contemplated in this Agreement; and
 - 22.2.3 prima facie be deemed to be material and to be a material representation inducing the Company to enter into this Agreement.

23 BREACH

In the event that either Party ("the defaulting party") to this Agreement breaches any material term of this Agreement and fails to remedy such breach within 30 (thirty) days of the date of receipt of a written notice from the other Party ("the aggrieved party") requiring such breach to be remedied, the aggrieved party will be entitled immediately to cancel this Agreement by written notice to the defaulting party, which cancellation will be without prejudice to any other rights which the aggrieved party may at law enjoy arising out of such breach and/or cancellation.

24 DISPUTE RESOLUTION

Any dispute arising between the parties in connection to or from the Agreement shall be settled as follows:

- 24.2 A dispute must be notified in writing.
- 24.3 The Parties must initially make a reasonable effort to settle any such dispute through amicable resolution.

- 24.4 If the Parties fail to reach an amicable resolution within 20 business days from date of notification or any other period agreed between the Parties to resolve the dispute, the dispute shall be referred to a single arbitrator agreed on by the Parties.

25 DOMICILIUM AND NOTICE

- 25.2 The Parties hereto choose *domicilia citandi et executandi* for all purposes of and in connection with this Agreement as follows:

The Municipality

TOWN HOUSE
17 PLEIN STREET
STELLENBOSCH
7600

T: 021 808 8025

E: municipal.manager@ Stellenbosch.gov.za

the Partner

- 25.3 Any Party hereto shall be entitled to change its *domicilium* from time to time, provided that any new *domicilium* selected by it shall be a street address and any such change shall only be effective upon receipt of notice in writing by the other Parties of such change.

- 25.4 Any notice given by or to either party in terms of this Agreement shall be given in writing and shall be delivered by hand to a responsible person present at or sent by prepaid registered post or facsimile transmission to the *domicilium* chosen by the addressee in terms of this Agreement.

- 25.5 A notice sent by one Party to another Party shall be deemed to be received:

25.5.1 on the date of delivery, if delivered by hand;

25.5.2 on the fourth day after posting, if sent by prepaid registered mail;

25.5.3 on the date sent or forwarded by the email

- 25.6 Notwithstanding anything to the contrary herein contained a written notice or communication actually received by a Party shall be an adequate written notice or communication to it notwithstanding that it was not sent to or delivered at its chosen *domicilium citandi et executandi*.

26 **FORCE MAJEURE**

26.2 Notice

- 26.2.1 Should a *Force Majeure* event occur then the invoking Party will forthwith give written notice thereof to the other party –
- 26.2.2 specifying the cause and anticipated duration of the *Force Majeure*; and
- 26.2.3 promptly upon termination of the *Force Majeure*, stating that such *Force Majeure* has terminated.

26.3 Suspension of performance

- 26.3.1 Performance of any such obligations will be suspended from the date on which notice is given of *Force Majeure* until the date on which notice is given of termination of *Force Majeure* (hereinafter referred to as the "Suspension Period"), subject always to the remaining provisions of this Clause 23.
- 26.3.2 The invoking Party will not be liable for any delay or failure in the performance of any obligation hereunder, or loss or damage due to or resulting from the *Force Majeure* during the Suspension Period, nor be entitled to any additional costs or additional time, provided that –
- 26.3.3 the invoking Party uses and continues to use its best efforts to perform such obligations.
- 26.3.3.1 if the *Force Majeure* shall continue for more than 60 (sixty) consecutive days, the other Party will be entitled to cancel this Agreement on the expiry of such period, but will not be entitled to claim damages against the invoking Party as a result of the delay or failure in the performance of any obligations hereunder due to or resulting from the *Force Majeure*; and
- 26.3.3.2 the Party not invoking *Force Majeure* will be entitled to elect, by giving written notice within 30 (thirty) days of the

termination thereof, as to whether or not it requires the invoking Party to perform any obligations incurred prior to the *Force Majeure*.

27 PROTECTION OF PERSONAL INFORMATION

27.2 The Parties agree that they are each responsible for complying with their respective general obligations under POPI.

27.3 The Parties agree and undertake:

27.3.1 to use and process the Personal Information solely for the purpose it was collected.

27.3.2 not to allow any unauthorised persons access to the Personal Information of the other party

27.3.3 not to do anything in relation to the Personal Information that requires the consent of, or notification to, a data subject without first acquiring such consent or providing such notification, as the case may be.

27.3.4 to implement reasonable and appropriate technical and organisational security measures to prevent the loss of damage to and/or unauthorized access or destruction of Personal Information and take reasonable steps to ensure that all its representatives, employees, agents, partners and third-party sub-contractors, if applicable, comply with all the undertakings in this clause.

28 WHOLE AGREEMENT

This agreement constitutes the entire agreement between the Parties regarding the subject matter hereof. No agreements, guarantees or representations, whether verbal or in writing, have been concluded, issued or made, upon which either party is relying in concluding this Agreement, save to the extent set out herein.

29 NO WAIVER

No waiver or indulgence of whatsoever nature shall be of any force of effect, including a waiver or indulgence in respect of this clause, unless it is reduced to writing and signed by and on behalf of the Parties.

30 NO INDULGENCE

No indulgence, leniency or extension of time which a party (the "grantor") may grant or show to the other will in any way prejudice the grantor or preclude the grantor from exercising any of his rights in the future.

31 SEVERABILITY

If any particular provision and/or term of this Agreement is found to be defective or unenforceable or is cancelled for any reason (whether by any competent Court or otherwise) then the remaining provisions and/or terms shall continue to be of full force and effect. Each provision and/or term of this Agreement shall accordingly be construed as entirely separate and separately enforceable in the widest sense from the other provisions and/or terms hereof.

32 NO CESSION OR ASSIGNMENT

Neither party hereto shall be entitled to cede or assign any of its rights, or delegate any of its obligations hereunder without the prior written consent of the other first being obtained.

33 NO VARIATION

No variation, suspension, deletion, amendment or modification of this Agreement is of any force or effect, unless recorded, reduced to in writing and signed by the Parties, and is effective only in the specific instance and for the purpose and to the extent set out.

34 EXECUTION/SIGNATURES

IN WITNESS WHEREOF;

The Parties have expressly executed this Agreement on the date of last signature herein under:

FOR THE STELLENBOSCH MUNICIPALITY

SIGNED AT on this the day of 2025.

.....
Anthony Barnes
Director: Planning and Economic
Development
(duly authorised thereto)

AS WITNESSES:

1.

2.

.....
Geraldine Mettler
Municipal Manager
that is duly authorised

FOR THE DEVELOPER

SIGNED AT on this the day of
2025.

.....
[insert name]
[insert delegation]
(duly authorised thereto)

AS WITNESSES:

1.

2.

DRAFT

ANNEXURE A: PRICING MODEL

Insert Pricing Model here before signing:

DRAFT

ANNEXURE B: PERFORMANCE GUARANTEES

Insert Performance Guarantee here before signing:

DRAFT

ANNEXURE C: DEVELOPMENT PROGRAMME

Insert the Development Programme here before signing:

DRAFT

ANNEXURE D: EMPOWERMENT TARGETS

1. Preamble

Stellenbosch Municipality is committed to leveraging its development projects to achieve broad-based economic transformation, local enterprise development, and skills enhancement within its community. This Appendix forms a binding condition of the Land Availability Agreement. It obligates the Developer and its appointed Contractor to implement the following targeted procurement and local development initiatives on the construction works associated with the approved development.

2. Definitions

In this Appendix, unless the context indicates otherwise:

"Agreement" means the Land Availability Agreement to which this Appendix is attached.

"Contractor" means the principal contractor appointed by the Developer to execute the construction works.

"Developer" means the successful bidder in the Call for Proposal.

"Local Labour" means individuals who are residents within Ward 17 (Cloetesville), the jurisdiction of Stellenbosch Municipality, or the Western Cape region. Priority must be given to individuals registered on the Stellenbosch Municipality unemployment database.

"Municipality" means the Stellenbosch Municipality.

"Targeted Enterprise" means a Qualifying Small Enterprise (QSE) or Exempted Micro Enterprise (EME) that is:

- a) At least 51% owned by youth, women, or persons with disabilities;
- b) Registered with the CIDB in a grade lower than that of the main Contractor; and
- c) Possesses a B-BBEE Status Level that is equal to or higher (i.e., a lower number) than that of the main Contractor.

3. Contract Participation Goal (CPG) for Enterprise Development

- 3.1. The contractor shall achieve in the performance of the contract the Contract Participation Goals relating to the engagement of targeted enterprises as established in the ***CIDB Standard for Indirect Targeting for Enterprises Development through Construction Contracts, Gazette Notice No. 36190 of 25 February 2013***. In this case, the contractor shall provide a minimum Contract Participation Goal of 5% of the total project value.
- 3.2. The development of the Targeted Enterprise(s) shall not be limited to the provision of work but must include structured developmental support. The Contractor shall, for each Targeted Enterprise:
 - a) develop the targeted enterprise/s in two development areas as specified in the Standard, and agreed by both the main contractor and the targeted enterprise/s.
 - b) perform needs analysis on the targeted enterprise to identify developmental goals;
 - c) provide internal mentorship support to improve the targeted enterprise/s performance;
 - d) develop a project-specific enterprise development plan to improve the targeted enterprise/s performance in the identified developmental areas;
 - e) monitor and report the progress of the agreed development areas with the targeted enterprise/s and
 - f) submit a project completion report to the Employer's representative for each targeted enterprise.

The development of the Targeted Enterprise should be guided by the **CIDB Competence Standard for Contractors Gazette No. 41237, 10 November 2017**. The following table outlines the minimum recognised qualifications to which the development of targeted enterprises must be undertaken by the main contractor.

CIDB Grading	Minimum Level	NQF	Recognised Qualifications
Business Management			
5 & 6	5		• National Occupational Qualification in Business Management NQF 5
2 to 4	2		• National Certificate: Construction Contracting NQF 2
Building and Construction Works Management			
5 & 6	5		• National Certificate: Management of Building Construction Processes NQF 5
2 to 4	3		• NCV 4: Civil Engineering and Building Construction, or • National Certificate: Supervision of Construction Processes
Civil Engineering Construction Works			
5 & 6	5		• National Certificate: Management of Civil Engineering Processes NQF 5, or • National Diploma: Civil Engineering and Building Diploma
2 to 4	3		• NCV 4: Civil Engineering and Building Construction or • National Certificate: Supervision of Construction Processes, or • Further Education and Training Certificate: Supervision of Construction Processes

The contractor shall appoint an **Enterprise Development Coordinator** who shall:

- Develop a project-specific Enterprise Development plan to improve the targeted enterprise's performance in the identified developmental areas and shall allocate resources to monitor progress in relation to improve performance; and
- Submit to the employer's representative a quarterly enterprise development report (Performa – ED105P) which documents all mentoring activities that have taken place during that month and the progress made in improving the targeted enterprise's performance in the agreed developmental areas, countersigned by the targeted enterprise.

Competence Criteria for an Enterprise Development Coordinator

The enterprise development coordinator shall have the following competencies:

- Minimum experience of 5 years in the construction industry at Managerial level as a Site Agent, Contracts Manager, Site Manager, Construction Manager, Business Development Manager or Enterprise Development Manager,
- Minimum experience of 2 years in training and development in Building or Construction; and
- National Diploma or B Degree in the Built Environment or Business Management.

4. Local Labour Target

4.1. All unskilled labour force employed on the project by the Contractor and all subcontractors must be Local Labour.

4.2. The Contractor is encouraged to utilise labour-intensive construction methods where technically and economically feasible to maximise local employment. Recommended labour-intensive activities include, but are not limited to:

- a) Site clearance, excavation, and trenching for shallow services.
- b) Construction of paving, kerbs, and sidewalks.
- c) Landscaping, planting, and irrigation installation.
- d) Construction of non-structural masonry walls.
- e) Painting, plastering, and tiling.

- 4.3. The Contractor must request access to the Stellenbosch Municipality unemployment database to assist in the sourcing of Local Labour.

Priority for these opportunities shall be given to individuals meeting the definition of Local Labour.

5. Community Liaison Officer appointment

- 5.1. The Developer shall employ a Community Liaison Officer (CLO) nominated by the community for the full duration of the contract at the average **basic salary of R 7,000.00** per month.
- 5.2. The duties of the CLO and the conditions of employment shall be in accordance with the Client's standard Agreement of Temporary Employment as Community Liaison Officer.
- 5.3. Allow for net extra cost involved in the employment of a Community Liaison Officer (CLO) in respect of the contract.

6. Compliance and Reporting

The Developer, through its Contractor, shall report monthly to the Municipality's designated Project/Programme Manager. Reports must be submitted by the 7th day of each month for the preceding month and shall include:

- 6.1. CPG & Enterprise Development Report:
- a) Proof of subcontracts awarded to Targeted Enterprise(s), including value and scope.
 - b) Progress reports on the Enterprise Development Plan for each Targeted Enterprise (using proforma ED105P or similar as directed by the Municipality).
 - c) A declaration of compliance (using proforma ED104P or similar).
- 6.2. Local Labour Report:
- a) A detailed list of all employees on site, indicating for each:
 - **PARTICIPANTS' DETAILS:** Name, Surname, South African ID Number, Gender, Disability, Start Date, Government Grant.
 - **EXPERIENCE/LITERACY:** First language, High level of Education.
 - **LOCATION DETAILS:** District/Municipality, Village/Suburb, Ward Name or Number, Residential Address, Cell Number
 - **HOUSEHOLD DETAILS:** Number of People in Household, Number of Dependants in Household, and Number of Children attending school
 - **LABOUR DAYS & WAGE DATA:** Number of labour days, Daily Wage Rate, and Total Wage Paid
 - b) The contractor will also be required to provide a monthly report on any training provided, including a monthly attendance register and the workforce (Supervision & Workforce) on site.
 - c) and the employer (Contractor or Subcontractor).
 - d) A calculation demonstrating the achievement of the 80% Local Labour target.
- 6.3. On appointment of local labour, the contractor will be required to provide LED section of Stellenbosch Municipality, through the appointed Project/Programme Manager, the **Contracts** of the local labour appointed, including **monthly proof of payment**.
- 6.4. Upon practical completion, the Contractor shall submit a final project completion report consolidating the achievements against the CPG and local labour.

7. Failure to Comply

Failure by the Developer or its Contractor to meet these obligations, or to provide accurate and timeous reporting, shall be considered a material breach of the Land Availability Agreement. The Municipality reserves the right to invoke any remedies available to it in law and under the Agreement, including but not limited to the imposition of penalties or termination of the Agreement.

8. Pricing Schedules

The financial provision for this Enterprise Development support (Needs Analysis, Mentorship, Reporting) shall be included by the Contractor as a Provisional Sum in the contract preliminaries,

separate from the value of the subcontracted works. This sum is non-competitive and shall be paid for upon the provision of the agreed development services.

Breakdown of the items per Targeted Enterprise to be included in the pricing

Item	Description	Unit	Rate	Quantity	Amount (R)
16	Enterprise Development				
16.1	Enterprise development of Targeted Enterprise or JV partners				
16.1.1	Needs Analysis and Enterprise Development Plan per Targeted Enterprise	No.	5,000	1	5,000
16.1.2	Monitoring and Interim reporting per targeted enterprise	Per Quarter	20,000	8	160,000
16.1.3	Project Completion Report per Targeted Enterprise	No.	5,000	1	5,000
	Provisional Sum				170,000

- Item 16.1.1 refers to the Needs Analysis that the contractor shall conduct on the targeted enterprise and/or JV partner to identify the developmental goals at R5000.00 (five thousand rands) per targeted enterprise.
- Item 16.1.2 refers to the Monitoring and Interim reporting to be conducted by the contractor as per the Standard at R20 000.00 (twenty thousand rands) per quarter.
- Item 16.1.3 refers to the Completion report; the contractor shall submit the Completion report to the Employer's representative as per the Standard at a rate of R5000.00 (five thousand rands) per targeted enterprise.

NOTE: The "Per Quarter" quantity is subject to change depending on the duration of the Targeted Enterprise's scope of work. This scope must be clearly defined and reflected in the contractor's programme to enable effective monitoring.

APPENDIX 1: PROJECT INTERIM REPORT (ED105P)

cidb PROJECT ASSESSMENT SCHEME: STANDARD FOR INDIRECT TARGETING PROJECT INTERIM REPORT To be completed for each qualifying enterprise	
Section A: Employer Information	
cidb Employer Number	
Employer Name	
Section B: Contractor / JV Information	
cidb Contractor Registration Number of main / lead contractor	
Name of contractor	
cidb Contractor Registration Number of Joint Venture Partner 2	
Name of contractor / Joint Venture	
cidb Contractor Registration Number of Joint Venture Partner 3	
Name of contractor / Joint Venture	
cidb Contractor Registration Number of Joint Venture Partner 4	
Name of contractor / Joint Venture	

APPENDIX 2: CLO DUTIES

COMMUNITY LIAISON OFFICER (CLO)

The duties of the CLO and the conditions of employment shall be in accordance with the Agreement of Temporary Employment as Community Liaison Officer are as follows:

DUTIES AND RESPONSIBILITIES OF THE CLO

The Community Liaison Officer shall:

1. Represent the community and assist the client, the client's agent and the contractor with communication between them and the community.
2. Inform community regarding the project detail, safety precautions and programme.
3. Be available at the site offices generally between the hours of 07:00 and 09:00 and again from 15:00 until end of working day. Normal working hours will be from 07:00 am till 17:00.
4. Assist with the relocation of people, where applicable.
5. Maintain an up-to-date record of potential employees within the community and provide the contractor with copies of this information.
6. To identify, screen and nominate labour from the community in accordance with the contractor's requirements and determine, in consultation with the contractor, the needs of local labour for employment and relevant technical training, where applicable.
7. Liaise between the contractor and labour regarding wages and conditions of employment.
8. Communicate daily with the contractor on labour-related issues such as numbers and skills.
9. Identify possible labour disputes, unrest, strikes, etc., in advance and assist in their resolution.
10. Have a good working knowledge of the contents of the contract document regarding labour and training matters.
11. Attend all meetings at which the community and/or labour is represented or discussed.
12. Attend contract site meetings and report on community and labour issues at these meetings.
13. Co-ordinate and assist with the obtaining of information regarding the community's needs (questionnaires, etc.).
14. Inform local labour of their conditions of temporary employment, to ensure their timeous availability and to inform them timeously of when they will be relieved.
15. Ensure that all labour involved in activities when tasks have been set, are fully informed of the principle of task-based work.
16. Attend disciplinary proceedings to ensure that hearings are fair and reasonable.
17. Keep a daily written record of interviews and community liaison.
18. Arrange venues for training if required.
19. Assist with the training and education of the community regarding the correct usage of the services, where applicable.

APPENDIX 3: CONSENT FORM TO PERSONAL INFORMATION

ACCESS TO PERSONAL INFORMATION: PARTICIPANT CONSENT FORM

SECTION 1: BACKGROUND:

Due to compliance to the No 4 of 2013: Protection of Personal Information Act, 2013 (POPIA) effective from 30 June 2021, and the citizen's right to privacy (South African Constitution 1996, Section 14), permission is required to obtain and process personal information for monthly reporting and verification purposes on the national Expanded Public Works Programme (EPWP) Reporting System.

The following personal details are needed:

- Full Name and Surname (as per ID document);
- Race;
- Disability Status;
- Certified Copy of the Green barcoded Identity Document or Card;
- Payment Information (Copy of Pay slips)
- Details of your home or living address;
- Banking Details, and
- Contact Details: email address and cell number.

SECTION 2: PARTICIPANT CONSENT:

Acknowledgement:

It is acknowledged that with the signing of the EPWP Employment Contract for the respective period, I was informed (through orientation or an induction programme) that personal details will be required for monthly reporting and verification purposes.

Consent:

Permission is herewith granted to the institution in question to obtain and process personal details on a monthly basis for reporting and verification purposes.

Signature:

Name and Surname:..... Witness:.....

The individual has the following rights with respect to their personal information:

- Right of access.*
 - Right to correct or update the personal information;*
 - Right to object to processing, or to revoke consent;*
- Right to receive a copy of the consent form and privacy notice or other additional information about the institution's privacy practices.*

I appreciate that failure to provide my consent or later revoking consent to the processing of personal information may result in not being able to sign an Employment Contract or report the work opportunity of the person on the EPWP Reporting System.

I.....(name and surname) give permission to STELLENBOSCH MUNICIPALITY (name of institution) to obtain personal details for monthly reporting and verification purposes.

Signed on..... (date), at..... (place).

SECTION 3: EMPLOYER DECLARATION:

Declaration:

declared in line with Condition 2 of Chapter 3 of POPIA, that the participant was informed about the purpose of this form on signing the EPWP Employment Contract for the respective period.

It is also declared that personal details will be obtained and processed on a monthly basis for reporting and verification purposes.

Signature

Employer/Supervisor:..... Witness:.....

Signed on.....(date), at.....(place).

DRAFT

ANNEXURE F

SPECIALIST

REPORTS

Engineering Services Report

A Broad Conceptual Urban Design Framework for Erf 7001, Cloetesville

Stellenbosch Municipality

Submission date: 2023/11/30

Document number: Cloetesville Urban Design Framework Engineering Services Report
Revision: 0

Document control record

Document prepared by:

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Author signature		Approver signature	
Name	Elzaan Jordaan	Name	Chris van der Walt
Title	Civil Engineer	Title	Associate

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1 INTRODUCTION

Stellenbosch Municipality has undertaken the task to appoint an experienced and professional consultant to undertake a Broad Conceptual Urban Design Framework for Erf 7001, Stellenbosch and to obtain town planning and development rights. Zutari was selected to be the lead consultant for this multidisciplinary project.

The main objective of the project is to undertake a Broad Conceptual Urban Design framework for Erf 7001, Cloetesville, Stellenbosch, and to obtain town planning and development rights. The Stellenbosch Municipality identified a need for integrated urban settlement developments to address municipal housing backlogs. Erf 7001, Cloetesville was identified as a suitable site for such a development.

The project aims to facilitate a sustainable integrated development including medium to upper income housing units (GAP) that will address housing needs in Cloetesville and ensure social and economic sustainability of the inhabitants of Cloetesville and beneficiaries as defined by the Stellenbosch Municipality.

2 Purpose of this report

This report addresses the needs of Stellenbosch Municipality regarding the provision of engineering services for the Cloetesville Housing Development Project. The infrastructure design of the development is based on technical requirements and guidelines as stated in the Design Guidelines and Minimum Standards for Civil Engineering Services (Stellenbosch Municipality, 2015) and the general subdivision/rezoning conditions. Additionally, design considerations are also based on the Guidelines for Human Settlement Planning and Design (Department of Human Settlements , 2019) and the Drainage Manual 6th Edition (SANRAL, 2013).

The level of service for the proposed infrastructure will be to the accepted standard associated with that of the various proposed housing topologies as per the architect's details.

This services report has been compiled based on the following available information:

- The latest Site Development Plan (SDP);
- Traffic Impact Assessment (TIA);
- Electrical Services Report.

3 Site locality and description

Erf 7001 is located in Ward 17 in Cloetesville, Stellenbosch. The Ward is a predominantly residential ward which includes a part of Cloetesville as well as Welgevonden, Green Oaks, Stellita Park, Weltevrede and the Municipal Flats in Rhode, Kloof and Long Streets as shown in Figure 1 below. The ward is bordered by the R44 Klappmuts road, Lakey and Long streets. The site is located west of the R44. It is in close proximity to a primary school and local sports ground. Erf 7001 is characterised by numerous trees.

The site slopes to the North and North East boundary at an average gradient of 6% - 8%. The highest point is at the existing reservoir erf at an elevation of 185.5m MAMSL. The lowest point is at the centre of the Western boundary at an elevation of 173m MAMSL.

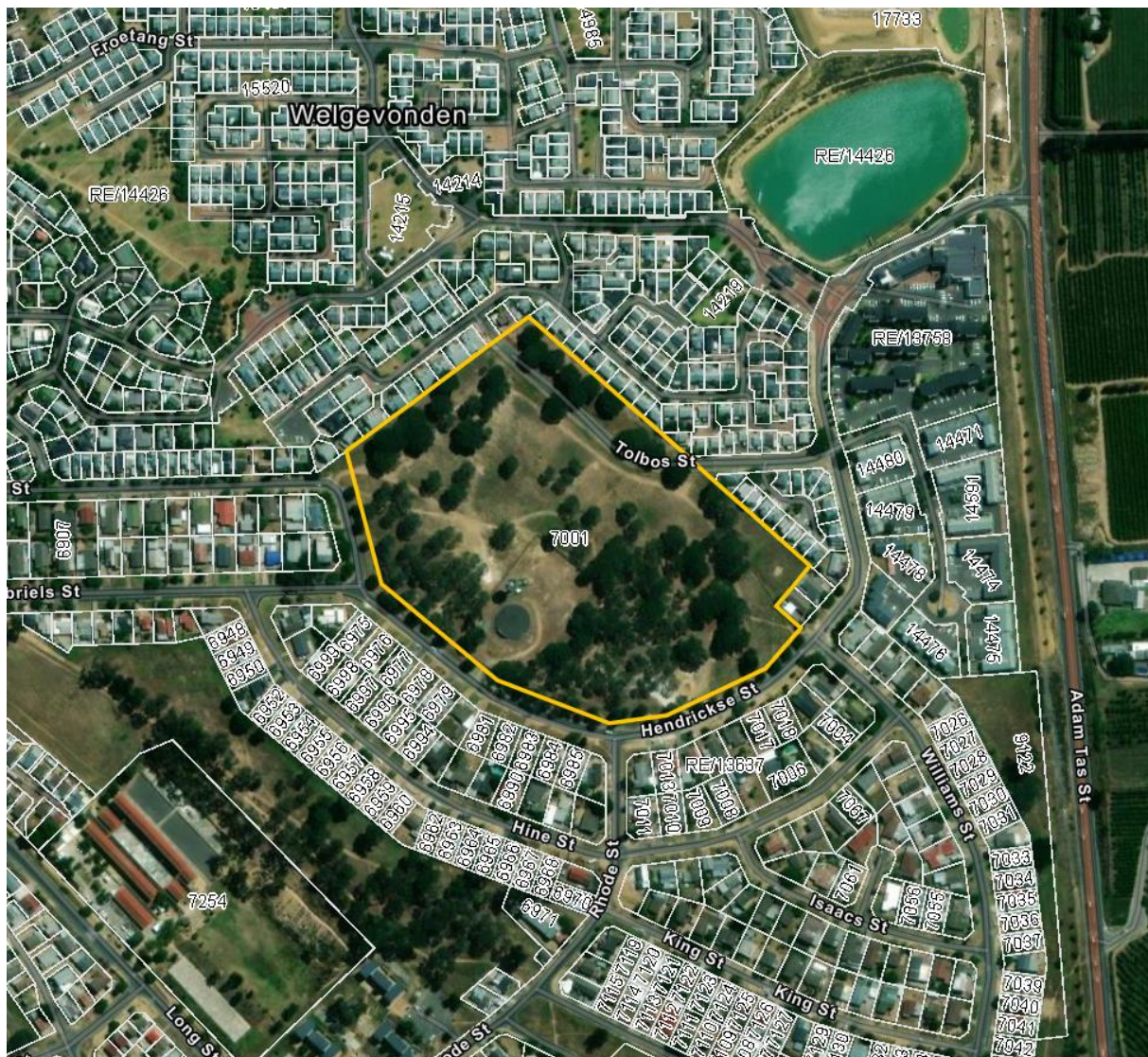


Figure 1: Erf 7001 Locality Map

4 Description of the proposed development

4.1 Proposed development

The proposed Cloetesville Housing Development comprises the following land uses:

- 203 Conventional single Residential Zone stands;
- Public Roads.

Please refer to Figure 2 which illustrates the subdivision and zoning plan. The erven size ranges from 115m² to 159m² and from 160m² to 200 m² for single residential units.



Figure 2: Cloetesville Housing Development Proposed Subdivision Plan

4.2 Geotechnical investigation

Kantey and Templer Consulting was appointed by Stellenbosch Municipality to prepare a geotechnical report for Erf 7001 for the proposed development.

Erf 7001 Cloetesville has been identified for possible residential development which comprises GAP housing (dwellings) located in terrain composed of and underlain at shallow depth by shales of the Tygerberg Formation, Malmesbury Group.

The subsoil profile, in general, is composed of naturally transported surficial soils which are resting on residual material a underlain by weathered shales.

Conditions for the use of conventional foundations at shallow depth are considered favourable classifying as 'S' in terms of the NHBRC site class designation. Accordingly, founding options allow for conventional strip and slab-on-ground foundations.

Groundwater conditions are considered favourable with a perched water table developing during periods of high rainfall. Given the steep topography of the bulk of the site, erosion associated with surface runoff can be expected.

Development costs may need to be increased due to:

- the non-availability of materials suitable for re-use on site;
- the unfavourable subgrade conditions;
- the need for measures to control the shallow presence of groundwater/surface runoff.

4.3 Traffic Impact Assessment

Zutari consulting engineers conducted a separate Traffic Impact Assessment (TIA) as per the Stellenbosch Municipality's requirements (See Appendix B). The Traffic impact assessment investigated the impact on the traffic flows in the area.

Based on the assessment of future traffic conditions, all the study intersections inside Cloeteville can operate at acceptable Levels of Service. All the future scenarios continue to operate at the same Levels of Service as the background traffic scenario. This is evidence that the delay and LOS issues at the key intersections are systemic and not as a result of the introduction of the development. Minor adjustments to the R304 intersection can improve the LOS for all approaches. But the intersection of R44 and Hendrickse Road currently experiences severe delays that require attention.

In summary, the following upgrades are recommended:

- The R44 x Hendrickse intersection requires immediate attention from the Municipality and/or the Western Cape Government, regardless of the proposed development. It has been demonstrated that minor changes to the signal phasing can have a positive impact on the overall Levels of Service but cannot resolve the poor Level of Service on the Hendrickse approach.
- An option for consideration is providing another signalised intersection at Fir Road which is currently two-way stop controlled. Providing another signalised access for Cloeteville will help distribute traffic and alleviate the pressure at Hendrickse Road.
- The lane configuration at R304 x Welgevonden intersection is not optimal for the volumes of traffic modelled in this report. This report proposes a change in the intersection configuration that can be accommodated in the existing roadway through a "line marking exercise". Though it should be highlighted and stressed that in the light of future development in the area and the natural growth in traffic, the intersection will need to be upgraded.
- Should there be an increase in delays experienced at the Hendrickse x Williams intersection, the Municipality can consider converting it to a two way stop control intersection. The modelling indicates an improved LOS because of the significantly high volumes of traffic on Hendrickse Road compared to Williams Road.
- An increase in pedestrian activity is expected, consideration must be given to expanding the provision of sidewalks along Hendrickse Road and Gabriels Road to link with Lang Street which is the main route for public transport within Cloeteville.

5 POTABLE WATER SUPPLY

5.1 Impact on bulk water capacity

GLS Consulting engineers were approached to comment on the service integration and impact on the bulk supply network of Cloeteville housing development. This section should be read in conjunction with the Water Master Plan (performed for the Stellenbosch Municipality) dated June 2023.

5.1.1 Network capacity

Cloeteville is currently supplied with water from the existing 2.8 ML Cloeteville Reservoir and 50 kl Cloeteville Tower. There is insufficient capacity in the existing water reticulation system to accommodate the proposed development.

The following bulk network upgrades will be required:

- New 7.0 ML Reservoir top water level at 188.0m;
- Upgrading of existing pumps from the reservoir to the water tower;

- Upgrading of existing pumps from the Idas Valley reservoir to Uniepark Reservoir which feeds the existing Cloetesville reservoir.

5.2 Water demand calculation

The potable water demand for the proposed development was calculated based on The Redbook, which recommends 0.40 kl/day/unit for high density group housing with an erf size between 130m² and 200m², 0.45 kl/day/unit for medium density group housing with a size between 200m² and 270m² and 0.3 kl/day/unit for low-income housing high density erven above 270m². The potable water calculations are shown in Table 1 below.

Table 1: Potable water demand calculation

POTABLE WATER DEMAND CALCULATIONS				PROJECT: Erf 7001 Cloetesville				
 IMPACT. ENGINEERED.				Project no:		1001918		
				Calculated by:		E. Jordaan	Rev:	0
				Checked by:		C van der Walt	Date:	2023/11/28
ANNUAL AVERAGE DAILY WATER DEMAND SCHEDULE								
Item no	Land use description	Amount of Units		Unit area (sqm)	Water demand rate per day		TOTAL DEMAND (l/d)	
		Qty	type		Rate per unit:	Rate by Area:		
					litre per unit	litre per sqm.		
	Residential							
1	Conventional Residential Zone Stands	168	units	130 - 200	400		67,200	
2	Conventional Residential Zone Stands	10	units	200- 270	450		4,500	
3	Conventional Residential Zone Stands	25	units	270 -400	300		7,500	
						Subtotal 1	79,200	
						Plus 10% losses	7,920	
						Subtotal 2	87,120	
GENERAL NOTES:				WATER UTILIZATION SUMMARY				
				TOTAL ANNUAL AVERAGE DAILY WATER DEMAND (l/d)			87,120	
				PEAK FLOW CONDITIONS:				
				Fire Fighting Flow Rate (l/s):			15	
				Instantaneous Peak Factor:			4.6	
				Instantaneous Peak Flow, Incl fire (l/s):			20	

From Table 1 it can be concluded that the potable water Annual Average Daily Demand (AADD) for the proposed development is 87,12 kl/d and the instantaneous peak flow is 20 l/s.

5.3 Internal reticulation

Regarding the water demand calculations in the section above, the approximate reticulation network pipe size for the development was determined.

The minimum diameter required by the Municipality for potable water pipes is 100 mm (Stellenbosch Municipality, 2015). Therefore, the proposed development was modelled with a 110mm diameter pipe network. For modelling, a 40 m pressure head was assumed at the connection point. Consequently, it was found that a 110 mm diameter internal reticulation network is sufficient for the development with firewater included in the potable water network.

The internal network will consist of HDPE PN12.5 PE 100 pipes which are the minimum requirement (Stellenbosch Municipality, 2015). A layout of the preliminary looped water network model is shown in Figure 3.

It is recommended that water saving mechanisms must be prescribed as part of the title deeds agreements and building guidelines, such as:

- Rainwater harvesting
- Greywater recycling

- Installation of toilets fitted with dual flush systems.
- Aerator nozzles fitted to taps and showers.
- Water-wise irrigation practices, such as the planting of indigenous plants, installation of timers.



Figure 3: Proposed water reticulation

5.4 Fire Fighting Requirements

According to The Red Book (2019), firefighting flow should be supplied at 15 l/s and 1 bar of pressure at the connection and must be available during peak instantaneous flow. For the proposed development, it is possible to allow for fire flow on the potable water line. Hydrants in the network will be spaced at a maximum of 240 m as per local authority standards (Stellenbosch Municipality, 2015). The necessary firefighting requirements will be included in the design of the development services.

6 SANITATION

6.1 Impact on bulk sewage

GLS Consulting engineers were approached to comment on the service integration and impact on the bulk supply network of Cloeteville housing development. This section should be read in conjunction with the Water Master Plan (performed for the Stellenbosch Municipality) dated June 2023.

6.1.1 Network capacity

There is sufficient capacity in the existing sewer reticulation system to accommodate the proposed development.

The following bulk network upgrades will be required:

- Upgrading of the bulk sewer line from Kayamandi to Merriman Street.

6.2 Sewage Yield Calculation

The development will typically have high density residential irrigation demands. Each conventional stand will have a small garden and grass area. Therefore, the percentage of potable water demand which will be converted to sewage yield was estimated as 90% to 95%. The calculations for daily sewage yield are shown in Table 2.

Table 2: Sewage yield calculation

SEWAGE YIELD CALCULATIONS				PROJECT:		Erf 7001 Cloetesville		
 IMPACT. ENGINEERED.				Project no:		1001918		
				Calculated by:		E. Jordaan	Rev.	0
				Checked by:		C van der Walt	Date:	2023/11/28
ANNUAL AVERAGE DAILY SEWAGE YIELD SCHEDULE								
Item no	Land use description	Amount of Units		Unit area (sqm)	Sewage yield rate per day		TOTAL YIELD (l/d)	
		Qty	type		Water demand (excl. Infiltration)	Sewer Flow % AADD		
	Residential							
1	Conventional Residential Zone Stands	168	units	130 - 200	67,200	90.00%	60480	
2	Conventional Residential Zone Stands	10	units	200- 270	4,500	90.00%	4050	
3	Conventional Residential Zone Stands	25	units	270 -400	7,500	95.00%	7125	
GENERAL NOTES:				SEWAGE YIELD SUMMARY				
		DAILY SEWAGE YIELD VOLUMES						
		Annual Average Daily Dry Weather Flow (l/d)					71,655	
		Infiltration factor (%)					15.0%	
		TOTAL ANNUAL AVERAGE DAILY WET WEATHER FLOW (l/d)					82,403	
		PEAK FLOW CONDITIONS:						
		Instantaneous Peak Factor:					2.5	
		Instantaneous Peak Dry Weather Flow (l/s)					2.07	
		Instantaneous Peak Wet Weather Flow (l/s):					2.4	

From **Error! Reference source not found.** it can be concluded that the additional annual average wet weather sewage flow yield generated by the proposed future development is 82.4 k/d. The instantaneous sewage peak flow is calculated as 2.4 l/s.

6.3 Internal Sewage Reticulation

A conventional uPVC Class 34 waterborne sewage system with a minimal diameter of 160 mm will be installed with connections to each erf. A layout of the preliminary sewer network is shown in Figure 4.

According to the Crimp & Bridges Tables the maximum capacity of a 160 mm uPVC pipe at 1:150 slope is 14.1 l/s. Considering the calculated peak sewage flow from the proposed development 2.4 l/s, a 160 mm uPVC network is sufficient.

No onsite sewage settling, or treatment will be done. All sewage will be directed towards the municipal bulk sewage network where it will be treated and discharged as per the municipal sewage management plan which has sufficient capacity to treat the raw sewage flow.

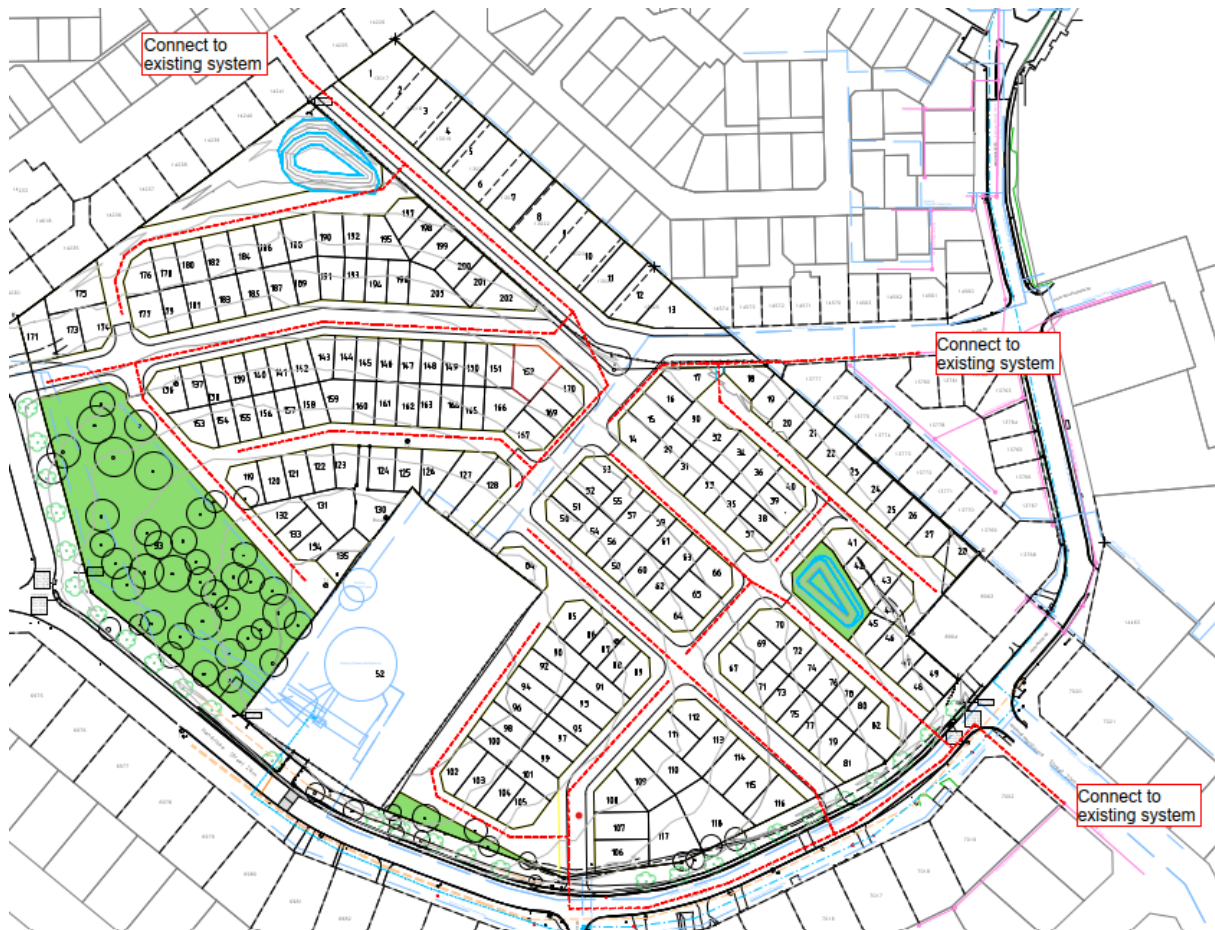


Figure 4: Proposed sewer system

7 STORMWATER MANAGEMENT

The site vegetation predominantly comprises of low grasses and scattered concentration of mature pipe trees. The in-situ soil conditions are semipermeable shales of Malmesbury Group which is mantled by residual and transported soils of various thickness. The majority of the site drains to the north where a cut-off earth channel directs the water to an existing headwall connected to the existing municipal system in the northern corner of the site. Figure 5 shows how surface water flows to the existing channels.

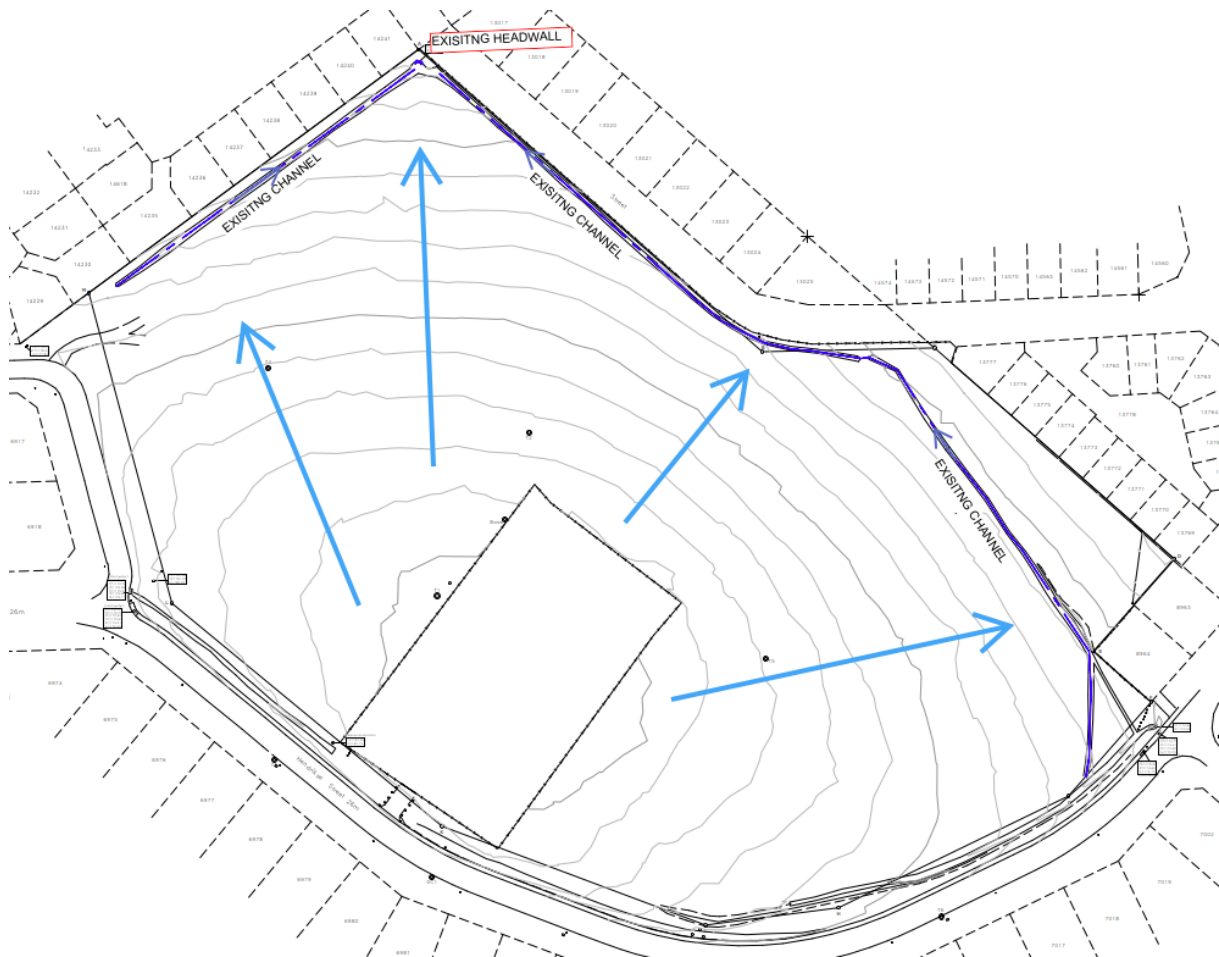


Table 3: The various RI storm events and related rainfall depths

Return Period (R) (years)	Rainfall depth (mm)
2	48.9
5	65.7
10	77.8
20	90.5
50	108.3
100	122.8
200	138.4

7.3 Pre-development Flood Run-off

The pre-development (greenfield site) stormwater runoff for various storm-events were calculated using the rational method. For the pre-development scenario, the site is considered to be in greenfield condition and all areas drain to a central point. The calculation sheet for the catchment in the pre-development model is shown in Table 4.

Table 4: Pre-development calculation sheet

FLOOD RUN-OFF CALCULATIONS		PROJECT: Cloetesville	
 IMPACT. ENGINEERED.		Project no: 1001918	
		Catchment Name: East catchment	
		Calculation Method: Rational Method	
		Calculated by: E Jordaan	
		Date: 28 November 2023	
		Checked By: Chirs van der Walt	Signed:
Date:			
Catchment characteristics			
Description of catchment		RESIDENTIAL: Pre Development for Pond 1	
Name of watercourse (if applicable)		N/A	
Physical characteristics		Meteorological characteristics	
Size of catchment (A)	0.056 km ²	Rainfall region:	
Longest watercourse (L)	0.440 km	Weather Service station	
Average slope (S _{av})	0.080 m/m	Weather Service number	
Dolomitic area (D _u)	0% %	Mean annual precipitation (MAP)	
Area distribution factors		2-year return period rainfall (M)	
Rural (α)	Urban (β)	Lakes (γ)	Days of thunder per year (R)
1	0	0.0	5 days/year
Comments:			
Catchment run-off coefficients			
Rural		Urban	
Surface slope	%	Factor	C _s
Vleis and pans	0.0%	0.03	0.000
Flat Areas	80.0%	0.08	0.064
Hilly	20.0%	0.16	0.032
Steep Areas		0.26	0.000
Total	100.0%	-	0.096
Permeability	%	Factor	C _p
Very permeable	0.0%	0.04	0.000
Permeable	45.0%	0.08	0.036
Semi-permeable	50.0%	0.16	0.080
Impermeable	5.0%	0.26	0.013
Total	100.0%	-	0.129
Vegetation	%	Factor	C _v
Thick bush and plantation	2.0%	0.04	0.001
Light bush and farm-lands	0.0%	0.11	0.000
Grasslands	93.0%	0.21	0.195
No vegetation	5.0%	0.28	0.014
Total	100.0%	-	0.210
Adjustment of run-off coefficients			
Return period (years), T	2	5	10
Rural run-off coefficient, C ₁	0.435	0.435	0.435
(C ₁ = C _s + C _p + C _v)	0.435	0.435	0.435
Adjustment of above for dolomitic areas, C _{1D}	0.435	0.435	0.435
(= C ₁ (1 - D _u) + C ₁ D _u (Σ[D _{factor} × C _s %]))	0.435	0.435	0.435
Adjustment factor for initial saturation of rural areas, F _t	0.500	0.550	0.600
Adjusted rural run-off coefficient, C _{1T}	0.218	0.239	0.261
(= C _{1D} × F _t)	0.218	0.239	0.261
Combined run-off coefficient, C _T	0.218	0.239	0.261
(= αC _{1T} + βC ₂ + γ1)	0.218	0.239	0.261
Time of concentration (T _c)			
Overland/Sheet flow	Defined watercourse	Notes:	
T _c = $\left(\frac{rL}{\sqrt{S_{av}}}\right)^{0.467}$	T _c = $\left(\frac{0.87L^2}{1000S_{av}}\right)^{0.385}$	Assume small catchment with T _c = 15minutes at least	
0.70 hours	0.25 hours		
Flood run-off: Rational method			
Return Period (years), T	2	5	10
Point rainfall (mm), P _T	13.700	18.300	21.700
Point intensity (mm/hour), P _{IT} (= P _T /T _C)	19.556	26.122	30.976
Area reduction factor (%), ARF _T	95.000%	95.000%	95.000%
Average intensity (mm/hour), I _T	18.578	24.816	29.427
(= P _{IT} × ARF _T)	18.578	24.816	29.427
Peak flow (m ³ /s)	0.063	0.092	0.120
Q _T = $\frac{C_T I_T A}{3.6}$	0.063	0.092	0.120
Flood run-off: Alternative rational method			
Return Period (years), T	2	5	10
Point rainfall (mm), P _T	13.846	23.358	30.554
Point intensity (mm/hour), P _{IT} (= P _T /T _C)	19.765	33.343	43.615
Area reduction factor (%), ARF _T	95.0%	95.0%	95.0%
Average intensity (mm/hour), I _T	18.777	31.676	41.434
(= P _{IT} × ARF _T)	18.777	31.676	41.434
Peak flow (m ³ /s)	0.064	0.118	0.168
Q _T = $\frac{C_T I_T A}{3.6}$	0.064	0.118	0.168

7.4 Post-development Flood Run-off

In line with the Red Book (CSIR, 2019) and Municipal Design Guidelines (Municipality, 2015), the proposed stormwater design will be based on restricting post-development peak flows to pre-development peak flows, for the same recurrence interval. The proposed stormwater design concept will comprise of smaller subdivided catchment areas conveying runoff generated from roads and erven

to grid inlets and ultimately into detention ponds via the stormwater network. Attenuation of the difference between the pre- and post-development peak flows will be accommodated in the two detention ponds. Catchment 1 (eastern catchment) will drain to detention pond 1 which has a volume capacity of 240m³. The area north of pond 1, is lower laying and will not be able to drain to pond 1. Instead, this area will drain to the north and connect to the existing system in Tolbos road. Pond 1 will have a variable outlet system only allowing pre-development flow rates out into the existing system connected in Hendrikse Road. Catchment 2 (western catchment) will drain to detention pond 2 which has a volume capacity of 410m³. Pond 2 will have a variable outlet system only allowing pre-development flow rates out into the existing system via the headwall in the northern corner of the site. Figure 6 illustrates the proposed stormwater network and catchment areas.

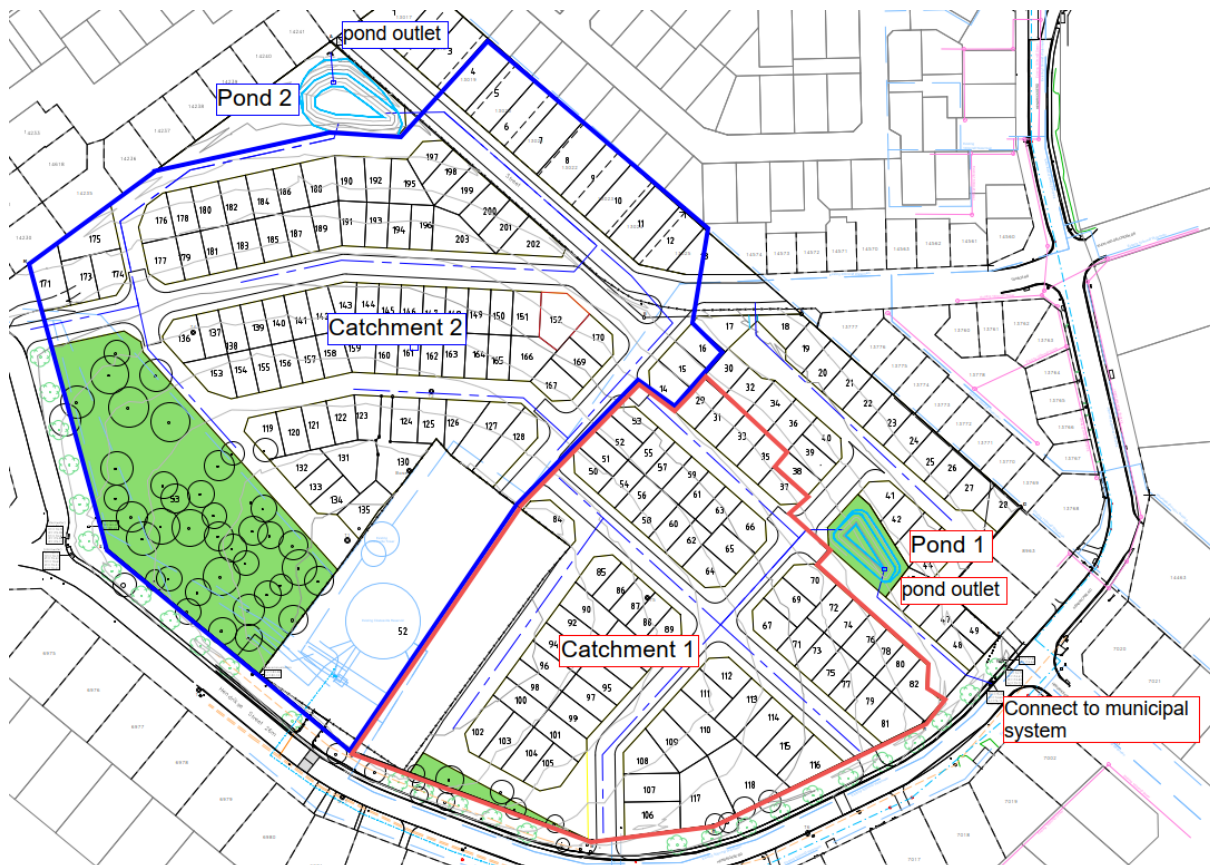


Figure 6: Proposed post-development stormwater network

The post-development stormwater runoff for various storm-events were also calculated using the rational method. For the post-development scenario, the site is considered to be developed as per the proposed sub-division plan, in Appendix A and all areas drain to detention pond 1 and detention pond two as shown in Figure 6.

The combined post-development run-off for 1:2, 1:5, 1:10, 1:20 and 1:50 years recurrence intervals for the development as calculated above is shown in Table 5.

Table 5: Combined post-development calculated peak flows

Recurrence Interval (1: years)	Peak flows		
	Pre-development (m ³ /s) Greenfield	Combined Post-development (m ³ /s) (flow into detention ponds)	Combined Post-development (m ³ /s) (outlet into the existing system)
2	0.063	0.234	0.063
5	0.092	0.394	0.092
10	0.120	0.516	0.120
20	0.155	0.638	0.155
50	0.230	0.798	0.230
100	0.236	0.920	0.236

8 ROADS

8.1 Access

A Traffic Impact Assessment (TIA) was conducted by Zutari that is attached to this report in Appendix B. Access to the Development will be via the extension of the existing road network. The layout of the roads will be done in accordance with the Guidelines for Human Settlement Planning and Design (commonly known as the Red Book) and the Stellenbosch Zoning Scheme. Bulk external road upgrades required will be implemented as per the findings of the TIA.

8.2 Internal roads

The internal road network will have a paved surface as per town planner's details. All civil services will be within the 13.5m to 8m road reserves.

Emphasis will be placed on traffic calming and low speeds by implementing an appropriate geometric road design philosophy. The roads shall have a 2.5% cross fall towards a paved stormwater channel.

Emergency services such as firefighting services and waste removal vehicles would be supplied by the Municipality. All roads will be designed and constructed to accommodate light vehicles as well as occasional usage by heavy vehicles such as fire trucks or delivery trucks.

8.3 Parking Facilities

Visitor and general parking areas will be provided along roads within the development as indicated in the TIA. Parking on the erven will be specified by the town planner as required for each house type.

9 Electrical Services

De Villiers and Moore (Pty) Ltd was appointed to investigate on the capacity availability in the existing system as well as electrical supply required for the proposed development. De Villiers and Moore reported that there is sufficient capacity in the existing system to accommodate the proposed development.

The provisional load-calculations indicate that 2 x miniature substations will be required to supply the calculated low-voltage load. The exact positions cannot be fixed now but will be in the vicinity of the 2 x blue blocks included on the drawing in Figure 7.

The minisubs will not require separate erven to be registered. We indicated one in the remaining POS-area, and the other in the water-reservoir area (can also be moved to the road-reserve outside the reservoir area). Each minisub position will be 6x4m dedicated for the minisub. Refer to Appendix C for the full report.



Figure 7: Proposed electrical mini substation positions

10 Solid Waste Disposal

All waste generated from the residential units of the proposed development, will be temporarily stored in storage bins. The municipality will collect all bins from an appropriate refuse areas or individual erven on the transport it to a Waste Disposal Site as determined by the Municipality. The position of the refuse areas (if applicable will be placed at a practical area with easy access for the Municipal Solid Waste Disposal Trucks of the Municipality. No access control will be used in the development. Stellenbosch Municipality has sufficient capacity available for the development.

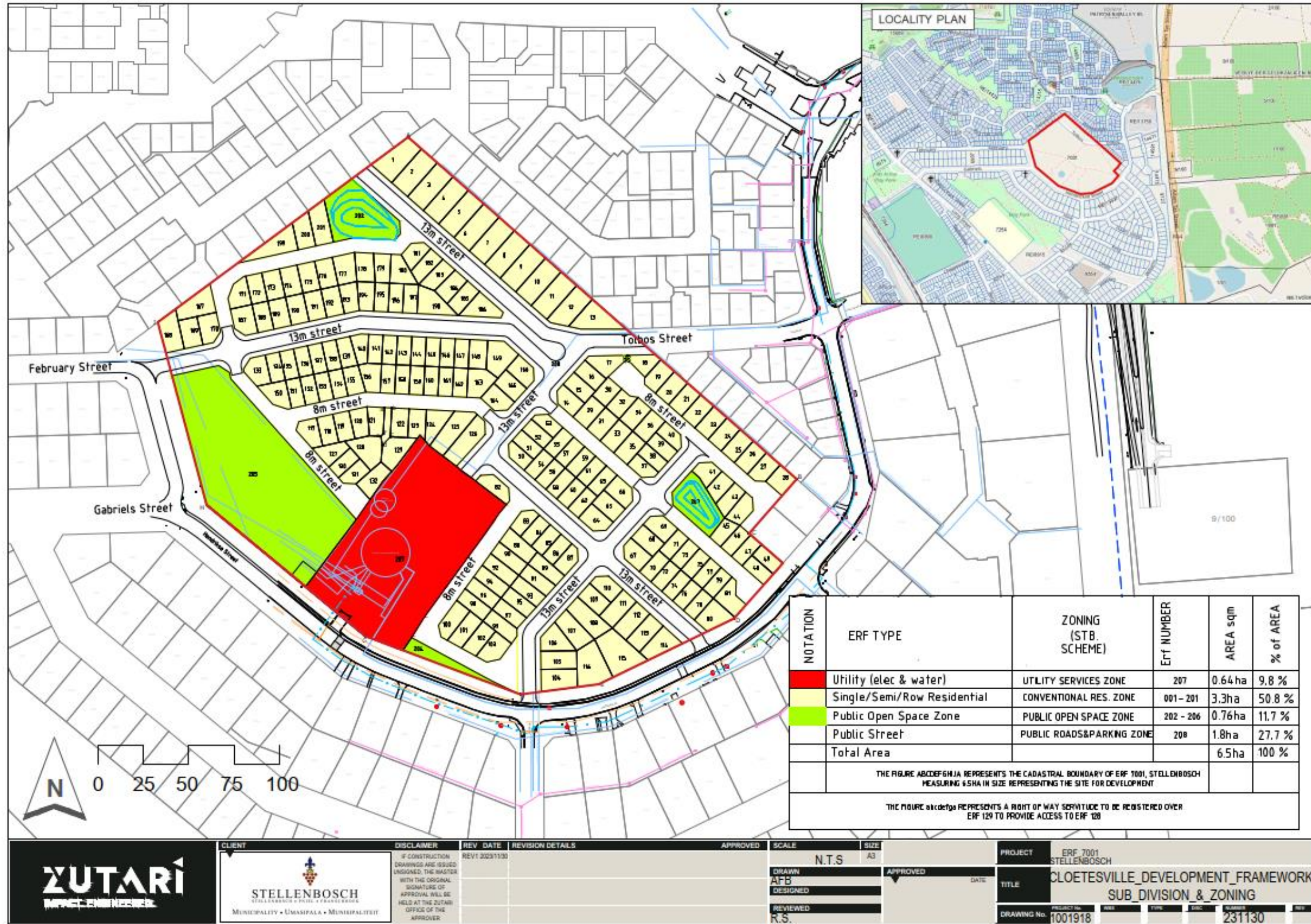
11 Conclusion

No major issues are foreseen for the proposed development in terms of engineering services. Ample capacity is available for all civil services, given proposed upgrades are facilitated ahead of construction. Detail design will identify and address all other minor issues such as exact connection points and other construction details.

12 Bibliography

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- Stellenbosch Municipality. (2015). *SM Design Guidelines and Standard Details Rev 0_June 2015*. Stellenbosch, Western Cape: Stellenbosch Municipality - Department: ENGINEERING SERVICES DIRECTORATE.

Appendix A: Subdivision and Zoning Plan



Appendix B: Traffic Impact Assessment

Appendix C: Electrical Services Report

In diversity there is beauty and there is strength.

MAYA ANGELOU

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ELECTRICAL SERVICES REPORT FOR ERF-7001, CLOETESVILLE, STELLENBOSCH



NOVEMBER 2023 : REVISION 0

Submitted By: **Wessel Badenhorst**
De Villiers & Moore (Pty) Ltd
(021) 976 3087
Project No: R5244R
Reference : 7555



de villiers & moore
Consulting Engineers
Electrical, Mechanical, Fire

SERVICES REPORT FOR THE ELECTRICAL SERVICES ERF-7001, CLOETESVILLE, STELLENBOSCH

1. SERVICES REPORT

This report must be read in conjunction with the drawing 1001918-231108 (see figure 1). The property is situated in Cloetesville, Stellenbosch, adjacent to existing built-up areas. The land will be developed as residential accommodation.



Figure 1: Proposed Site Layout

1.1 Purpose of this report

- Consolidate the principles, concepts and specific requirements of the client
- Provide the basic information parameters of existing electrical services
- Confirm availability of services for the proposed development

2. ELECTRICAL SUPPLY

The Electrical Supply Authority for the area is Stellenbosch Municipality.

The estimated load for the development is : **Total - 694kVA** at 11kV-level

We communicated with Stellenbosch Municipality re the existing services in the area, especially the bulk services utilized in the surrounding areas, that is already developed.

We did not receive any feedback from the municipality.

We also contacted Lyners Engineers, who do all the masterplan designs and development for the municipality. **Lyners confirmed that the network in the area will have sufficient capacity for the development of Erf-7001, as indicated above.**

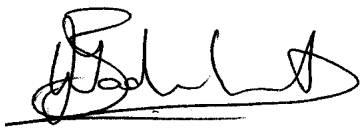
3. MINIATURE SUBSTATIONS

The provisional load-calculations indicate that 2 x miniature substations will be required to supply the calculated low-voltage load. The exact positions can not be fixed now, but will be in the vicinity of the 2 x blue blocks included on the drawing in figure-1.

The minisubs will not require separate erven to be registered. We indicated one in the remaining POS-area, and the other in the water-reservoir area (can also be moved to the road-reserve outside the reservoir area).

Each minisub position will be 6x4m dedicated for the minisub.

Regards



WESSEL BADENHORST

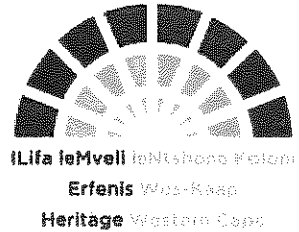
PROFESSIONAL TECHNOLOGIST

Director



Tel: 021 976 3087 | Cell: 082 854 4474 | E-mail: wessel@devmoore.co.za
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7001
Cloeteville



REGISTERED POST

Our Ref: HM/ CAPE WINELANDS / STELLENBOSCH / ERF 7001
Case No.: 19011611SB0118E
Enquiries: Stephanie-Anne Barnardt
E-mail: stephanie.barnardt@westerncape.gov.za
Tel: 021 483 9689
Date: 31 January 2019

Guillaume Nel
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Paarl
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gn@anec.co.za , carina@anec.co.za

RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP: FINAL
In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape
Provincial Gazette 6061, Notice 298 of 2003

NOTIFICATION OF INTENT TO DEVELOP: PROPOSED RESIDENTIAL DEVELOPMENT ON ERF 7001, CLOETESVILLE, STELLENBOSCH, SUBMITTED IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

CASE NUMBER: 19011611SB0118E

The matter above has reference.

Heritage Western Cape is in receipt of your application for the above matter received on 18 January 2019. This matter was discussed at the Heritage Officers meeting held on 28 January 2019.

You are hereby notified that, since there is no reason to believe that the proposed residential development, **will not impact** on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.

However, should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately and Heritage Western Cape must be notified without delay.

This letter does not exonerate the applicant from obtaining any necessary approval from any other applicable statutory authority.

HWC reserves the right to request additional information as required.

Should you have any further queries, please contact the official above and quote the case number.

Yours faithfully

Dr. Mxolisi Dlamuka
Chief Executive Officer, Heritage Western Cape

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Engineering Services Report

A Broad Conceptual Urban Design Framework for Erf 7001, Cloetesville

Stellenbosch Municipality

Submission date: 2023/11/30

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1 INTRODUCTION

Stellenbosch Municipality has undertaken the task to appoint an experienced and professional consultant to undertake a Broad Conceptual Urban Design Framework for Erf 7001, Stellenbosch and to obtain town planning and development rights. Zutari was selected to be the lead consultant for this multidisciplinary project.

The main objective of the project is to undertake a Broad Conceptual Urban Design framework for Erf 7001, Cloetesville, Stellenbosch, and to obtain town planning and development rights. The Stellenbosch Municipality identified a need for integrated urban settlement developments to address municipal housing backlogs. Erf 7001, Cloetesville was identified as a suitable site for such a development.

The project aims to facilitate a sustainable integrated development including medium to upper income housing units (GAP) that will address housing needs in Cloetesville and ensure social and economic sustainability of the inhabitants of Cloetesville and beneficiaries as defined by the Stellenbosch Municipality.

2 Purpose of this report

This report addresses the needs of Stellenbosch Municipality regarding the provision of engineering services for the Cloetesville Housing Development Project. The infrastructure design of the development is based on technical requirements and guidelines as stated in the Design Guidelines and Minimum Standards for Civil Engineering Services (Stellenbosch Municipality, 2015) and the general subdivision/rezoning conditions. Additionally, design considerations are also based on the Guidelines for Human Settlement Planning and Design (Department of Human Settlements , 2019) and the Drainage Manual 6th Edition (SANRAL, 2013).

The level of service for the proposed infrastructure will be to the accepted standard associated with that of the various proposed housing topologies as per the architect's details.

This services report has been compiled based on the following available information:

- The latest Site Development Plan (SDP);
- Traffic Impact Assessment (TIA);
- Electrical Services Report.

3 Site locality and description

Erf 7001 is located in Ward 17 in Cloetesville, Stellenbosch. The Ward is a predominantly residential ward which includes a part of Cloetesville as well as Welgevonden, Green Oaks, Stellita Park, Weltevrede and the Municipal Flats in Rhode, Kloof and Long Streets as shown in Figure 1 below. The ward is bordered by the R44 Klappmuts road, Lakey and Long streets. The site is located west of the R44. It is in close proximity to a primary school and local sports ground. Erf 7001 is characterised by numerous trees.

The site slopes to the North and North East boundary at an average gradient of 6% - 8%. The highest point is at the existing reservoir erf at an elevation of 185.5m MAMSL. The lowest point is at the centre of the Western boundary at an elevation of 173m MAMSL.

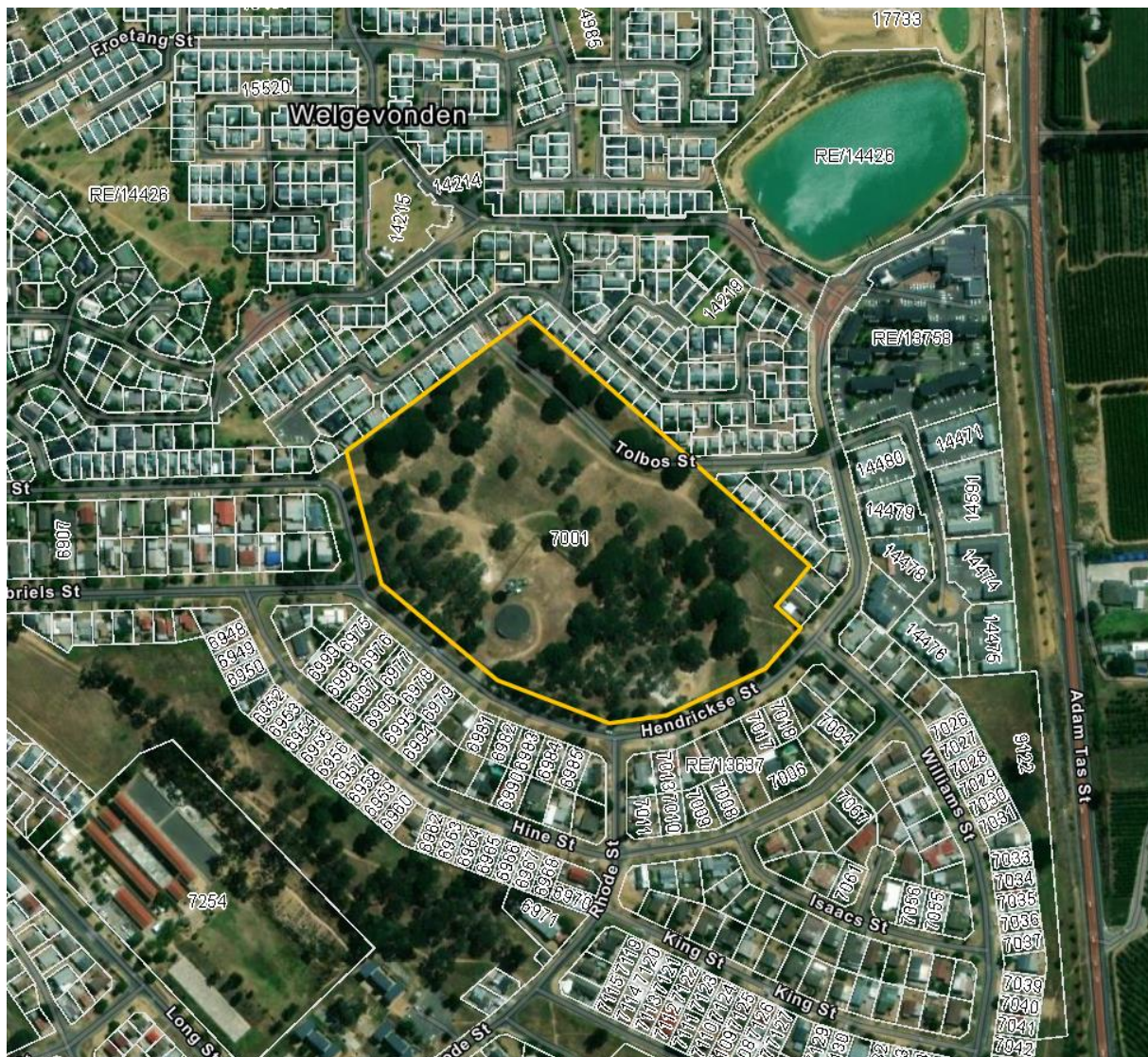


Figure 1: Erf 7001 Locality Map

4 Description of the proposed development

4.1 Proposed development

The proposed Cloetesville Housing Development comprises the following land uses:

- 203 Conventional single Residential Zone stands;
- Public Roads.

Please refer to Figure 2 which illustrates the subdivision and zoning plan. The erven size ranges from 115m² to 159m² and from 160m² to 200 m² for single residential units.



Figure 2: Cloetesville Housing Development Proposed Subdivision Plan

4.2 Geotechnical investigation

Kantey and Templer Consulting was appointed by Stellenbosch Municipality to prepare a geotechnical report for Erf 7001 for the proposed development.

Erf 7001 Cloetesville has been identified for possible residential development which comprises GAP housing (dwellings) located in terrain composed of and underlain at shallow depth by shales of the Tygerberg Formation, Malmesbury Group.

The subsoil profile, in general, is composed of naturally transported surficial soils which are resting on residual material a underlain by weathered shales.

Conditions for the use of conventional foundations at shallow depth are considered favourable classifying as 'S' in terms of the NHBRC site class designation. Accordingly, founding options allow for conventional strip and slab-on-ground foundations.

Groundwater conditions are considered favourable with a perched water table developing during periods of high rainfall. Given the steep topography of the bulk of the site, erosion associated with surface runoff can be expected.

Development costs may need to be increased due to:

- the non-availability of materials suitable for re-use on site;
- the unfavourable subgrade conditions;
- the need for measures to control the shallow presence of groundwater/surface runoff.

4.3 Traffic Impact Assessment

Zutari consulting engineers conducted a separate Traffic Impact Assessment (TIA) as per the Stellenbosch Municipality's requirements (See Appendix B). The Traffic impact assessment investigated the impact on the traffic flows in the area.

Based on the assessment of future traffic conditions, all the study intersections inside Cloeteville can operate at acceptable Levels of Service. All the future scenarios continue to operate at the same Levels of Service as the background traffic scenario. This is evidence that the delay and LOS issues at the key intersections are systemic and not as a result of the introduction of the development. Minor adjustments to the R304 intersection can improve the LOS for all approaches. But the intersection of R44 and Hendrickse Road currently experiences severe delays that require attention.

In summary, the following upgrades are recommended:

- The R44 x Hendrickse intersection requires immediate attention from the Municipality and/or the Western Cape Government, regardless of the proposed development. It has been demonstrated that minor changes to the signal phasing can have a positive impact on the overall Levels of Service but cannot resolve the poor Level of Service on the Hendrickse approach.
- An option for consideration is providing another signalised intersection at Fir Road which is currently two-way stop controlled. Providing another signalised access for Cloeteville will help distribute traffic and alleviate the pressure at Hendrickse Road.
- The lane configuration at R304 x Welgevonden intersection is not optimal for the volumes of traffic modelled in this report. This report proposes a change in the intersection configuration that can be accommodated in the existing roadway through a "line marking exercise". Though it should be highlighted and stressed that in the light of future development in the area and the natural growth in traffic, the intersection will need to be upgraded.
- Should there be an increase in delays experienced at the Hendrickse x Williams intersection, the Municipality can consider converting it to a two way stop control intersection. The modelling indicates an improved LOS because of the significantly high volumes of traffic on Hendrickse Road compared to Williams Road.
- An increase in pedestrian activity is expected, consideration must be given to expanding the provision of sidewalks along Hendrickse Road and Gabriels Road to link with Lang Street which is the main route for public transport within Cloeteville.

5 POTABLE WATER SUPPLY

5.1 Impact on bulk water capacity

GLS Consulting engineers were approached to comment on the service integration and impact on the bulk supply network of Cloeteville housing development. This section should be read in conjunction with the Water Master Plan (performed for the Stellenbosch Municipality) dated June 2023.

5.1.1 Network capacity

Cloeteville is currently supplied with water from the existing 2.8 ML Cloeteville Reservoir and 50 kl Cloeteville Tower. There is insufficient capacity in the existing water reticulation system to accommodate the proposed development.

The following bulk network upgrades will be required:

- New 7.0 ML Reservoir top water level at 188.0m;
- Upgrading of existing pumps from the reservoir to the water tower;

- Upgrading of existing pumps from the Idas Valley reservoir to Uniepark Reservoir which feeds the existing Cloetesville reservoir.

5.2 Water demand calculation

The potable water demand for the proposed development was calculated based on The Redbook, which recommends 0.40 kl/day/unit for high density group housing with an erf size between 130m² and 200m², 0.45 kl/day/unit for medium density group housing with a size between 200m² and 270m² and 0.3 kl/day/unit for low-income housing high density erven above 270m². The potable water calculations are shown in Table 1 below.

Table 1: Potable water demand calculation

POTABLE WATER DEMAND CALCULATIONS				PROJECT: Erf 7001 Cloetesville				
 IMPACT. ENGINEERED.				Project no:		1001918		
				Calculated by:		E. Jordaan	Rev:	0
				Checked by:		C van der Walt	Date:	2023/11/28
ANNUAL AVERAGE DAILY WATER DEMAND SCHEDULE								
Item no	Land use description	Amount of Units		Unit area (sqm)	Water demand rate per day		TOTAL DEMAND (l/d)	
		Qty	type		Rate per unit: litre per unit	Rate by Area: litre per sqm.		
	Residential							
1	Conventional Residential Zone Stands	168	units	130 - 200	400		67,200	
2	Conventional Residential Zone Stands	10	units	200- 270	450		4,500	
3	Conventional Residential Zone Stands	25	units	270 -400	300		7,500	
						Subtotal 1	79,200	
						Plus 10% losses	7,920	
						Subtotal 2	87,120	
GENERAL NOTES:				WATER UTILIZATION SUMMARY				
				TOTAL ANNUAL AVERAGE DAILY WATER DEMAND (l/d)			87,120	
				PEAK FLOW CONDITIONS:				
				Fire Fighting Flow Rate (l/s):			15	
				Instantaneous Peak Factor:			4.6	
				Instantaneous Peak Flow, Incl fire (l/s):			20	

From Table 1 it can be concluded that the potable water Annual Average Daily Demand (AADD) for the proposed development is 87,12 kl/d and the instantaneous peak flow is 20 l/s.

5.3 Internal reticulation

Regarding the water demand calculations in the section above, the approximate reticulation network pipe size for the development was determined.

The minimum diameter required by the Municipality for potable water pipes is 100 mm (Stellenbosch Municipality, 2015). Therefore, the proposed development was modelled with a 110mm diameter pipe network. For modelling, a 40 m pressure head was assumed at the connection point. Consequently, it was found that a 110 mm diameter internal reticulation network is sufficient for the development with firewater included in the potable water network.

The internal network will consist of HDPE PN12.5 PE 100 pipes which are the minimum requirement (Stellenbosch Municipality, 2015). A layout of the preliminary looped water network model is shown in Figure 3.

It is recommended that water saving mechanisms must be prescribed as part of the title deeds agreements and building guidelines, such as:

- Rainwater harvesting
- Greywater recycling

- Installation of toilets fitted with dual flush systems.
- Aerator nozzles fitted to taps and showers.
- Water-wise irrigation practices, such as the planting of indigenous plants, installation of timers.



Figure 3: Proposed water reticulation

5.4 Fire Fighting Requirements

According to The Red Book (2019), firefighting flow should be supplied at 15 l/s and 1 bar of pressure at the connection and must be available during peak instantaneous flow. For the proposed development, it is possible to allow for fire flow on the potable water line. Hydrants in the network will be spaced at a maximum of 240 m as per local authority standards (Stellenbosch Municipality, 2015). The necessary firefighting requirements will be included in the design of the development services.

6 SANITATION

6.1 Impact on bulk sewage

GLS Consulting engineers were approached to comment on the service integration and impact on the bulk supply network of Cloeteville housing development. This section should be read in conjunction with the Water Master Plan (performed for the Stellenbosch Municipality) dated June 2023.

6.1.1 Network capacity

There is sufficient capacity in the existing sewer reticulation system to accommodate the proposed development.

The following bulk network upgrades will be required:

- Upgrading of the bulk sewer line from Kayamandi to Merriman Street.

6.2 Sewage Yield Calculation

The development will typically have high density residential irrigation demands. Each conventional stand will have a small garden and grass area. Therefore, the percentage of potable water demand which will be converted to sewage yield was estimated as 90% to 95%. The calculations for daily sewage yield are shown in Table 2.

Table 2: Sewage yield calculation

SEWAGE YIELD CALCULATIONS				PROJECT: Erf 7001 Cloetesville			
 IMPACT. ENGINEERED.				Project no: 1001918			
				Calculated by: E. Jordaan		Rev.	0
				Checked by: C van der Walt		Date:	2023/11/28
ANNUAL AVERAGE DAILY SEWAGE YIELD SCHEDULE							
Item no	Land use description	Amount of Units		Unit area (sqm)	Sewage yield rate per day		TOTAL YIELD (l/d)
		Qty	type		Water demand (excl. Infiltration)	Sewer Flow % AADD	
	Residential						
1	Conventional Residential Zone Stands	168	units	130 - 200	67,200	90.00%	60480
2	Conventional Residential Zone Stands	10	units	200- 270	4,500	90.00%	4050
3	Conventional Residential Zone Stands	25	units	270 -400	7,500	95.00%	7125
GENERAL NOTES:				SEWAGE YIELD SUMMARY			
				DAILY SEWAGE YIELD VOLUMES			
				Annual Average Daily Dry Weather Flow (l/d)			71,655
				Infiltration factor (%)			15.0%
				TOTAL ANNUAL AVERAGE DAILY WET WEATHER FLOW (l/d)			82,403
				PEAK FLOW CONDITIONS:			
				Instantaneous Peak Factor:			2.5
				Instantaneous Peak Dry Weather Flow (l/s)			2.07
				Instantaneous Peak Wet Weather Flow (l/s):			2.4

From **Error! Reference source not found.** it can be concluded that the additional annual average wet weather sewage flow yield generated by the proposed future development is 82.4 k/d. The instantaneous sewage peak flow is calculated as 2.4 l/s.

6.3 Internal Sewage Reticulation

A conventional uPVC Class 34 waterborne sewage system with a minimal diameter of 160 mm will be installed with connections to each erf. A layout of the preliminary sewer network is shown in Figure 4.

According to the Crimp & Bridges Tables the maximum capacity of a 160 mm uPVC pipe at 1:150 slope is 14.1 l/s. Considering the calculated peak sewage flow from the proposed development 2.4 l/s, a 160 mm uPVC network is sufficient.

No onsite sewage settling, or treatment will be done. All sewage will be directed towards the municipal bulk sewage network where it will be treated and discharged as per the municipal sewage management plan which has sufficient capacity to treat the raw sewage flow.

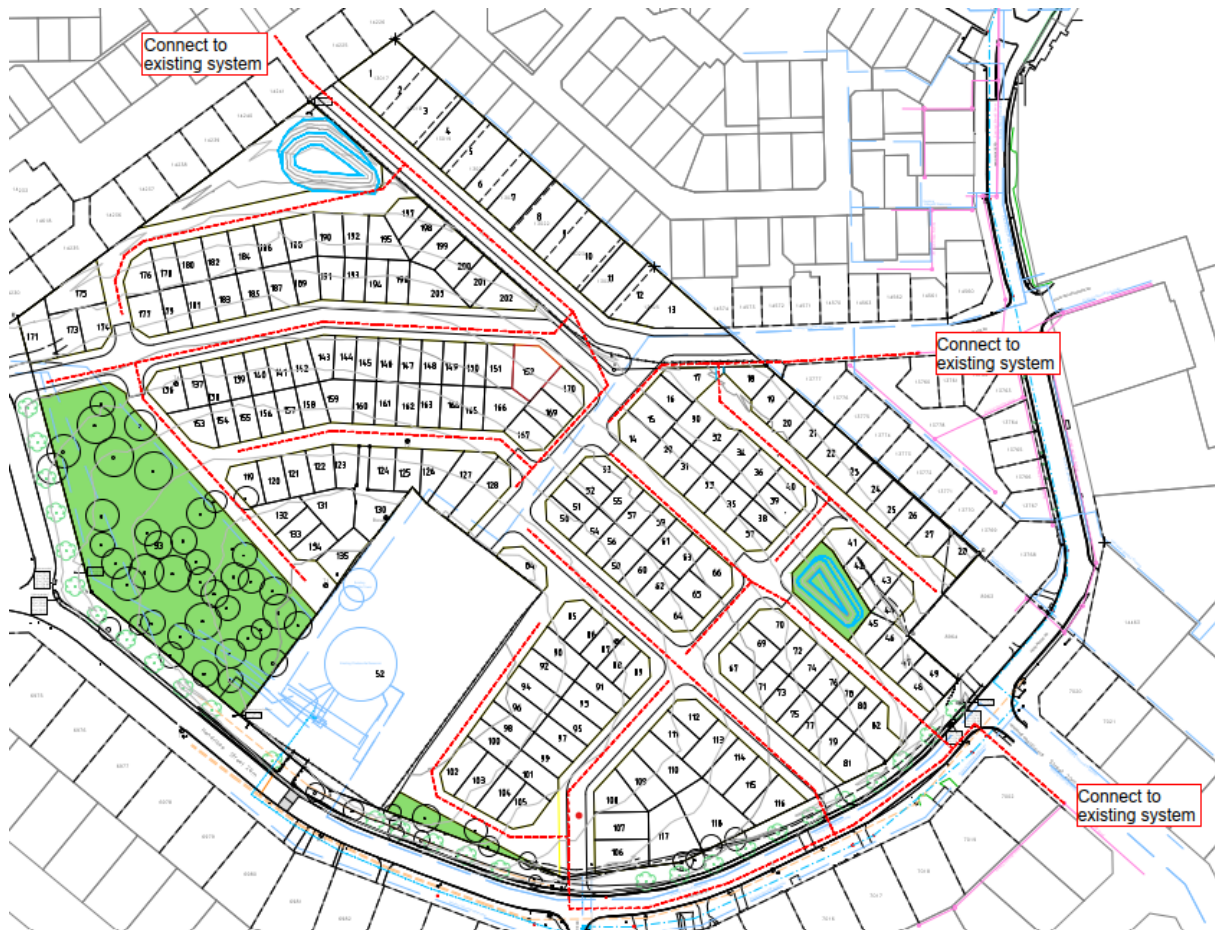


Figure 4: Proposed sewer system

7 STORMWATER MANAGEMENT

The site vegetation predominantly comprises of low grasses and scattered concentration of mature pipe trees. The in-situ soil conditions are semipermeable shales of Malmesbury Group which is mantled by residual and transported soils of various thickness. The majority of the site drains to the north where a cut-off earth channel directs the water to an existing headwall connected to the existing municipal system in the northern corner of the site. Figure 5 shows how surface water flows to the existing channels.

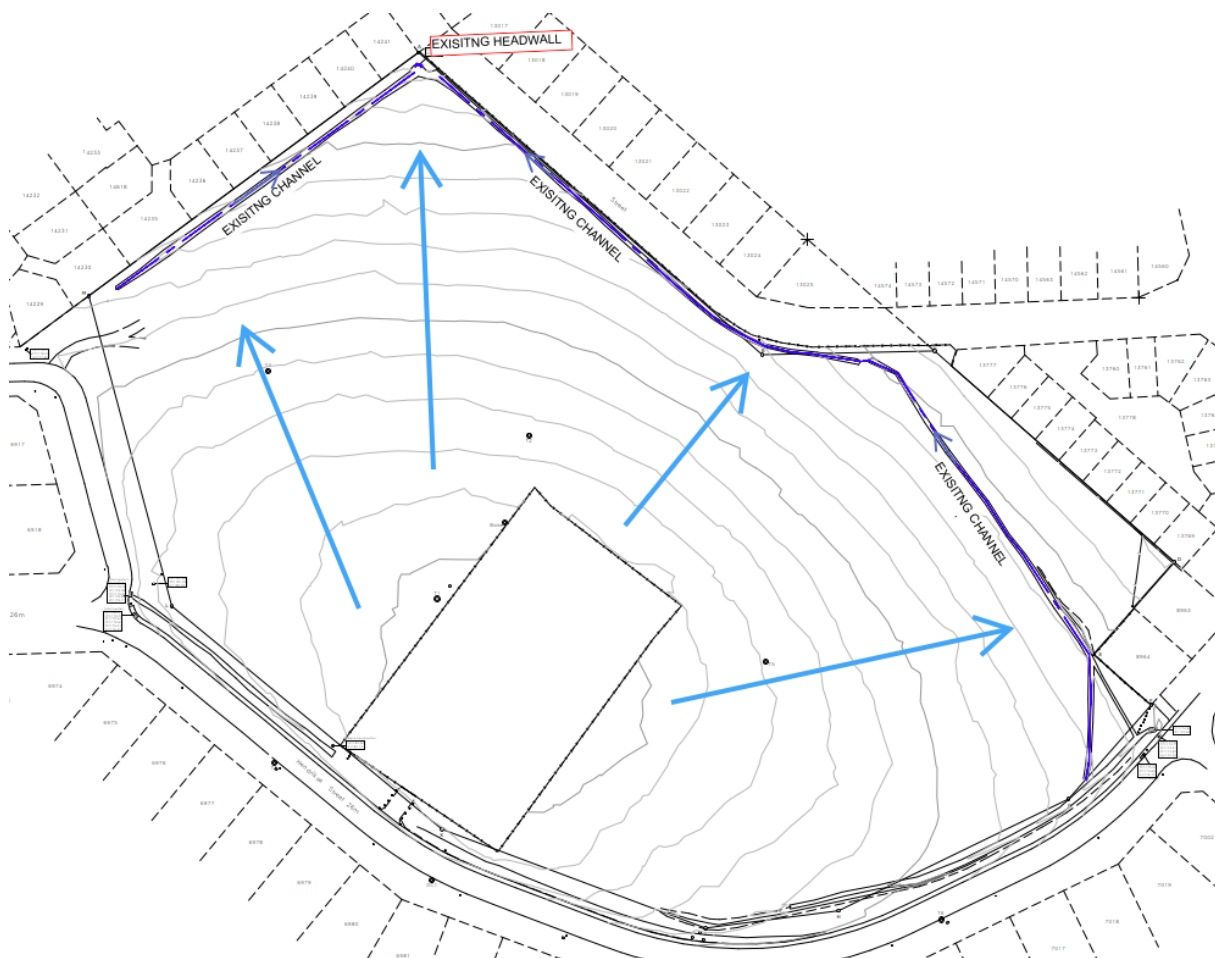


Table 3: The various RI storm events and related rainfall depths

Return Period (R) (years)	Rainfall depth (mm)
2	48.9
5	65.7
10	77.8
20	90.5
50	108.3
100	122.8
200	138.4

7.3 Pre-development Flood Run-off

The pre-development (greenfield site) stormwater runoff for various storm-events were calculated using the rational method. For the pre-development scenario, the site is considered to be in greenfield condition and all areas drain to a central point. The calculation sheet for the catchment in the pre-development model is shown in Table 4.

Table 4: Pre-development calculation sheet

FLOOD RUN-OFF CALCULATIONS		PROJECT: Cloetesville	
 IMPACT. ENGINEERED.		Project no: 1001918	
		Catchment Name: East catchment	
		Calculation Method: Rational Method	
		Calculated by: E Jordaan	
		Date: 28 November 2023	
		Checked By: Chirs van der Walt	Signed:
Date:			
Catchment characteristics			
Description of catchment		RESIDENTIAL: Pre Development for Pond 1	
Name of watercourse (if applicable)		N/A	
Physical characteristics		Meteorological characteristics	
Size of catchment (A)	0.056 km ²	Rainfall region:	
Longest watercourse (L)	0.440 km	Weather Service station	
Average slope (S _{av})	0.080 m/m	Weather Service number	LONG: 33°54' LAT:18°5
Dolomitic area (D _u)	0% %	Mean annual precipitation (MAP)	653 mm
Area distribution factors		2-year return period rainfall (M)	
Rural (α)	Urban (β)	Lakes (γ)	48.9
1	0	0.0	5 days/year
Comments:			
Catchment run-off coefficients			
Rural		Urban	
Surface slope	% Factor C _s	Description	% Factor C _s
Vleis and pans	0.0% 0.03 0.000	Lawns in sandy soil, flat grade(<2%)	0.10 0.000
Flat Areas	80.0% 0.08 0.064	Lawns in sandy soil, steep grade(>7%)	0.20 0.000
Hilly	20.0% 0.16 0.032	Lawns in heavy soil, flat grade(<2%)	0.17 0.000
Steep Areas	0.26 0.000	Lawns in heavy soil, steep grade(>7%)	0.35 0.000
Total	100.0% - 0.096	Residential: Houses	0.00% 0.50 0.000
Permeability	% Factor C _p	Residential: Flats	0.70 0.000
Very permeable	0.0% 0.04 0.000	Light industry	0.80 0.000
Permeable	45.0% 0.08 0.036	Heavy industry	0.90 0.000
Semi-permeable	50.0% 0.16 0.080	Business complexes in the city centre	0.95 0.000
Impermeable	5.0% 0.26 0.013	Business complexes in suburban areas	0.70 0.000
Total	100.0% - 0.129	Street area	0.95 0.000
Vegetation	% Factor C _v	Maximum Flood	1.00 0.000
Thick bush and plantation	2.0% 0.04 0.001	Total (C ₂)	0.00% - 0
Light bush and farm-lands	0.0% 0.11 0.000	Notes:	
Grasslands	93.0% 0.21 0.195		
No vegetation	5.0% 0.28 0.014		
Total	100.0% - 0.210		
Adjustment of run-off coefficients			
Return period (years), T	2	5	10
Rural run-off coefficient, C ₁	0.435	0.435	0.435
(C ₁ = C _s + C _p + C _v)			
Adjustment of above for dolomitic areas, C _{1D}	0.435	0.435	0.435
(= C ₁ (1 - D _u) + C ₁ D _u (Σ[D _{factor} × C _s %]))			
Adjustment factor for initial saturation of rural areas, F _t	0.500	0.550	0.600
Adjusted rural run-off coefficient, C _{1T}	0.218	0.239	0.261
(= C _{1D} × F _t)			
Combined run-off coefficient, C _T	0.218	0.239	0.261
(= αC _{1T} + βC ₂ + γ1)			
Time of concentration (T _c)			
Overland/Sheet flow	Defined watercourse	Notes:	
T _c = ($\frac{rL}{\sqrt{S_{av}}}$) ^{0.467}	T _c = ($\frac{0.87L^2}{1000S_{av}}$) ^{0.385}	Assume small catchment with T _c = 15minutes at least	
0.70 hours	0.25 hours		
Flood run-off: Rational method			
Return Period (years), T	2	5	10
Point rainfall (mm), P _T	13.700	18.300	21.700
Point intensity (mm/hour), P _{IT} (= P _T /T _C)	19.556	26.122	30.976
Area reduction factor (%), ARF _T	95.000%	95.000%	95.000%
Average intensity (mm/hour), I _T	18.578	24.816	29.427
(= P _{IT} × ARF _T)			
Peak flow (m ³ /s)	0.063	0.092	0.120
Q _T = $\frac{C_T I_T A}{3.6}$			
Flood run-off: Alternative rational method			
Return Period (years), T	2	5	10
Point rainfall (mm), P _T	13.846	23.358	30.554
Point intensity (mm/hour), P _{IT} (= P _T /T _C)	19.765	33.343	43.615
Area reduction factor (%), ARF _T	95.0%	95.0%	95.0%
Average intensity (mm/hour), I _T	18.777	31.676	41.434
(= P _{IT} × ARF _T)			
Peak flow (m ³ /s)	0.064	0.118	0.168
Q _T = $\frac{C_T I_T A}{3.6}$			

7.4 Post-development Flood Run-off

In line with the Red Book (CSIR, 2019) and Municipal Design Guidelines (Municipality, 2015), the proposed stormwater design will be based on restricting post-development peak flows to pre-development peak flows, for the same recurrence interval. The proposed stormwater design concept will comprise of smaller subdivided catchment areas conveying runoff generated from roads and erven

to grid inlets and ultimately into detention ponds via the stormwater network. Attenuation of the difference between the pre- and post-development peak flows will be accommodated in the two detention ponds. Catchment 1 (eastern catchment) will drain to detention pond 1 which has a volume capacity of 240m³. The area north of pond 1, is lower laying and will not be able to drain to pond 1. Instead, this area will drain to the north and connect to the existing system in Tolbos road. Pond 1 will have a variable outlet system only allowing pre-development flow rates out into the existing system connected in Hendrikse Road. Catchment 2 (western catchment) will drain to detention pond 2 which has a volume capacity of 410m³. Pond 2 will have a variable outlet system only allowing pre-development flow rates out into the existing system via the headwall in the northern corner of the site. Figure 6 illustrates the proposed stormwater network and catchment areas.

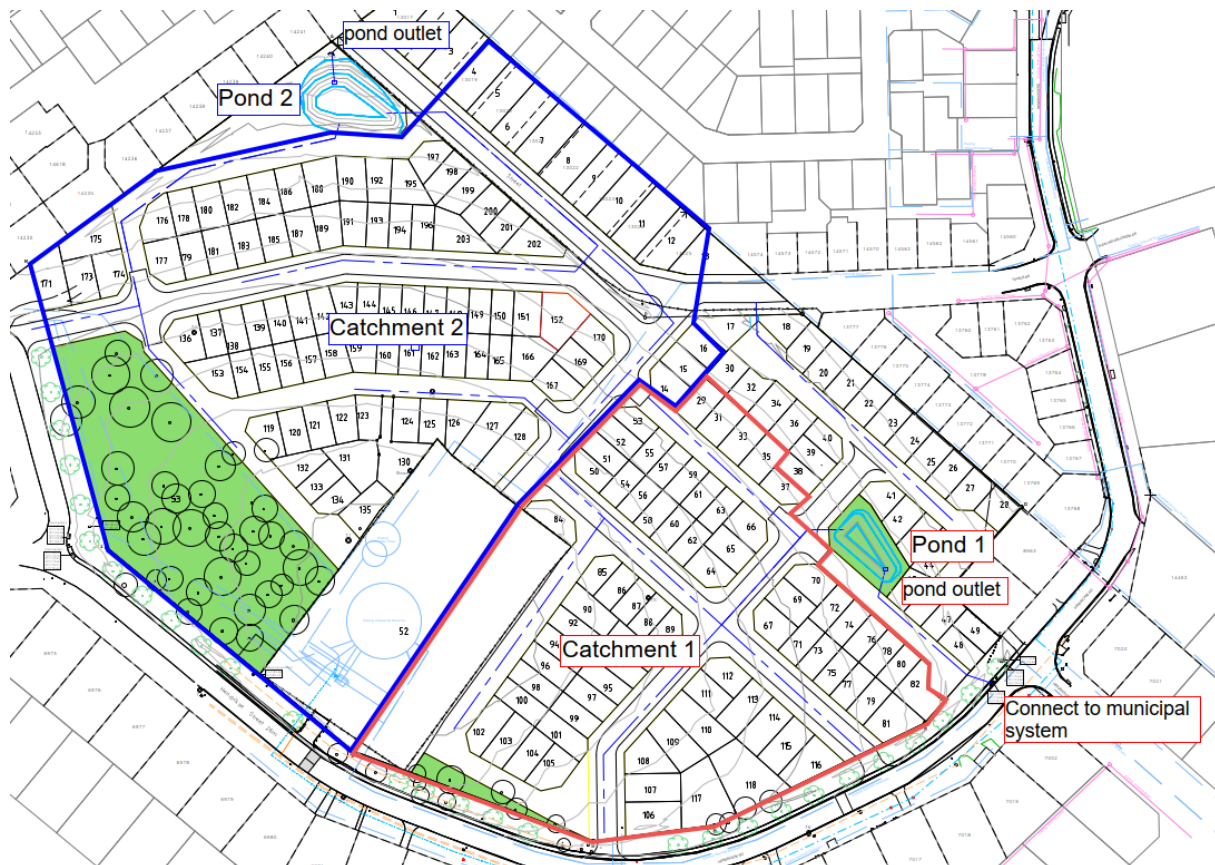


Figure 6: Proposed post-development stormwater network

The post-development stormwater runoff for various storm-events were also calculated using the rational method. For the post-development scenario, the site is considered to be developed as per the proposed sub-division plan, in Appendix A and all areas drain to detention pond 1 and detention pond two as shown in Figure 6.

The combined post-development run-off for 1:2, 1:5, 1:10, 1:20 and 1:50 years recurrence intervals for the development as calculated above is shown in Table 5.

Table 5: Combined post-development calculated peak flows

Recurrence Interval (1: years)	Peak flows		
	Pre-development (m³/s) Greenfield	Combined Post-development (m³/s) (flow into detention ponds)	Combined Post-development (m³/s) (outlet into the existing system)
2	0.063	0.234	0.063
5	0.092	0.394	0.092
10	0.120	0.516	0.120
20	0.155	0.638	0.155
50	0.230	0.798	0.230
100	0.236	0.920	0.236

8 ROADS

8.1 Access

A Traffic Impact Assessment (TIA) was conducted by Zutari that is attached to this report in Appendix B. Access to the Development will be via the extension of the existing road network. The layout of the roads will be done in accordance with the Guidelines for Human Settlement Planning and Design (commonly known as the Red Book) and the Stellenbosch Zoning Scheme. Bulk external road upgrades required will be implemented as per the findings of the TIA.

8.2 Internal roads

The internal road network will have a paved surface as per town planner's details. All civil services will be within the 13.5m to 8m road reserves.

Emphasis will be placed on traffic calming and low speeds by implementing an appropriate geometric road design philosophy. The roads shall have a 2.5% cross fall towards a paved stormwater channel.

Emergency services such as firefighting services and waste removal vehicles would be supplied by the Municipality. All roads will be designed and constructed to accommodate light vehicles as well as occasional usage by heavy vehicles such as fire trucks or delivery trucks.

8.3 Parking Facilities

Visitor and general parking areas will be provided along roads within the development as indicated in the TIA. Parking on the erven will be specified by the town planner as required for each house type.

9 Electrical Services

De Villiers and Moore (Pty) Ltd was appointed to investigate on the capacity availability in the existing system as well as electrical supply required for the proposed development. De Villiers and Moore reported that there is sufficient capacity in the existing system to accommodate the proposed development.

The provisional load-calculations indicate that 2 x miniature substations will be required to supply the calculated low-voltage load. The exact positions cannot be fixed now but will be in the vicinity of the 2 x blue blocks included on the drawing in Figure 7.

The minisubs will not require separate erven to be registered. We indicated one in the remaining POS-area, and the other in the water-reservoir area (can also be moved to the road-reserve outside the reservoir area). Each minisub position will be 6x4m dedicated for the minisub. Refer to Appendix C for the full report.



Figure 7: Proposed electrical mini substation positions

10 Solid Waste Disposal

All waste generated from the residential units of the proposed development, will be temporarily stored in storage bins. The municipality will collect all bins from an appropriate refuse areas or individual erven on the transport it to a Waste Disposal Site as determined by the Municipality. The position of the refuse areas (if applicable will be placed at a practical area with easy access for the Municipal Solid Waste Disposal Trucks of the Municipality. No access control will be used in the development. Stellenbosch Municipality has sufficient capacity available for the development.

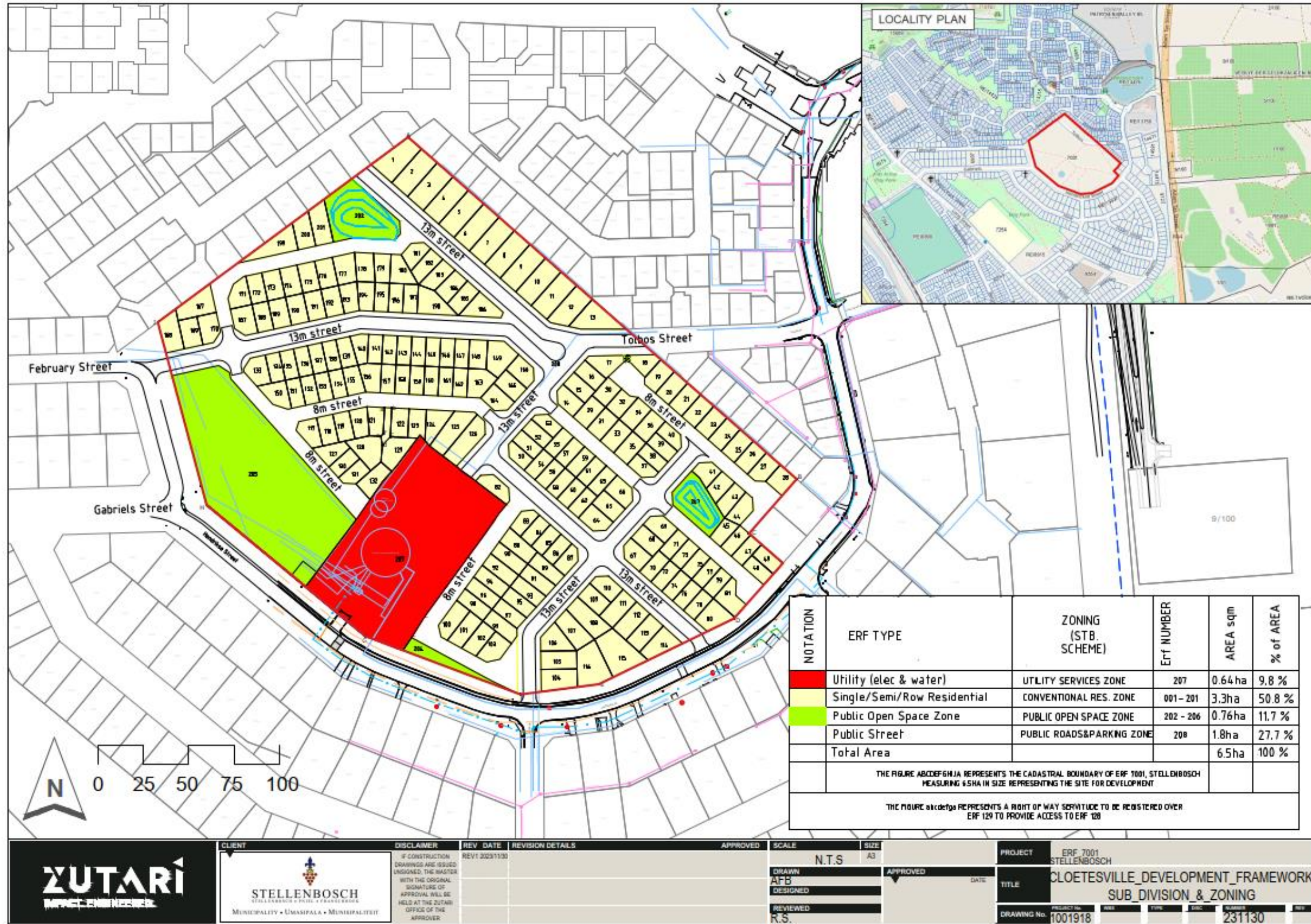
11 Conclusion

No major issues are foreseen for the proposed development in terms of engineering services. Ample capacity is available for all civil services, given proposed upgrades are facilitated ahead of construction. Detail design will identify and address all other minor issues such as exact connection points and other construction details.

12 Bibliography

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Appendix A: Subdivision and Zoning Plan



Appendix B: Traffic Impact Assessment

Appendix C: Electrical Services Report

In diversity there is beauty and there is strength.

MAYA ANGELOU

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ATC SOUTH AFRICA

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BASE STATION NUMBER: 351316

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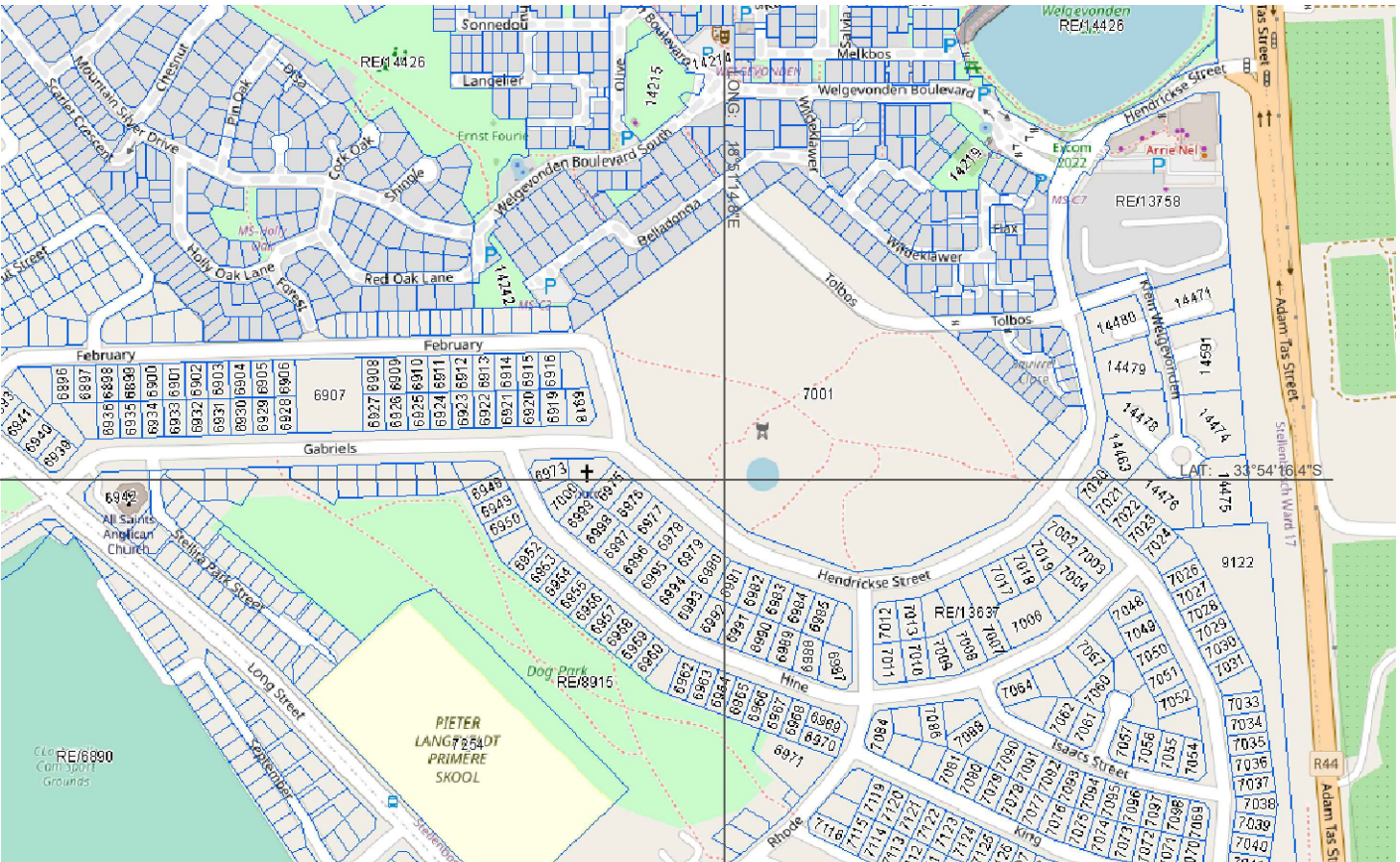
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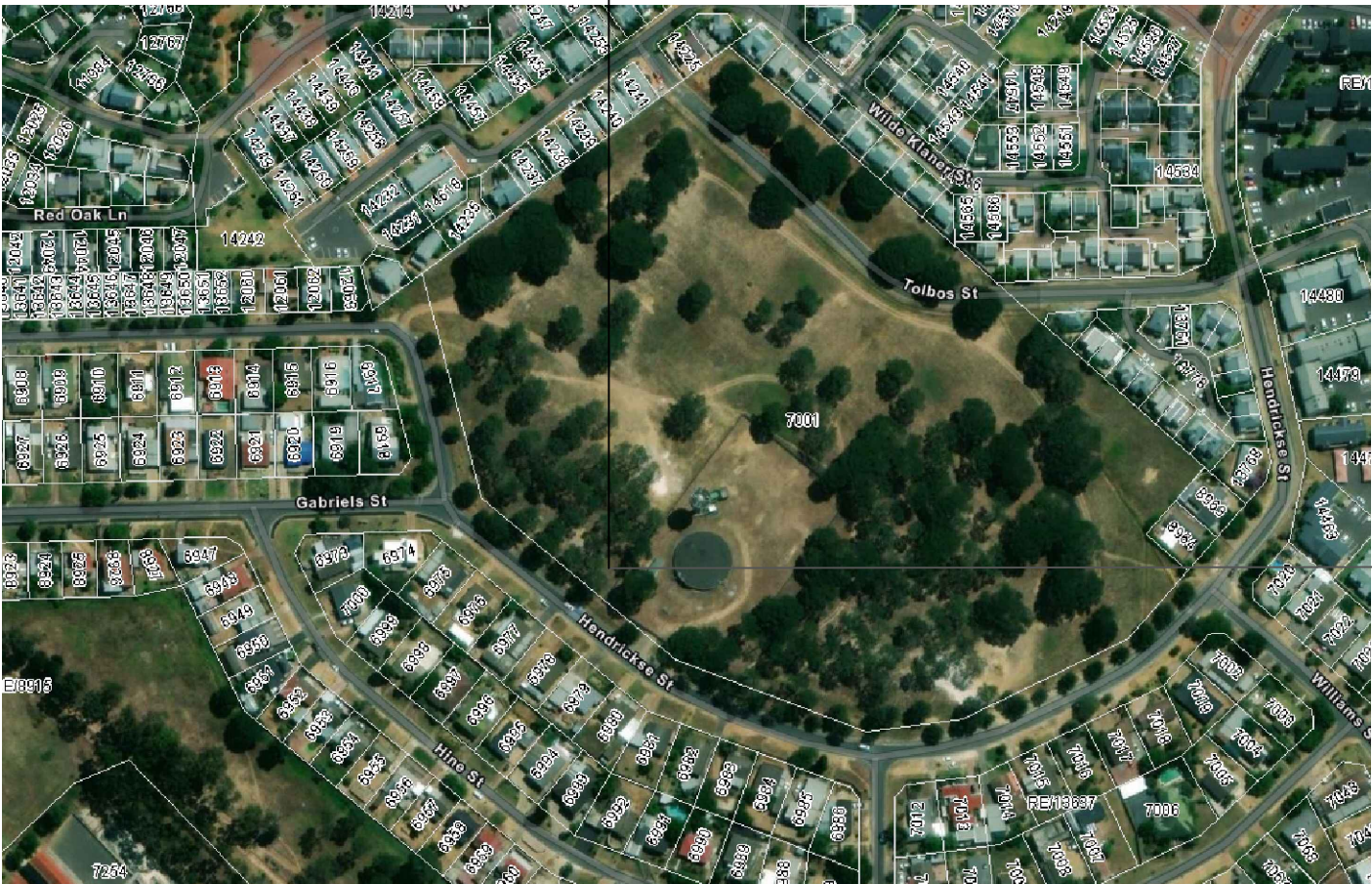


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LAT: 33°54'16.4"S

LONG: 18°51'14.8"E

Cloetesville
Base Number: 351316



BO

TP 9460

KANTOORAFSKRIF

Friedlaender Burger & Volkmann, Land Surveyors

SYE	Meter	RIGTINGS- HOEKE	L.G. No.
A B	311,50	311 19 20	3 1 2 2 - 8 7
B C	80,76	41 19 10	Goedgekeur
C D	83,27	64 06 30	<i>M. van der Merwe</i>
D E	43,75	82 36 50	Landmeter-generaal
E F	91,71	110 33 20	07/09/07
F G	114,15	129 32 00	
G H	104,66	165 00 00	
H A	172,36	233 34 00	

Beskrywing van Bakens.
A ----- 25mm pen teenaan spoorstaaf paal in ou baksteen baken
Alle ander bakens is 12mm. penne

Rest. Weltevrede No. 82

Rest. Patrys Valley No. 101

Skaal 1: 4000

Die figuur A B C D E F G H
stel voor 6,6341 hektaar
ERF 7001 STELLENBOSCH (PUBLIEKE PLEK)
geleë in Cloeteville Dorp Uitbreiding No. 2 in die Munisipaliteit en
Administratiewe Distrik van Stellenbosch Provinsie Kaap die Goeie Hoop.
Vervaardig kragtings Artikke 39 van Akte 9 van 1927 in April 1987
deur my *Burger*
Landmeter

Hierdie kaart is geheg aan T/A No. 56720/B7 gedateer t.g.v.	Lêer No. Stel. 81 M.S. No. Vervaardig. Komp. BHSZ-121 (6930)
Registrateur van Aktes	Alg. Plan TP No. 9460 Vel No. 3 en 5

7001



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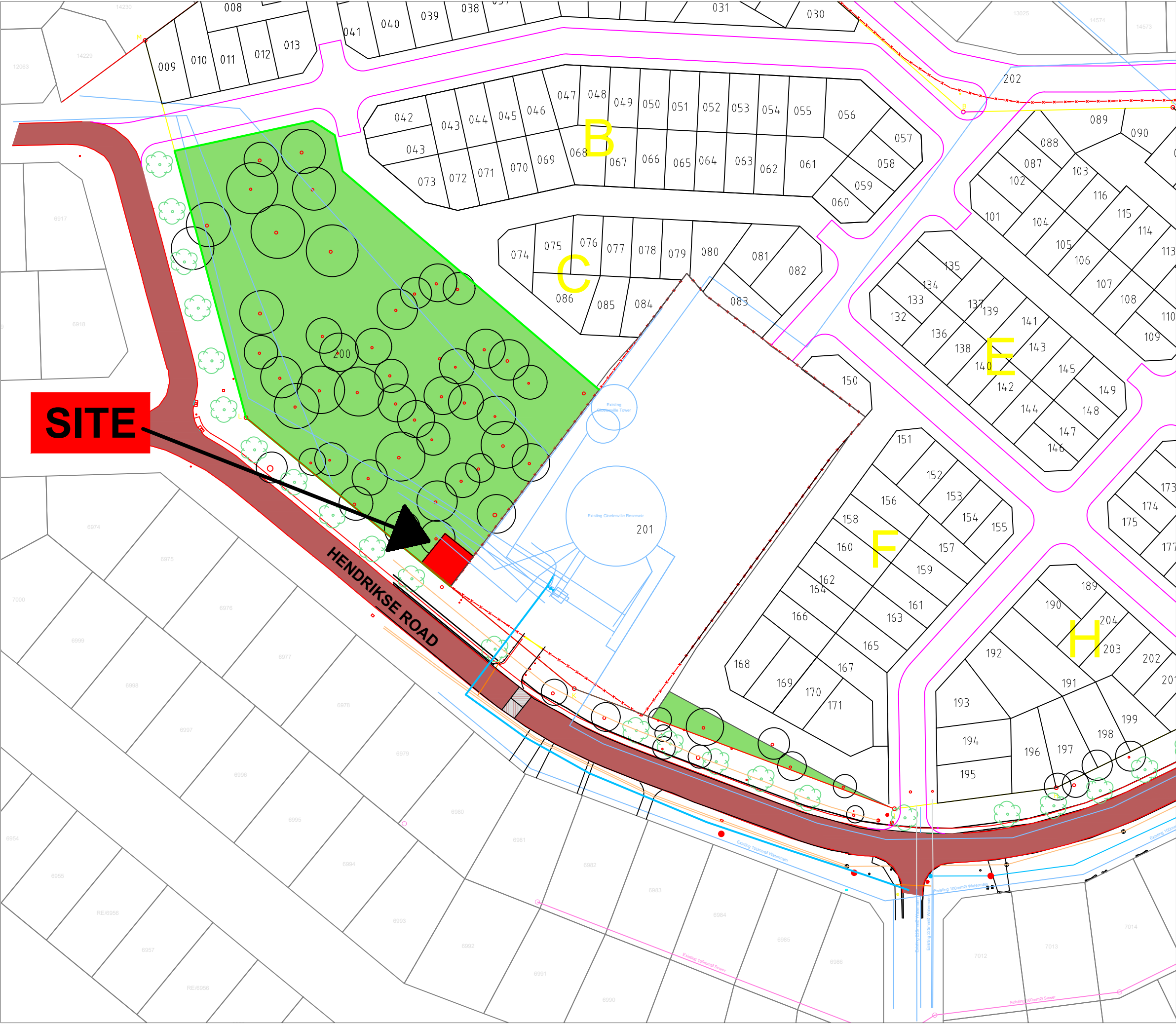
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SHEET 2 OF 7



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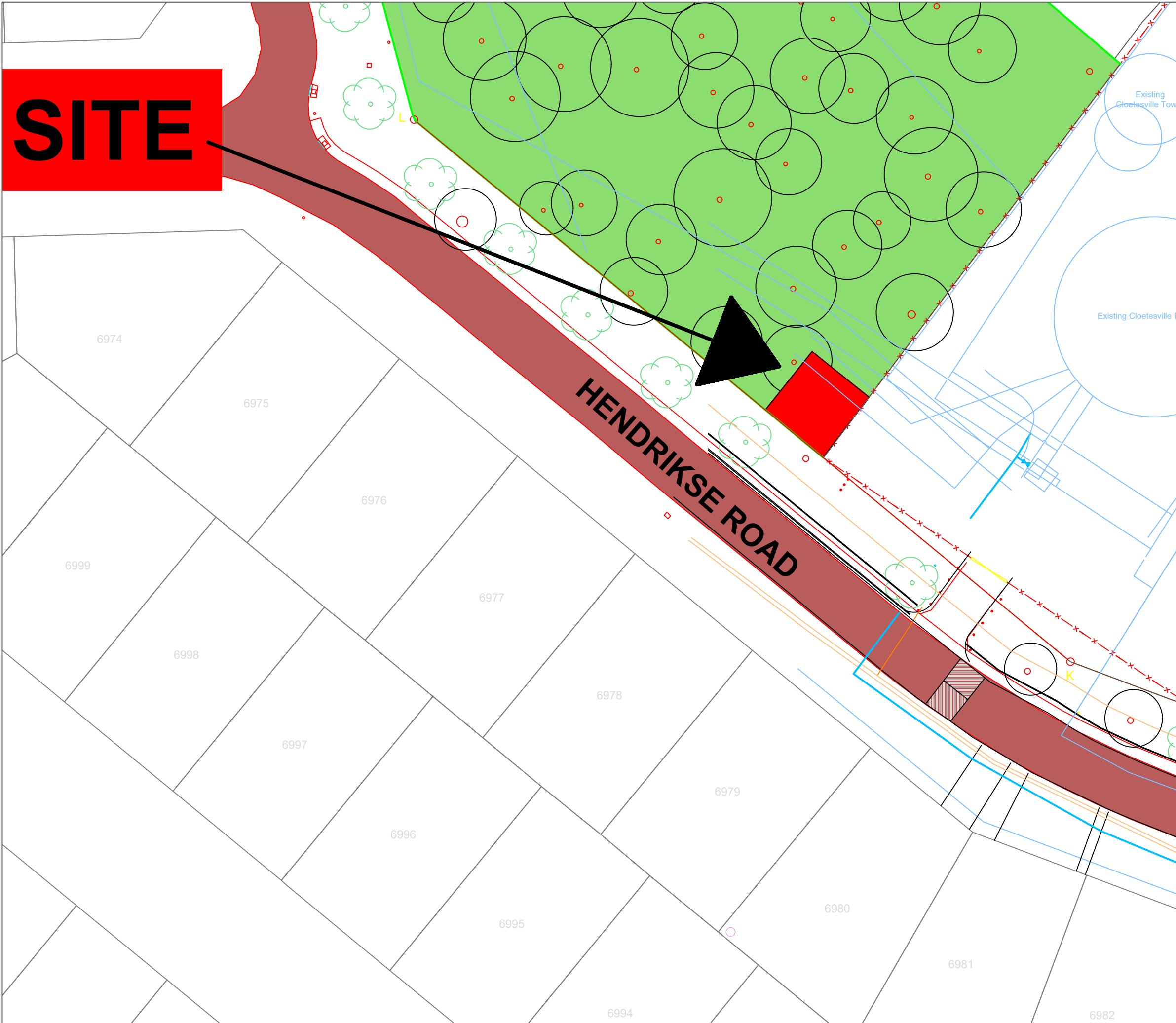
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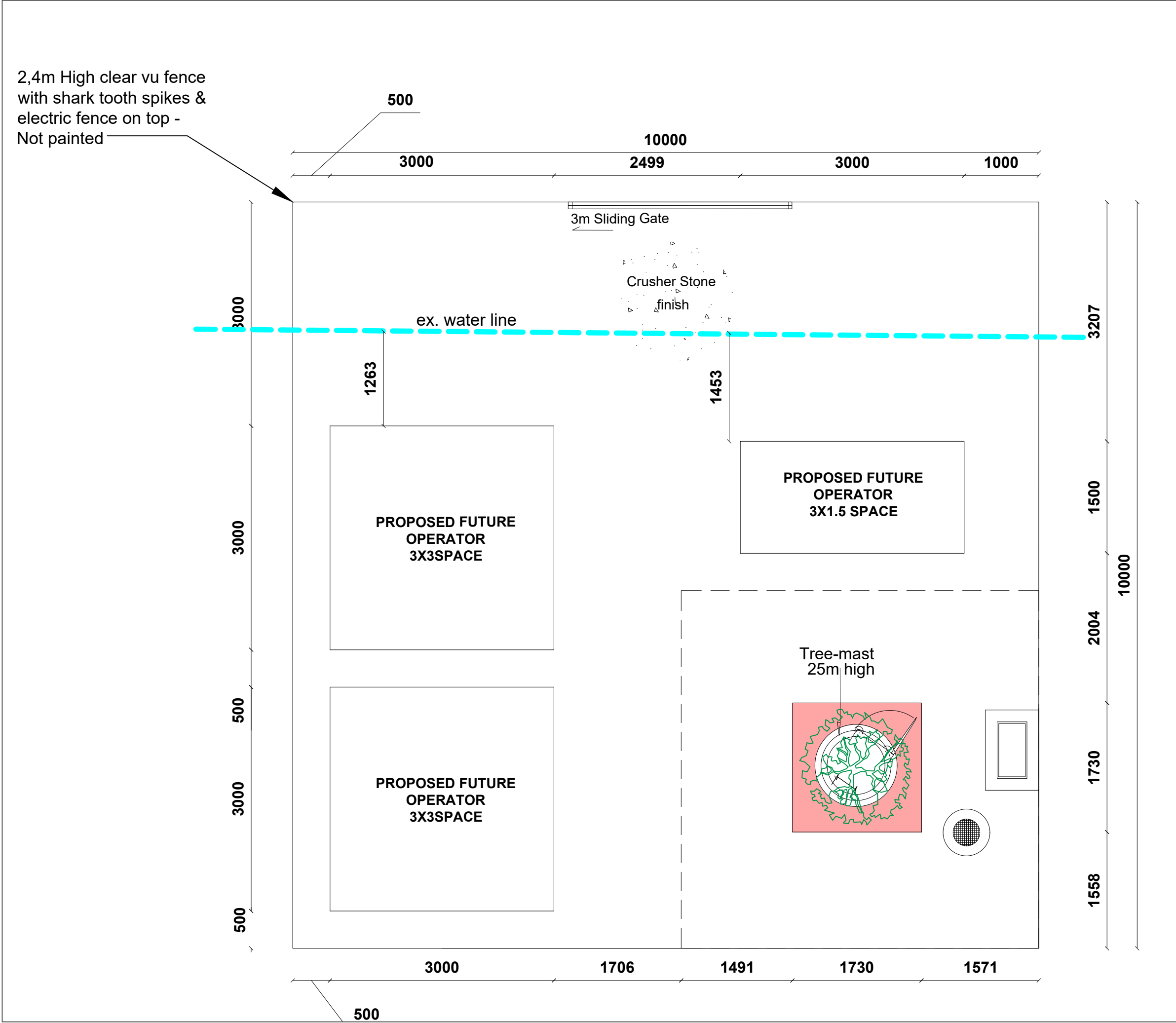


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SITE LAYOUT 2
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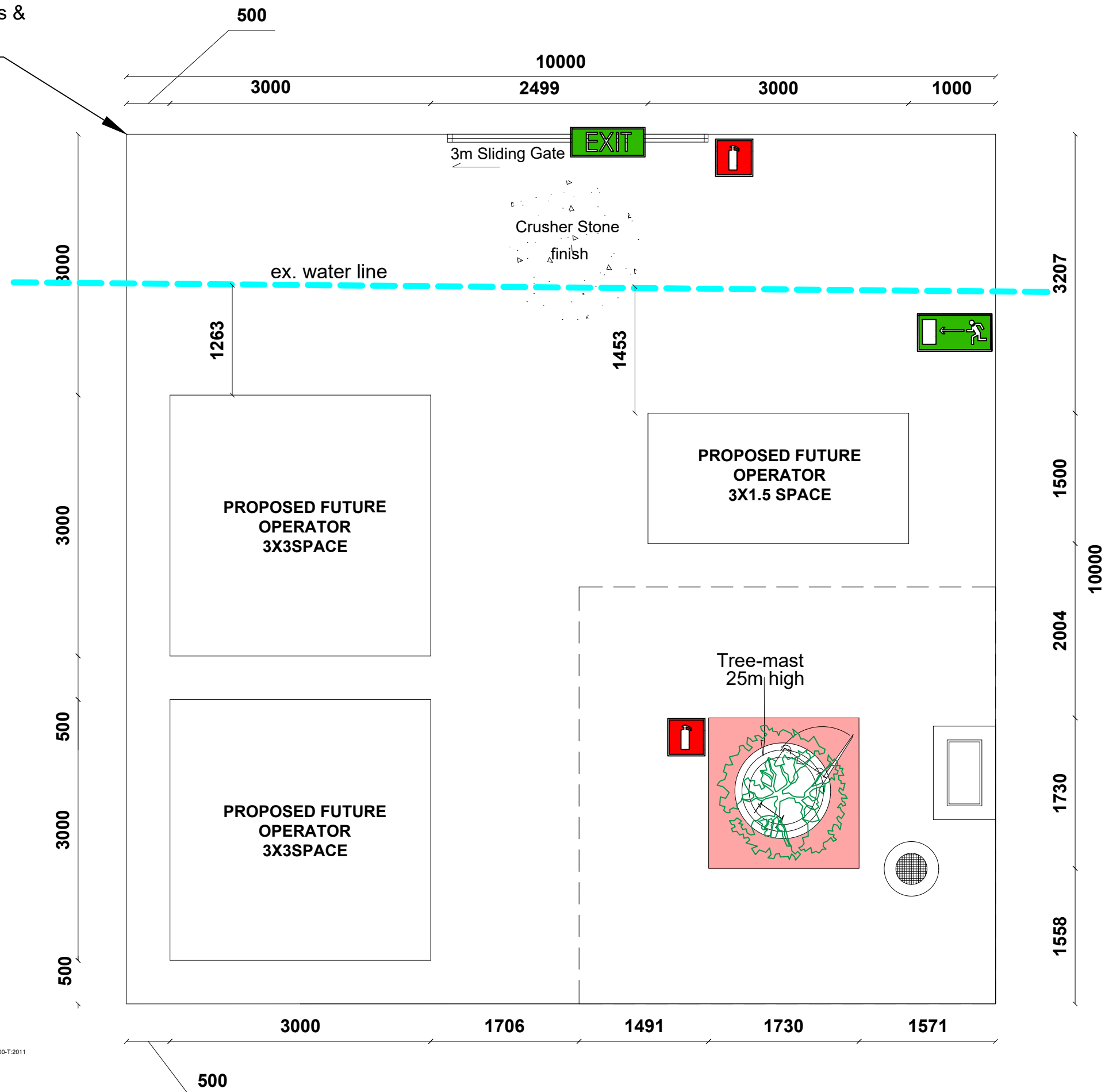
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ACTUAL SITE LAYOUT
SHEET 5 OF 7

2,4m High clear vu fence
with shark tooth spikes &
electric fence on top -
Not painted



NOTES:
REGULATIONS: The fire plan specifications are according to SANS 10400-T:2011
Edition 3 (refer to section 4.37 & Table 11)

- KEY:
- 1 x 9kg Powder Extinguisher
 - Direction to Exit
 - Exit



ATC SOUTH AFRICA

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Traffic Impact Assessment

Broad Conceptual Urban Design Framework for Erf 7001, Cloetesville

Stellenbosch Municipality

Submission date: 2024/06/11

Document control record

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Current revision		2				

Approval			
Author signature		Approver signature	
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Appendices

Traffic Counts

SIDRA Analysis Existing Traffic

SIDRA Analysis 2026 Background Traffic

SIDRA Analysis 2026 Total Traffic

SIDRA Analysis Future 2031 Traffic

Figures

Figure 1: Locality Plan of Cloetesville

Figure 2: Key Intersections

Figure 3: Intersection 1: R44 / Hendrikse Road AM and PM LOS Upgraded

Figure 4: Intersection 1: R44 / Hendrikse Road AM and PM LOS for Additional Upgrades

Figure 5: Intersection 7: R304 / Welgevonden Boulevard AM and PM LOS

Figure 6: Intersection 8: R44 / Fir Street Average Vehicle Queue Length on Fir Street

Figure 7: Intersection 8: R44 / Fir Street AM and PM LOS Converted to Signalised Intersection

Figure 8: Previous Developments

Figure 9: Global Trip Distribution

Figure 10: Global Trip Distribution

Figure 11: Intersection 1: R44 / Hendrikse intersection AM and PM LOS 2026 Background Traffic

Figure 12: Intersection 7: R304 / Welgevonden Boulevard intersection AM and PM LOS 2026 Background Traffic

Figure 13: Intersection 1: R44 / Hendrikse Road intersection AM and PM LOS dualled R44

Figure 14: Upgraded Intersection 7: R304 / Welgevonden Boulevard Intersection

Figure 15: Upgraded Intersection 7: R304 / Welgevonden Boulevard - AM and PM LOS

Figure 16: Extension of short lane on Hendrikse Road.

Figure 17: Intersection 1: R44 / Hendrikse Road Intersection AM and PM LOS dualled R44 with extended short lane on Hendrikse Road

Figure 18: Intersection 2: Hendrikse Road / Tolbos Road Conversion affect 2026 Background Traffic plus All Developments

Figure 19: Intersection 5: Lang Road / Gabriels Road Conversion affect 2026 Background Traffic plus All Developments

Figure 20: Intersection 1: R44 / Hendrikse Road - AM and PM LOS future 2031 Traffic Conditions

Figure 21: Intersection 2: Hendrikse Road / Tolbos Road Conversion affect future 2031 Traffic Conditions

Figure 22: Intersection 5: Lang Road / Gabriels Road Converted affect during AM Peak hour future 2031 Traffic Conditions

Figure 23: Proposed PT and NMT Expansion

Tables

Table 1: Existing Intersection Analysis

Table 2: Previous Development Trips

Table 3: Development Trip Generation (Unadjusted)

Table 4: AM and PM Distributions at R304/Welgevonden

Table 5: AM and PM Distributions at R44/Hendrikse Road

Table 6: 2026 Background Traffic plus Previous Developments Intersection Analyses

Table 7: 2026 Total Traffic Intersection Analyses

Table 8: 2031 Future Traffic Intersection Analyses

1 Introduction

1.1 Context and Purpose

Stellenbosch Municipality identified a need for integrated urban settlement developments to address municipal housing backlogs. The municipality has therefore undertaken the Broad Conceptual Urban Design Framework for Erf 7001, Stellenbosch to obtain town planning and development rights. As part of the feasibility study for possible housing, a basic transport/traffic status quo report was conducted in 2022. The current stage of the project requires a full Traffic Impact Assessment (TIA) in terms of the South African Traffic Impact Assessment Manual (TMH 16).

1.2 Scope of Assessment

The scope of this report encompasses quantifying the impacts of the proposed development of Erf 7001 only. There are currently other developments in and around the Cloetesville area, which were accounted for in this assessment.

The site is currently undeveloped, sloped and consist of palm trees. The proposed *development* will be infill housing for the suburb of Cloetesville that will consist of 204 single residential units with the associated roads to tie into the existing road network. The scope of the TIA includes the estimation of the trips that will be generated by developing the land. Identifying, modelling as well as discussing the impact that the additional trips will have on the road network. Each intersection will be modelled for the following four scenarios:

- Existing Background Traffic volumes (2022 and 2024);
- Escalated Background Traffic volumes plus Previously Planned Development Traffic (2026);
- Escalated Background Traffic volumes plus All Development Traffic, including Cloetesville (2026);
- Future Traffic volumes 5 Years after Development has been completed (2031); and
- Analysis of any mitigation measures for poor levels of service (e.g., existing intersections, under different lane configurations or signal phasing and/or intersection upgrades).

As the development will form part of an existing neighbourhood and class 5 road network, much of the focus of the intersection modelling is placed on the intersections at the R304 and the R44.

Further considerations will include Public Transport (PT), access routes, Non-Motorised Transport (NMT) and pedestrian activity.

2 Study Area

2.1 Locality

Cloetesville is a suburb of Stellenbosch and is located just north of the Stellenbosch CBD. It is “wedged” between the R304 (Bird Street) and the R44 (Adam Tas Street). The R304 provides access to Bottellary Road and the N1 to the North. The R44 provides access to Somerset West and the N2 to the South. Erf 7001 is located within Cloetesville and directly south of Welgevonden Estate. The locality of the proposed development site is shown in Figure 1.

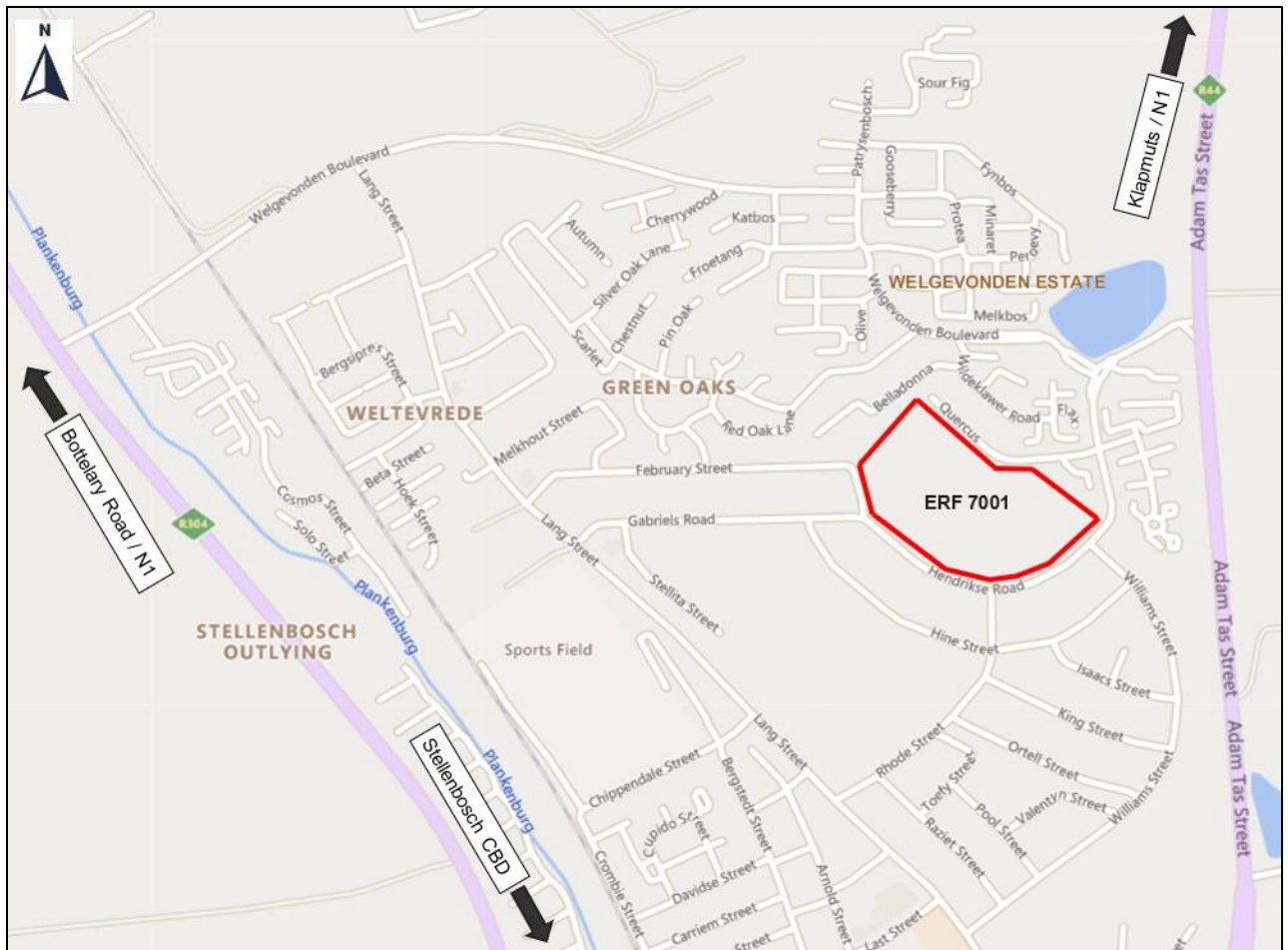


Figure 1: Locality Plan of Cloetesville

2.2 Affected Roads

The primary concern is the impact that the additional housing bulk will have on the R304 and the R44 in Stellenbosch. The other impacted roads are standard Class 5 Local streets, and the development of the site will itself introduce additional roads to the road network.

- R304 is classified as a Class 2 Primary Arterial, it is one lane per direction, with turning lanes at intersections, paved shoulders and sidewalks along Kayamandi.
- R44 is classified as a Class 2 Primary Arterial, it is dualled from Stellenbosch and becomes one lane per direction further north, with turning lanes at intersections, paved shoulders and sidewalks along the roadway from Stellenbosch to Hendrikse Road. The road also allows for the North-South connectivity, Stellenbosch to the South with Wellington to the North.

- R304 and R44, Langstraat Suid Road are the only 3 signalised access roads into Cloetesville. The majority of all vehicle trips use one of these three access roads. The location of the site is in the north of Cloetesville so it is reasonable to assume that the development traffic will be attracted to the R304 and the R44 as access roads, especially in the AM peak. In the PM peak it can be expected that vehicles trips will enter Cloetesville from the south via Langstraat Suid Road.
- It is assumed that access may be onto Hendrikse Road in the South; or February Road in the East; or Tolbos Road in the North. Hendrikse Road functions as a distributor as it connects to the R44 and the other two roads are class 5 residential streets, approximately 6 to 7m wide and with sidewalks only along the north of Hendrikse Road. Traffic calming facilities are also provided along Hendrikse Road.
- There is a downward slope to the south, towards Hendrikse Road. An excessive gradient is often problematic for 4-way stop controlled intersections. SARTSM recommends that all-way stop control not be used on roads with a gradient greater than 8%. Careful consideration must be given to the new intersections that will be created by the developments access roads.
- The future “access” roads are likely to be off Hendrikse Road which functions as a Collector/Distributor for this portion of Cloetesville. Hendrikse Road accesses the R44 in the North and access into Stellenbosch in the North. It is therefore expected that Hendrikse Road will carry large volumes of traffic.

3 Traffic Impact Analysis

3.1 Intersections and Traffic Counts

The key intersections, shown in Figure 2, were identified in the Status Quo Report as requiring modelling and analysis. Based on the access arrangements for the Cloetesville community the intersections at the R304 and the R44 are the most critical in terms of analyses. These two high order roads are also important arterials in the greater road network the region and any impacts to them must be carefully considered.

Peak hour traffic counts were conducted in August 2022 and June 2024 for the full day by Nick Venter Traffic Surveying. The peak hour traffic counts that were used in the modelling are included as Appendix A of this report. The proposed development will consist of residential units only and will therefore mostly generate vehicle trips during weekday morning and evening peak hours.

Counts were undertaken at these intersections (also shown in Figure 2):

- **Intersection 1:** R44 / Hendrikse Road (*Traffic Control Signal*) – *Currently being upgraded*
- **Intersection 2:** Hendrikse Road / Tolbos Road (*All-Way Stop*)
- **Intersection 3:** Hendrikse Road / Williams Road (*All-Way Stop*)
- **Intersection 4:** Hendrikse Road / Rhode Street (*Priority Yield*)
- **Intersection 5:** Lang Road / Gabriels Road (*All-Way Stop*)
- **Intersection 6:** Lang Road / Welgevonden Blvd (*Priority Stop*)
- **Intersection 7:** R304 / Welgevonden Blvd (*Traffic Control Signal*)
- **Intersection 8:** R44 / Fir Street (*Priority Stop*) – Counted in June 2024

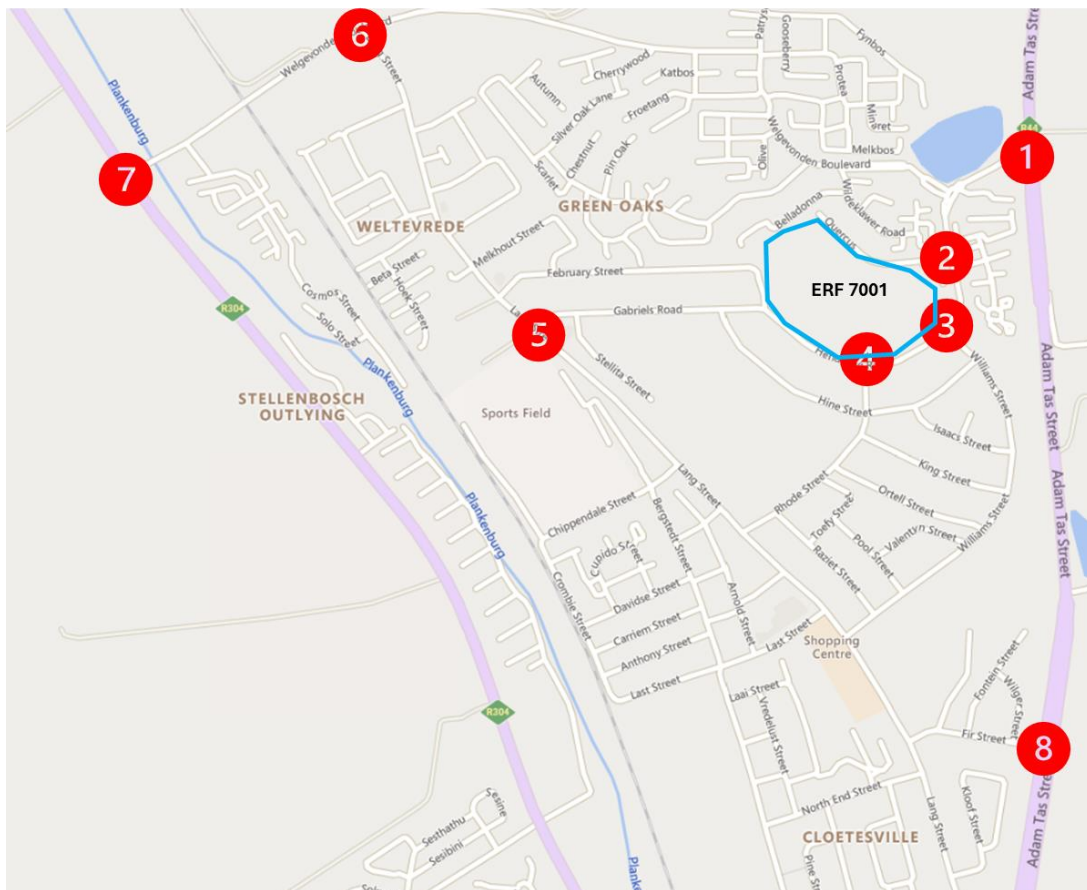


Figure 2: Key Intersections

3.2 Existing Traffic

3.2.1 Intersection Analysis

The impact on capacity and intersection operation was analysed using SIDRA Intersection modelling software. The intersections were modelled individually and not as a network. The modelling outputs that were considered and included in this report are:

- Level of Service (LOS) from A to F.
- Average Delay per Vehicle (seconds).
- Degree of Saturation (v/c ratio).

The results of the SIDRA modelling are summarized in Table 1 below and included as Appendix B. The existing traffic operations are based on existing intersection geometries, lane configuration and controls. Based on the results of these capacity analyses, there are already serious congestion concerns at the R44 / Fir Street intersection. Vehicles turning right from these minor approach onto the R44 experience long delays as they are waiting for an available gap to enter the R44 traffic safely. This in turn delays the vehicles who want to turn left onto the R44, who require smaller gaps, to wait longer due to only having one approach lane.

The R44/Hendrikse Road intersection was found to operate at an unacceptable LOS for the AM peak hour. Upgrades to the intersection is currently underway. The impact of these upgrades will be discussed in Section 3.2.2.

Table 1: Existing Intersection Analysis

No.	Intersection Name	Peak Period	Delay (sec)	V/C Ratio	Overall LOS	Approach Leg Level of Service			
						South	East	North	West
1	R44 / Hendrikse Road Traffic Signal	AM	129.3	1.08	F	E	-	F	F
		PM	16.6	0.76	B	B	-	A	E
2	Hendrikse Road / Tolbos Road All-way stop	AM	14.5	0.28	B	B	B	B	E
		PM	26.4	1.00	D	B	B	C	F
3	Hendrikse Road / Williams Road All-way stop	AM	13.6	0.21	B	C	B	-	B
		PM	13.2	0.24	B	C	B	-	B
4	Hendrikse Road / Rhode Street Yield on southern side	AM	1.1	0.07	A	A	A	-	A
		PM	1.7	0.06	A	A	A	-	A
5	Lang Road / Gabriels Road All-way stop	AM	12.6	0.56	B	B	C	B	-
		PM	10.0	0.28	B	A	C	A	-
6	Lang Road / Welgevonden Stop on southern side	AM	5.4	0.31	A	A	A	-	A
		PM	5.2	0.17	A	A	A	-	A
7	R304 / Welgevonden Blvd Traffic Signal	AM	18.4	0.76	B	B	D	B	-
		PM	22.9	0.83	C	C	E	A	-
8	R44 / Fir Street Stop on western side	AM	2560.5	39.2	F	A	-	A	F
		PM	156.1	8.5	F	A	-	A	F

3.2.2 Discussion

Intersection 1 R44 / Hendrikse Road: All the approaches on R44 and Hendrikse Road intersection experiences severe delays in the AM peak hour under the **existing** traffic conditions and consequently the overall LOS for the intersection is LOS F. The upgrade to the intersection is provided in Appendix C.

The impact of the intersection upgrades (currently underway) is shown in Figure 3. SIDRA's optimised signalised setting was used with a maximum cycle time of 120 seconds. The upgrades proposed provide little improvements to the performance of the intersection during the AM peak hour. The greatest issue is the sheer amount of traffic turning right from Hendrikse Road. There are over 800 vehicles turning right in the AM peak hour. Erf 7001 is less than 500m from this intersection. Given existing traffic patterns, the development of the site will likely contribute to the congestion at the R44 x Hendrikse Intersection especially as annual traffic continue to grow.

Figure 4 shows the impact of additional upgrades to the R44 / Hendrikse Road intersection and its impact on the performance of the intersection. The only additional changes to the upgrades currently underway include, adding an additional right turn movement on Hendrikse Road and make the right turn lane a through movement lane as well on the southern approach of the R44. The SIDRA results show the one turning lane still operates under LOS F conditions, however overall, the intersection operates under acceptable LOS D conditions during the AM peak hour. This layout will be used for the remaining testing scenarios.

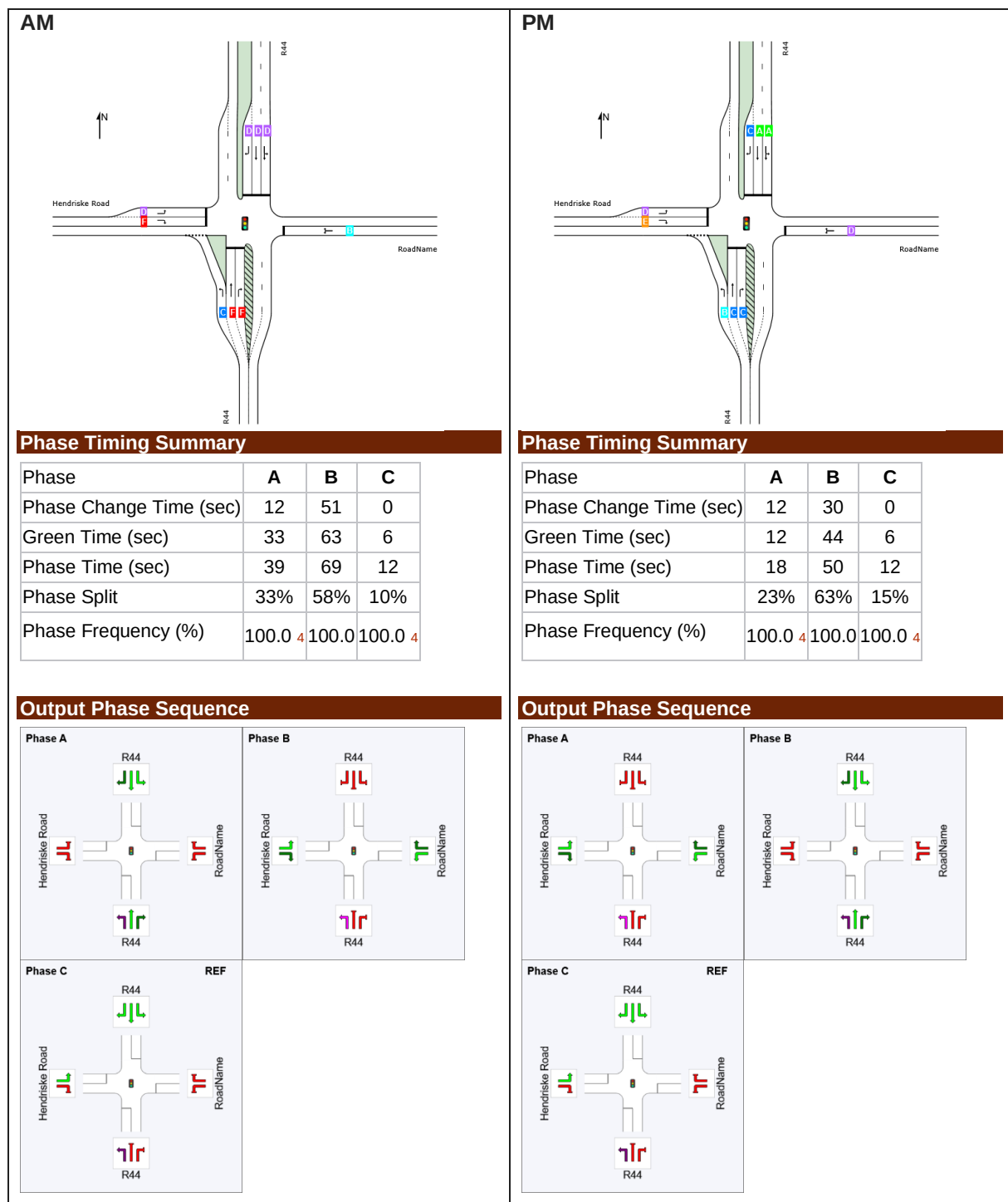


Figure 3: Intersection 1: R44 / Hendrikse Road AM and PM LOS Upgraded

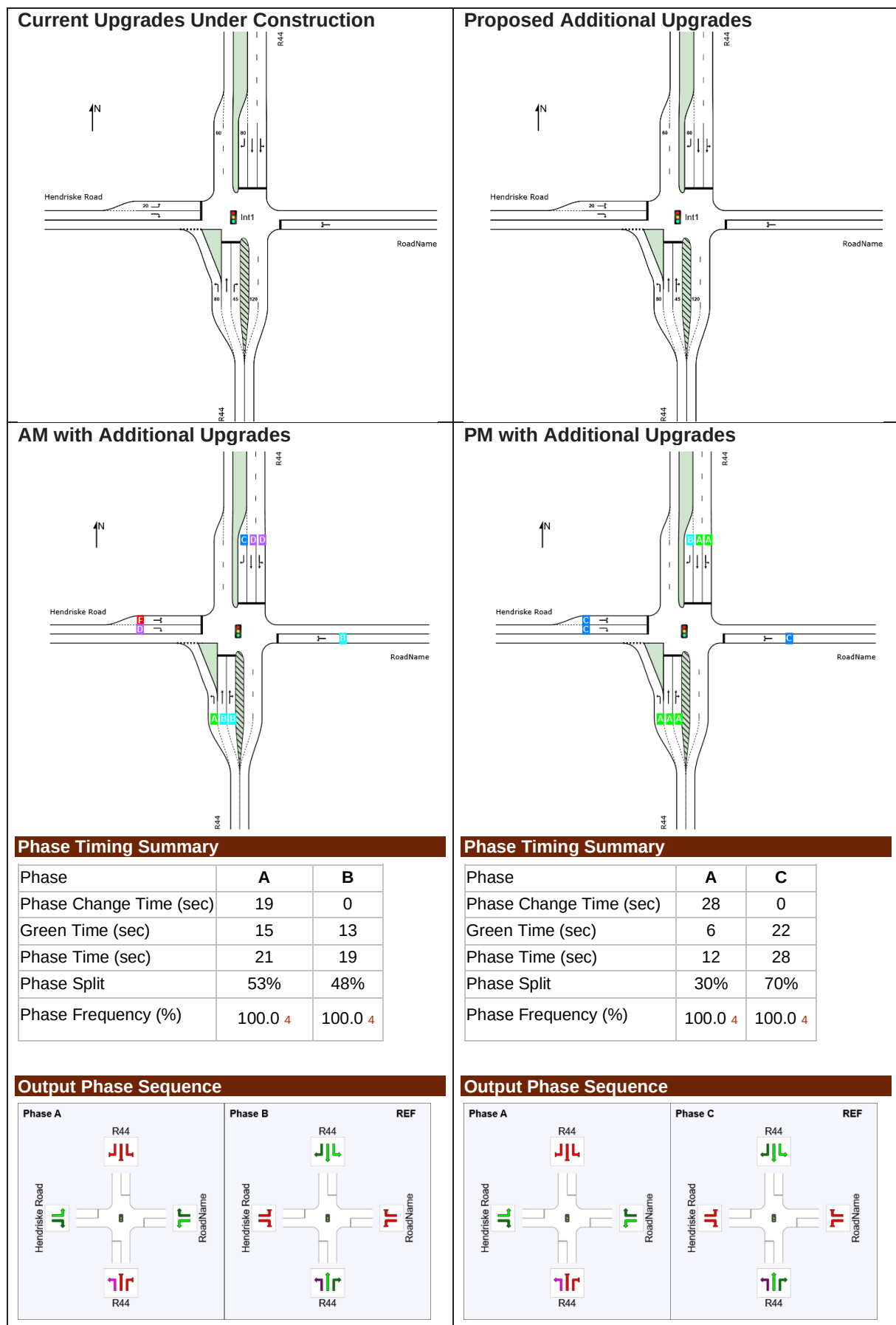


Figure 4: Intersection 1: R44 / Hendrikse Road AM and PM LOS for Additional Upgrades

Intersection 7 R304 / Welgevonden Blvd: The minor road approaches experience large delays (and poor LOS) under existing traffic conditions for PM peak hours as shown in Figure 4. The modelling results show that all movements along the major roads experience average delays but do not affect the LOS of all movements on R304. This is likely because green time is prioritised for traffic on the R304 as it is one of the main arterial roads to Stellenbosch. Should the LOS become completely unsatisfactory, a mitigation measure will be proposed to improve the LOS for failing legs.

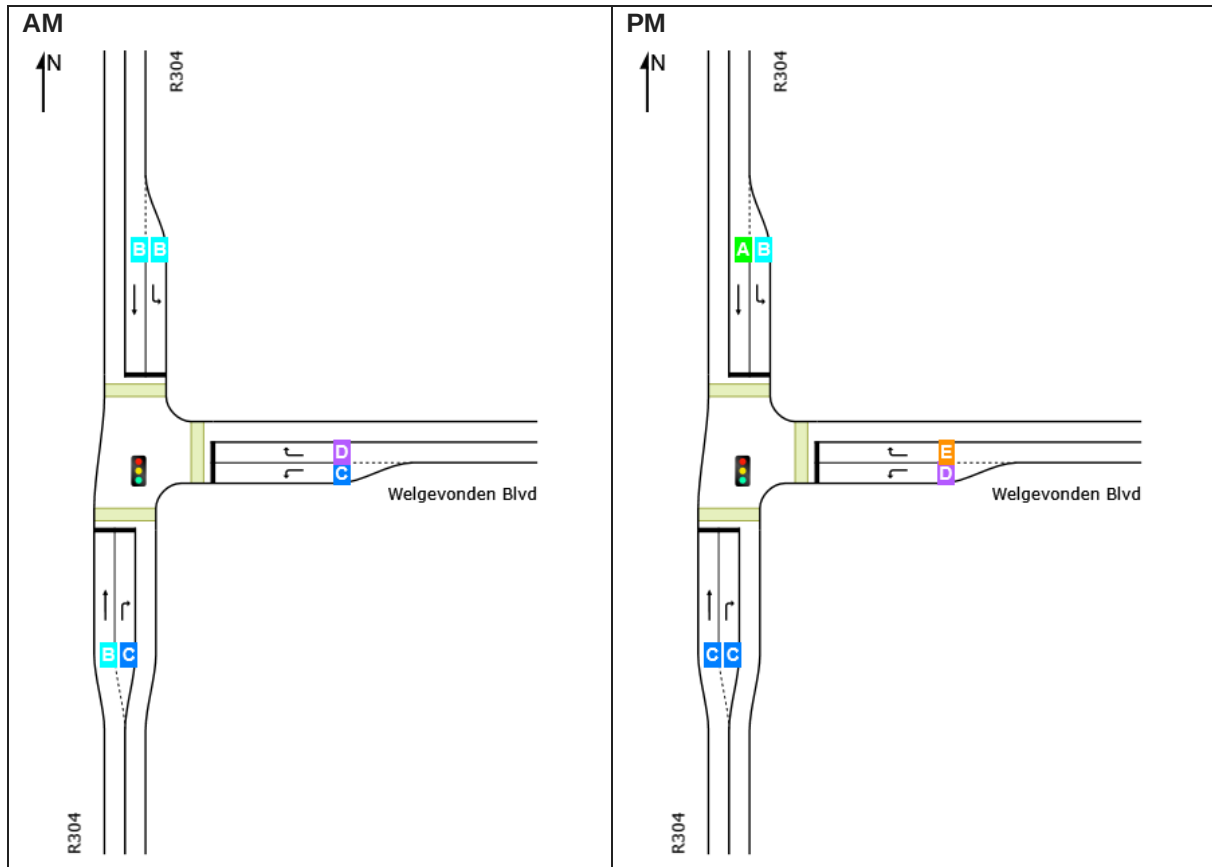


Figure 5: Intersection 7: R304 / Welgevonden Boulevard AM and PM LOS

Intersections 2 – 6: All the residential intersection operate at acceptable LOS. This is due to low traffic volumes and the minimal overall delay experienced at the intersections that are all-way stop or priority stop controlled. It should be noted that all-way stop control intersection operate best when the traffic on all approaches is “balanced”, thus distributing the delay equitably and improving LOS. After the development traffic is added to the local road network the *balance* on these intersections may change.

Intersection 8: Operates at unacceptable LOS conditions during the AM and PM peak hours. With the minor approach experiencing major delays. To mitigate the poor performance at this intersection, it is proposed to convert this intersection into a signalised intersection.

According to the South African Road Traffic Signs Manual (SARTSM) Volume 3 Traffic Signal Design, the installation of a traffic signal is deemed warranted at an intersection when ANY one of the following three queue length warrants are met:

- **WARRANT 1:** The average length of ANY individual queue equals or exceeds four (4) over any one hour of a normal day.
- **WARRANT 2:** The SUM of the average lengths of all queues equals or exceeds six (6) over any one hour of a normal day.

- **WARRANT 3:** The SUM of the average lengths of all queues equals or exceeds four (4) over each of any eight hours of a normal day (the hours do not have to be consecutive, but they may not overlap).

Figure 6 shows the average vehicle queue lengths that formed on Fir Street. During the AM peak hour 63 vehicles queue on Fir Street and during the PM peak hour 16 vehicles queue on Fir Street. From the SIDRA results it is clear that the R44 / Fir Street intersection warrants a traffic signal according to WARRANT 1 of the SARTSM guidelines.

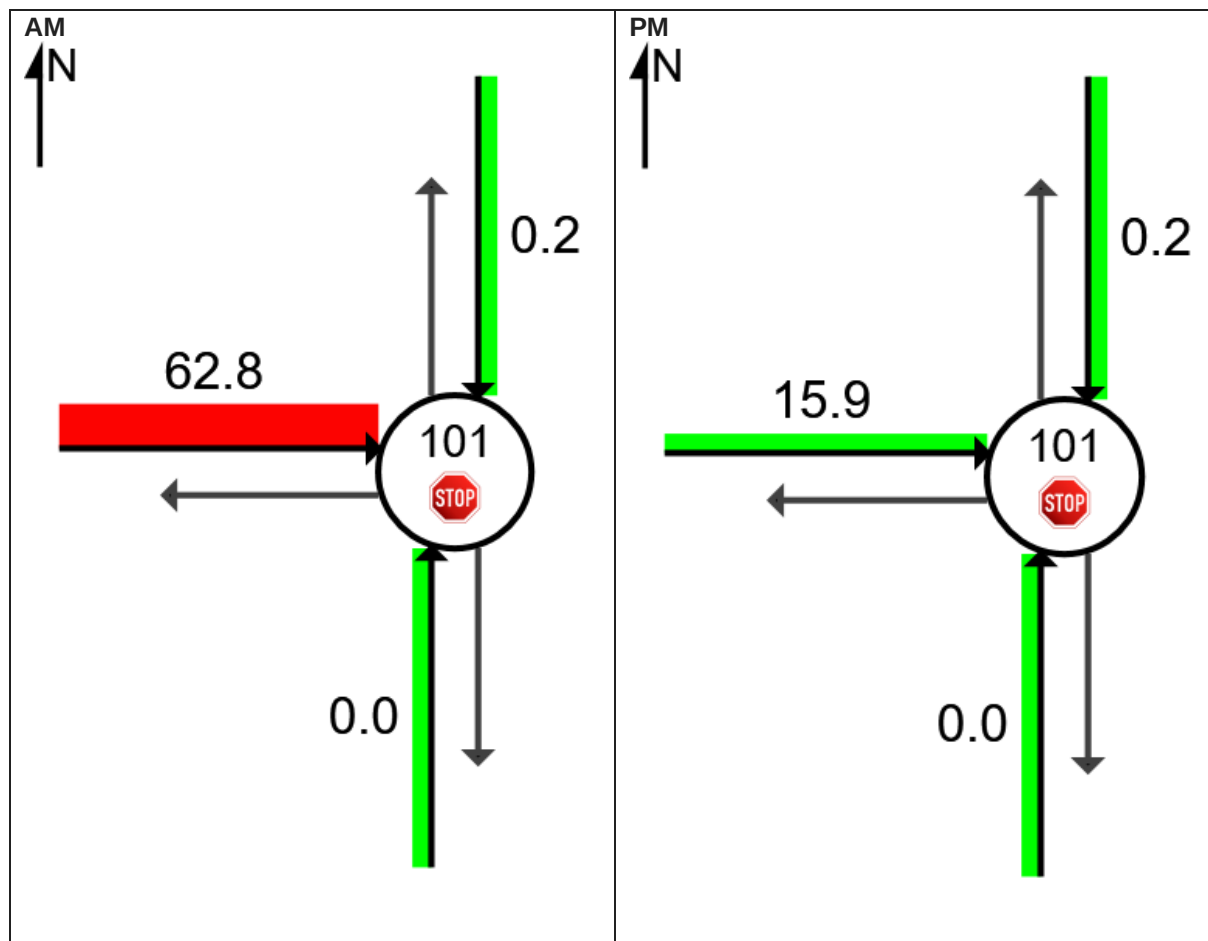


Figure 6: Intersection 8: R44 / Fir Street Average Vehicle Queue Length on Fir Street

During the traffic count survey, it was observed that a significant queue of vehicles formed on Fir Street at the R44 / Fir Street intersection. Approximately, 40 vehicles or more during the AM peak hour. The field observations thus confirm what was found from the SIDRA results, that this intersection warrants a traffic signal according to WARRANT 1 of the SARTSM guidelines.

SIDRA's optimised signal setting was used with a maximum cycle time of 120 seconds for the signal phasing. Further investigation into the conversion of this intersection may be required, specifically looking at the entire corridor of the R44, from the R44 / Langstraat Suid Road to the R44 / Voliere Access intersections.

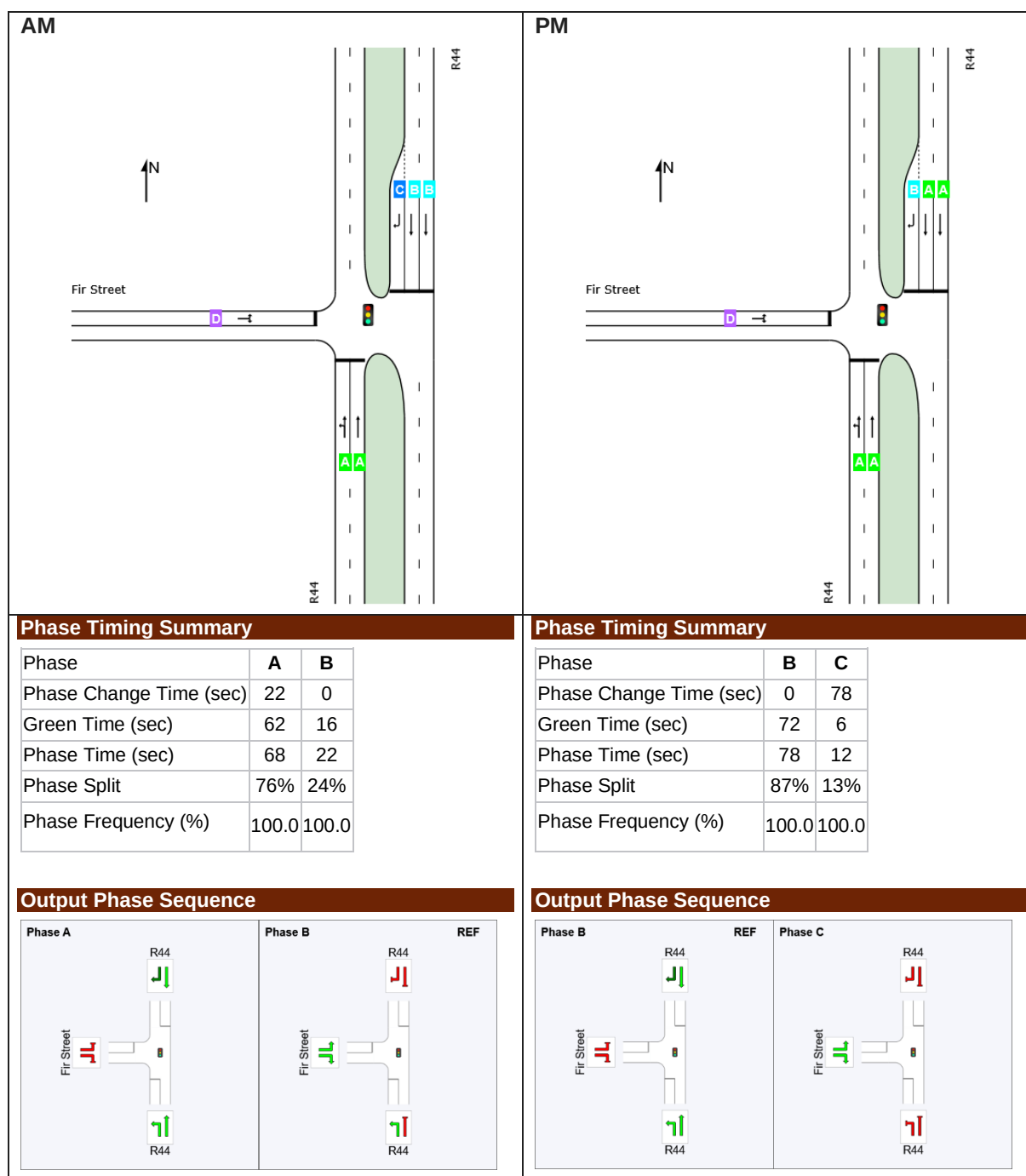


Figure 7: Intersection 8: R44 / Fir Street AM and PM LOS Converted to Signalised Intersection

3.3 Impact of Previous Developments

At the time of preparing this TIA, three other developments had submitted TIAs to the Stellenbosch Municipality for approval and one development is currently being planned. It was therefore necessary to take trips to/from these developments into account and consider the overall impact on the road network. The four developments that will be considered in this TIA are listed below:

- ▶ Oakhills Estate Stellenbosch – Construction in progress
- ▶ Farm 81/33 Newinbosch – Construction in progress
- ▶ Erf 7001 Voliere - Construction in progress
- ▶ Kayamandi Northern Extension – Planning in progress

Table 2 shows the number trips each development will generate, as determined by their respective TIAs. As shown, a total of 3 908 trips (1 504 IN and 2 404 OUT) will be generated in the AM peak and

3 398 trips (2 133 IN and 1 265 OUT) will be generated in the PM peak hour. Figure 8 shows the locations of these developments.

Table 2: Previous Development Trips

Development	AM		PM	
	In	Out	In	Out
Oakhills Estate	47	142	132	57
Newinbosch	986	1 411	1 261	785
Voliere	52	154	144	62
Kayamandi Northern Extension	419	697	596	361
Total	1 504	2 404	2 133	1 265

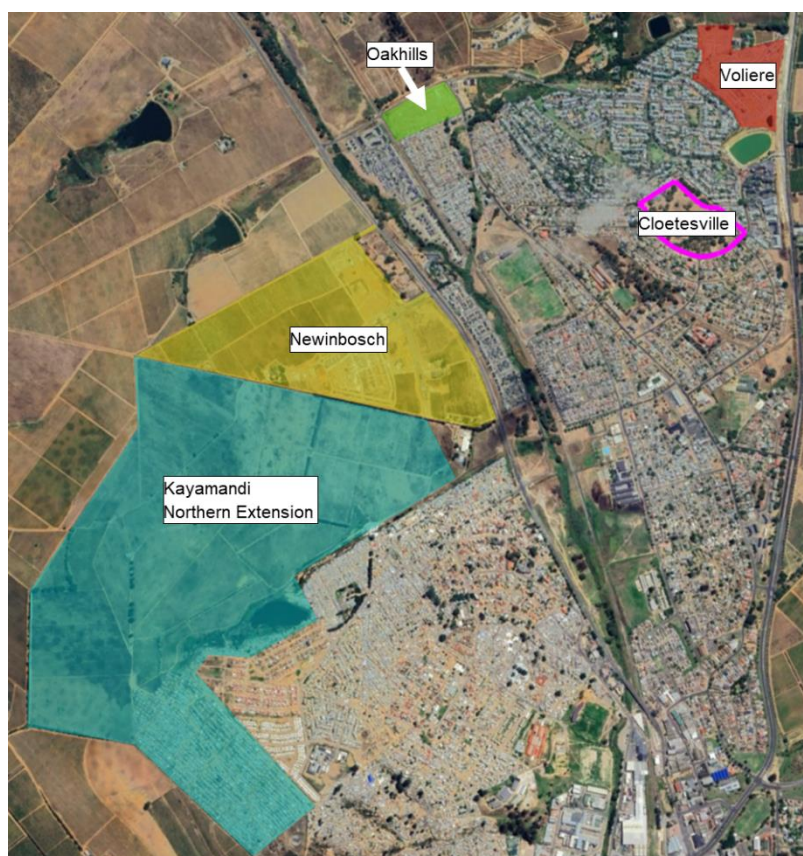


Figure 8: Previous Developments

3.4 Development Traffic

3.4.1 Trip Generation

TMH17 South African Trip Data Manual was used to estimate the number of peak hour trips. Since the development site is purely residential, Land Use code 200 was applicable, and weekday peak hour traffic volumes are considered. The trip generation rate and the in/out split that were used to estimate the traffic are shown below. And the estimated trips are summarised in Table 3.

Land Use: Residential (Code 200)	AM peak	PM peak
210: Single Dwelling Units - In / Out Split (%)	1.0 / Unit 25:75	1.0 / Unit 70:30

Table 3: Development Trip Generation (Unadjusted)

Land Use Type	Number	Trips	AM		PM	
			In	Out	In	Out
Single Residential	204	204	51	153	143	61
Total Trips		204	51	153	143	61

Trip Generation assumes a motorised vehicle trip; therefore, the typical trip rates are applicable to areas with high vehicle ownership and low public transport usage/availability. TMH17 therefore recommends trip reduction factors for developments and areas where the typical trip rate would not apply. Trip generation may be reduced based on a Mixed-use Development, Vehicle Ownership and Transit Availability. In correspondence between Zutari and Stellenbosch Municipality, it has been agreed that none of the COTO trip reductions are applicable for this development.

3.4.2 Trip Distribution

It is assumed that the generated trips will distribute throughout Cloetesville the same as the existing traffic.

The nature of the development is simply additional dwelling units in an already established residential neighbourhood. It is envisioned that the socio-economic profile of the new residents will be similar or the same to the rest of Cloetesville. There is therefore no reason to expect the traffic patterns to be different. The existing traffic counts were used to estimate:

1. The global distribution i.e., the proportion of traffic that will use specific accesses to the neighbourhood;
2. The local distribution i.e., the proportion of traffic assigned to each movement at a particular intersection.

Despite there being 3 signalised access roads in the suburb, it was assumed that 100% of the development traffic will use either the R304 or the R44 as the primary access road for Cloetesville. Based on the existing traffic patterns the following estimations were made about the *Global* traffic distribution shown in Figure 9.

- 77% AM traffic will enter via R304 and 23% traffic will enter via R44, 22% AM traffic will exit via R304 and 78% will exit via R44.
- 33% PM traffic will enter via R304 and 67% traffic will enter via R44, 53% PM traffic will exit via R304 and 47% traffic will exit via R44.

Thereafter it is assumed all traffic will take the most direct path to the erf 7001.

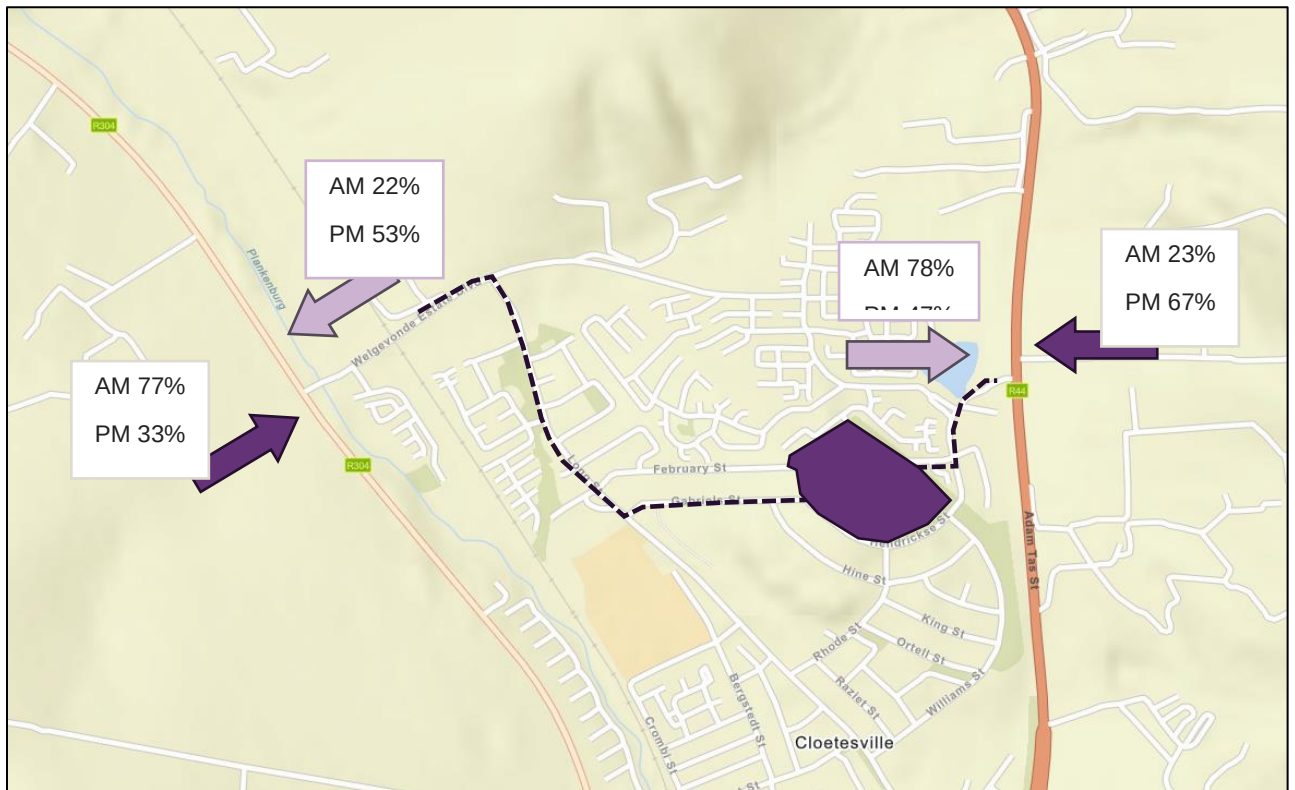


Figure 9: Global Trip Distribution

For the Local Distribution (i.e., the individual intersection movements)

- At the R304 x Welgevonden intersection

Table 4: AM and PM Distributions at R304/Welgevonden

AM Distribution	PM Distribution
South Bound, left turning: 67% North Bound, right turning: 33%	South Bound, left turning: 55% North Bound, right turning: 45%
West Bound, left turning: 28% West Bound, right turning: 72%	West Bound, left turning: 65% West Bound, right turning: 35%

- At the R44 x Hendrikse Intersection

Table 5: AM and PM Distributions at R44/Hendrikse Road

AM Distribution	PM Distribution
South Bound, right turning: 25% North Bound, left turning: 75%	South Bound, right turning: 19% North Bound, left turning: 81%
East Bound, left turning: 5% East Bound, right turning: 95%	East Bound, left turning: 26% East Bound, right turning: 74%

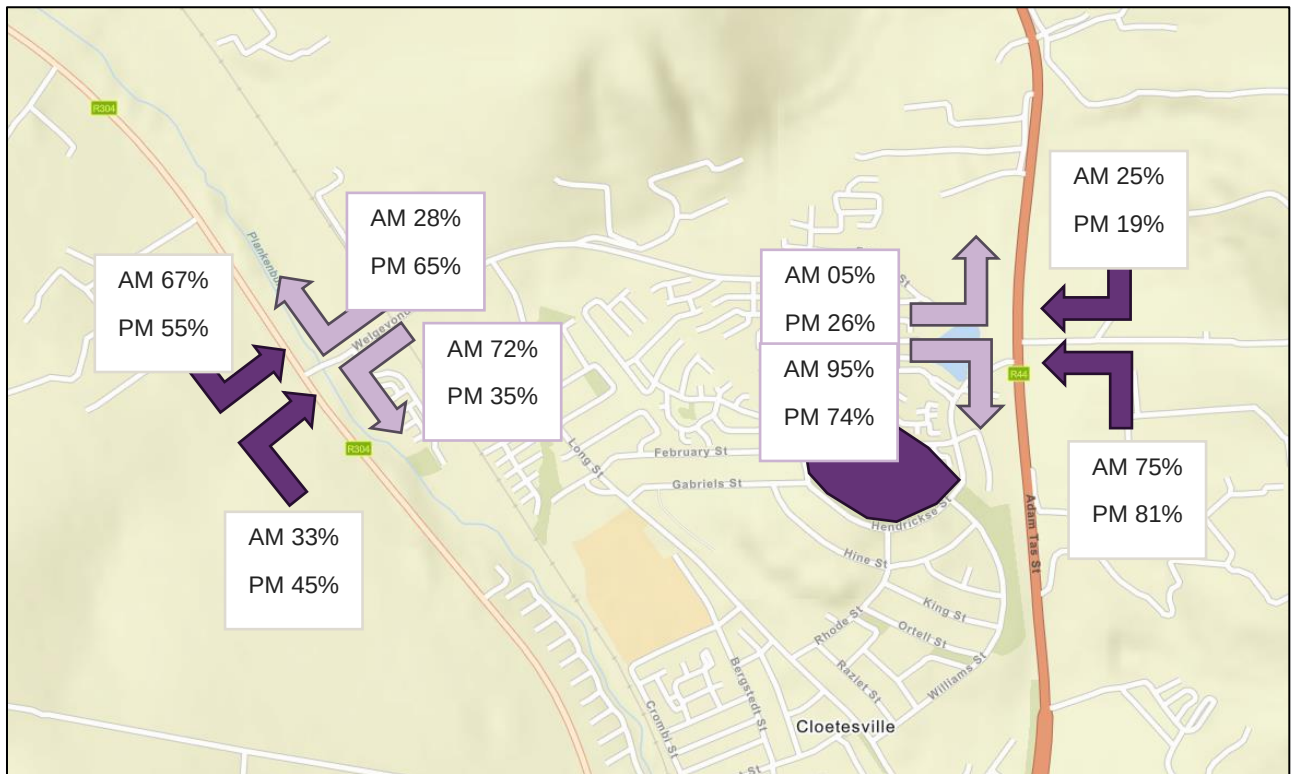


Figure 10: Global Trip Distribution

3.5 2026 Background Traffic (Escalated Existing + Previously Planned Development)

For the purpose of this TIA, it is assumed that the majority of the previously planned developments (Discussed in Section 3.3) will be completed by 2026. Thus, the total background traffic for 2026 was estimated by escalating the existing traffic conditions with a 2% growth rate over 4 or 2 years, depending on when traffic counts were conducted. Plus, the trips generated by the planned developments (Only Phase 1 of the Kayamandi Northern Extension). The results of modelling this scenario are summarised in Table 6, and included as Appendix D.

Based on the initial analyses results, the R304 / Welgevonden Boulevard and R44 / Hendrikse Road intersections were found to operate under unacceptable conditions. The poor performance of the R304 / Welgevonden Boulevard intersection is due to the growth in background traffic and the introduction of the Newwinbosch development, that is assumed to be completed by 2026. Similarly, the growth in background traffic with the introduction of the Voliere development causes the R44 / Hendrikse Road intersection to fail. Mitigation measures for these intersections will be proposed.

It is noted that the western leg of Intersection 2: Hendrikse Road / Tolbos Road experiences LOS F during the PM peak hour. However, according to the traffic counts only 1 vehicle was surveyed coming from the western leg. This is also not due to any of the introduced developments. The intersection operates at an overall acceptable LOS and is a minor intersection located in the residential area. Thus, this is not case for major concerns.

All other study intersections continue to operate at the acceptable LOS as with the existing traffic scenario.

Table 6: 2026 Background Traffic plus Previous Developments Intersection Analyses

No.	Intersection Name	Peak Period	Delay (sec)	V/C Ratio	Overall LOS	Approach Leg Level of Service			
						South	East	North	West
1	R44 / Hendrikse Road Traffic Signal	AM	142.4	1.28	F	B	B	F	F
		PM	9.8	0.66	A	A	C	A	C
2	Hendrikse Road / Tolbos Road All-way stop	AM	14.7	0.31	B	B	B	B	E
		PM	25.9	1	D	B	B	C	F
3	Hendrikse Road / Williams Road All-way stop	AM	13.8	0.23	B	C	B	-	B
		PM	13.4	0.26	B	C	B	-	B
4	Hendrikse Road / Rhode Street Yield on southern side	AM	1.1	0.07	A	A	A	-	A
		PM	1.7	0.06	A	A	A	-	A
5	Lang Road / Gabriels Road All-way stop	AM	15.7	0.74	C	B	C	C	-
		PM	10.5	0.39	B	B	C	B	-
6	Lang Road / Welgevonden Stop on southern side	AM	5.8	0.41	A	A	A	-	A
		PM	5.8	0.26	A	A	A	-	A
7	R304 / Welgevonden Blvd Traffic Signal	AM	180.4	1.45	F	F	F	F	-
		PM	138.0	1.48	F	F	F	C	-
8	R44 / Fir Street Traffic Signal	AM	17.0	0.86	B	A	-	B	E
		PM	4.9	0.61	A	A	-	A	D

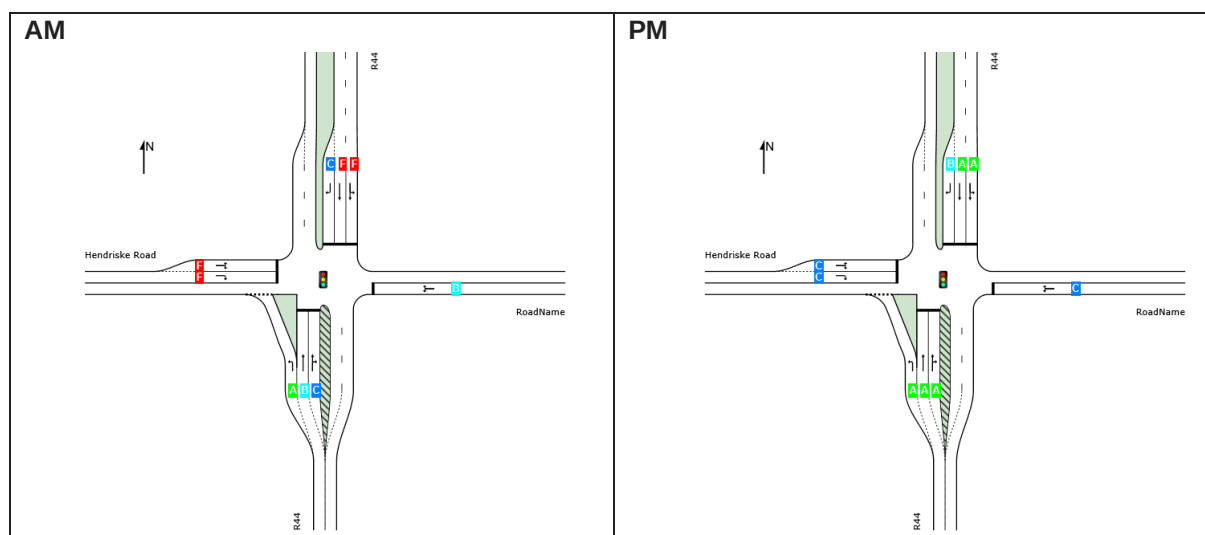


Figure 11: Intersection 1: R44 / Hendrikse intersection AM and PM LOS 2026 Background Traffic

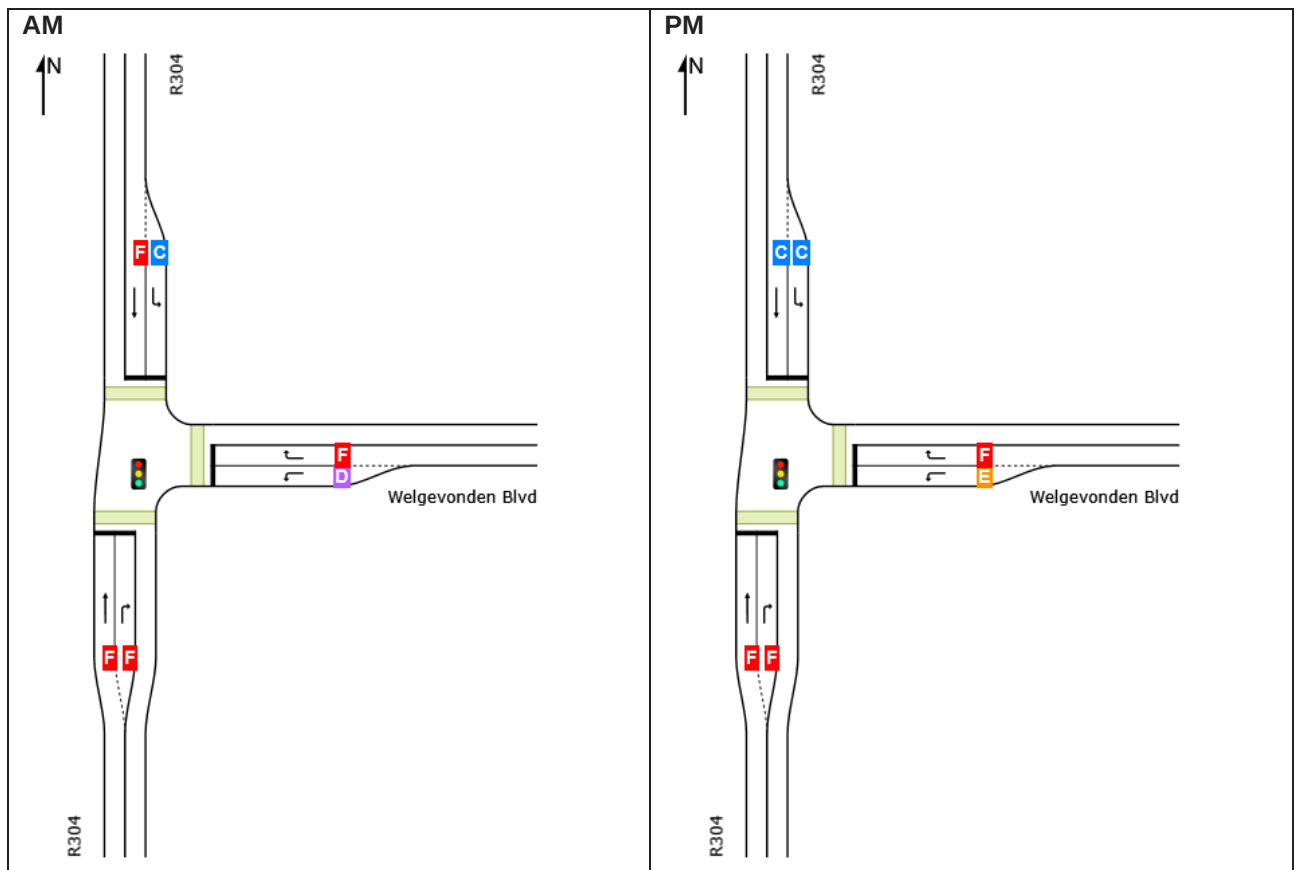


Figure 12: Intersection 7: R304 / Welgevonden Boulevard intersection AM and PM LOS 2026 Background Traffic

3.5.1 Mitigation Measures

The upgrade to Intersection 1: R44 / Hendrikse Road intersection is not sufficient with the growth in background traffic and the introduction of the previously planned developments. In addition to the upgrades proposed in Section 3.2.2, it may be necessary to dual the R44 between the R44 / Hendrikse Road and R44 / Fir Road intersection. The impact of the proposal is shown in Figure 13. Although the western approach still operates under LOS F conditions, the intersection overall operates under acceptable LOS E conditions during the AM peak hour.

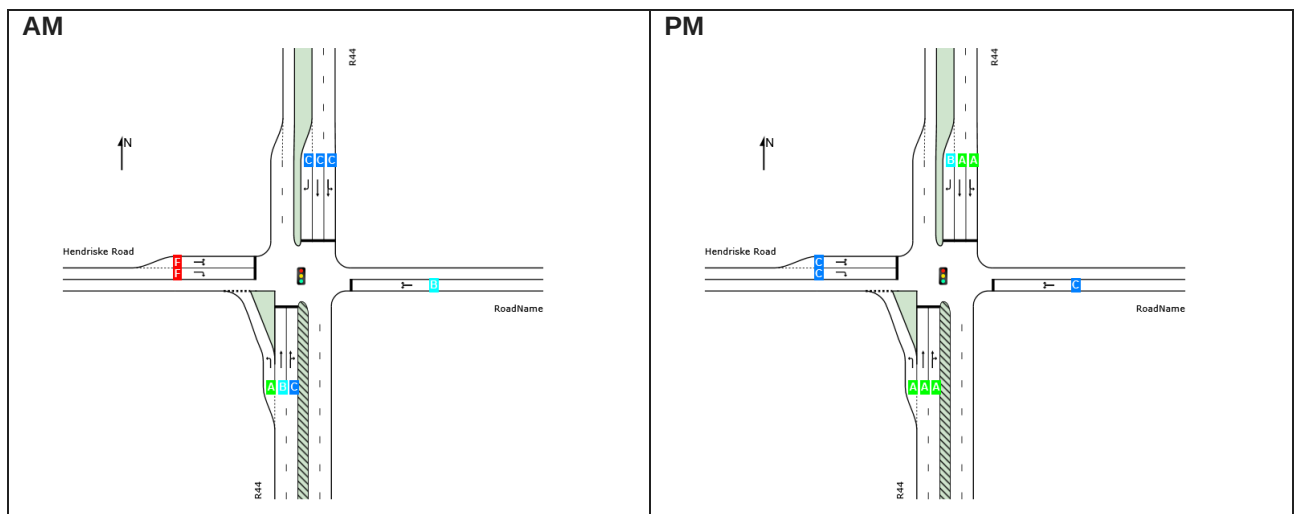


Figure 13: Intersection 1: R44 / Hendrikse Road intersection AM and PM LOS dualled R44

To address the poor performance of the R304 / Welgevonden Boulevard intersection it is proposed to upgrade the layout of the intersection as shown in Figure 14. As shown, it is proposed to dual the sections of the R304 approaching the R304 / Welgevonden Boulevard intersection. This is to accommodate the high background traffic volumes travelling on the R304 and the trips that are introduced by the Newwinbosch development.

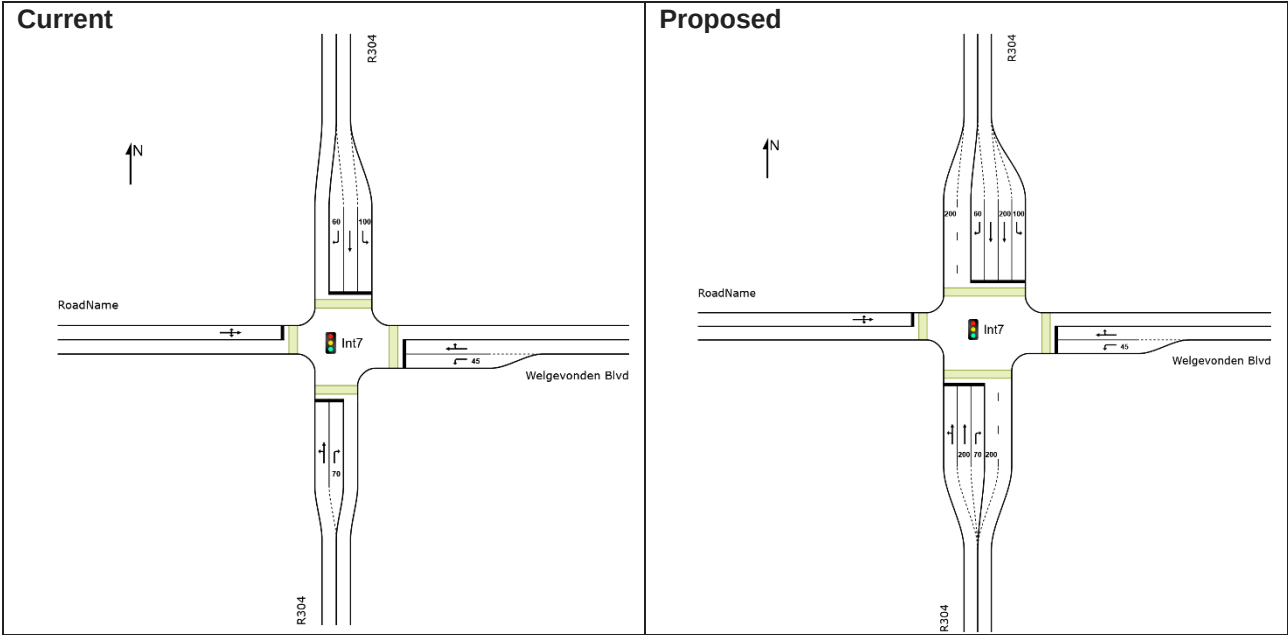


Figure 14: Upgraded Intersection 7: R304 / Welgevonden Boulevard Intersection

Figure 15 shows the LOS for the proposed upgrade R304 / Welgevonden Boulevard intersection. The dualling resulted in a significant improvement in the performance of the intersection. The western approach is not displayed in the figure below, since no traffic was observed using that approach during the traffic survey.

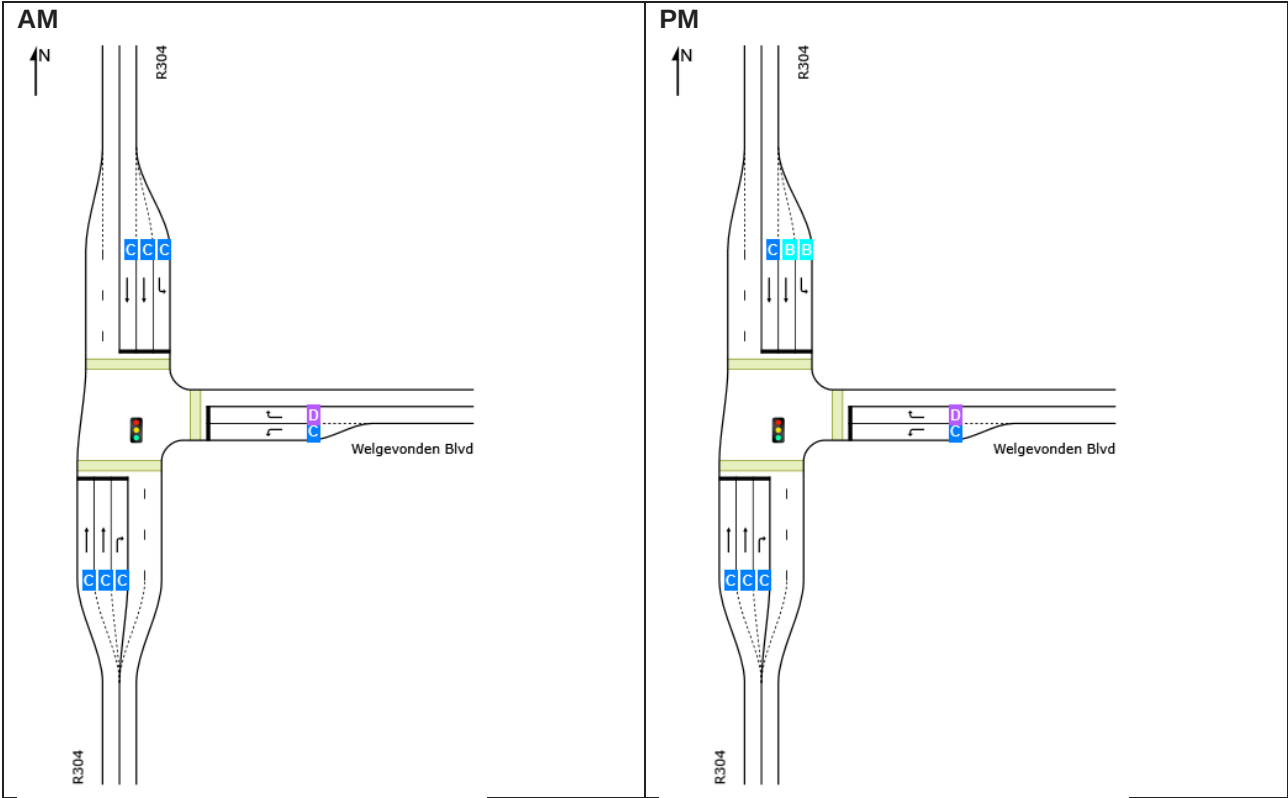


Figure 15: Upgraded Intersection 7: R304 / Wegevonden Boulevard - AM and PM LOS

3.6 2026 Total Traffic (Escalated Existing + All Developments)

For the purpose of this TIA, it is assumed that the Cloetesville development will also be completed by 2026. Thus, the total traffic for 2026 was estimated using:

- 1) The existing traffic conditions escalated with a 2% growth rate over 4 or 2 years, depending on when traffic counts were conducted.
- 2) The trips generated by the planned developments (Only Phase 1 of the Kayamandi Northern Extension) and the trips generated by the Cloetesville development.

The results of modelling this scenario are summarised in Table 7 and included as Appendix E.

Intersection 1: R44 / Hendrikse Road intersection was found to operate under unacceptable conditions during the AM Peak hour. As expected, this is due to the introduction of the Cloetesville development. Mitigation measures will be proposed.

It is noted that when the Cloetesville development traffic is added to the network, Hendrikse Road / Tolbos Road intersection operates at an overall acceptable LOS. However, the western leg of Intersection 2 experiences LOS F during the AM and PM peak hour. This is a minor intersection located in a residential area. The poor LOS is a result of the imbalance of the traffic volumes on each leg. Being a minor approach, this is not cause for concerns. However, the effect of converting this intersection into a stop control or priority control on just Tolbos Road approaches is shown in Figure 18.

The northern approach of Intersection 5: Lang Road / Gabriels Road was found to operate under LOS F conditions during the AM peak hour. But overall, the intersection operates under acceptable LOS E conditions. This intersection is not a major concern at the moment. This intersection could also potentially be converted to only have a priority control or stop control on Gabriels Road. The affects are shown in Figure 19

All other study intersections will continue to operate at acceptable LOS as with the 2026 background traffic plus all development traffic scenario.

Table 7: 2026 Total Traffic Intersection Analyses

No.	Intersection Name	Peak Period	Delay (sec)	V/C Ratio	Overall LOS	Approach Leg Level of Service			
						South	East	North	West
1	R44 / Hendrikse Road Traffic Signal	AM	109.5	1.21	F	C	B	D	F
		PM	9.5	0.65	A	A	C	A	C
2	Hendrikse Road / Tolbos Road All-way stop	AM	18.0	0.51	C	B	B	B	F
		PM	31.5	1.00	D	B	B	B	F
3	Hendrikse Road / Williams Road All-way stop	AM	14.0	0.31	B	C	B	-	B
		PM	13.7	0.32	B	C	B	-	B
4	Hendrikse Road / Rhode Street Yield on southern side	AM	2.3	0.09	A	A	A	A	A
		PM	2.8	0.08	A	A	A	A	A
5	Lang Road / Gabriels Road All-way stop	AM	41.1	0.97	E	B	C	F	-
		PM	16.8	0.60	C	C	C	C	-
6	Lang Road / Welgevonden Stop on southern side	AM	5.9	0.43	A	A	A	-	A
		PM	5.8	0.28	A	A	A	-	A
7	R304 / Welgevonden Blvd	AM	26.1	0.73	C	C	D	C	-

No.	Intersection Name	Peak Period	Delay (sec)	V/C Ratio	Overall LOS	Approach Leg Level of Service			
						South	East	North	West
	Traffic Signal	PM	26.4	0.78	C	C	C	B	-
8	R44 / Fir Street	AM	17.0	0.86	B	A	-	B	E
	Traffic Signal	PM	4.9	0.61	A	A	-	A	D

3.6.1 Mitigation Measures

Further upgrades to Intersection 1: R44 / Hendrikse Road intersection is required to accommodate the additional trips introduced by the Cloetesville development. It is further proposed to extend the short lane on Hendrikse Road as shown in Figure 16. It is showed on the old intersection layout, but it is only for illustrative purposes. This extension results in the short lane having a total length of approximately 80 meters, an approximate 60 meter extension. The impact of the proposal is shown in Figure 17.



Figure 16: Extension of short lane on Hendrikse Road.

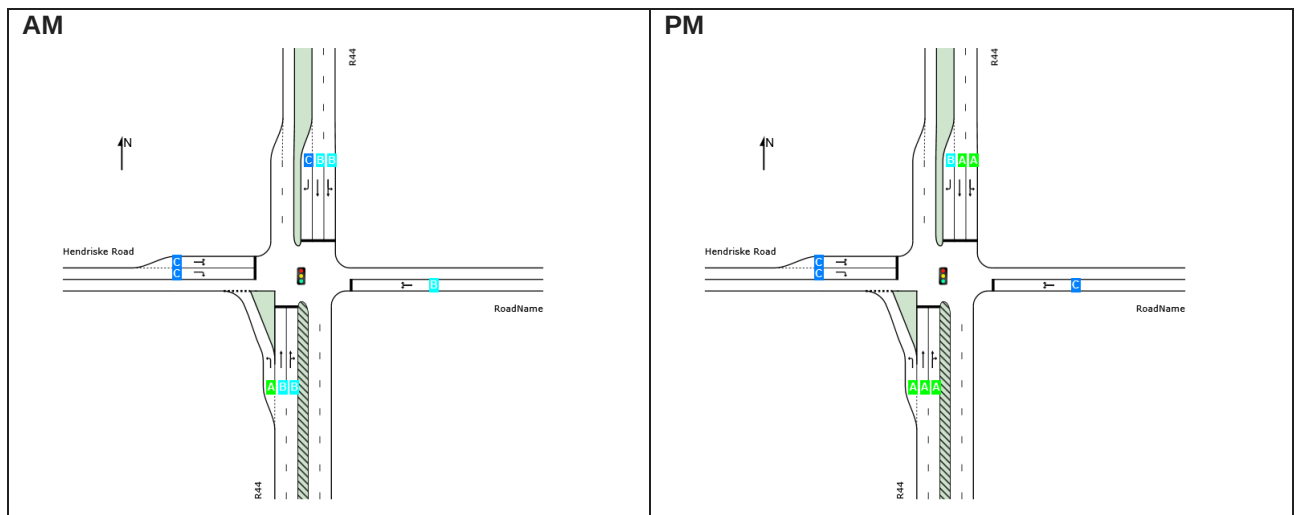


Figure 17: Intersection 1: R44 / Hendrikse Road Intersection AM and PM LOS dualled R44 with extended short lane on Hendrikse Road

As shown in Figure 18 converting Intersection 2: Hendrikse Road / Tolbos Road into an only a priority or stop control on Tolbos Road improves the performance of the intersection.

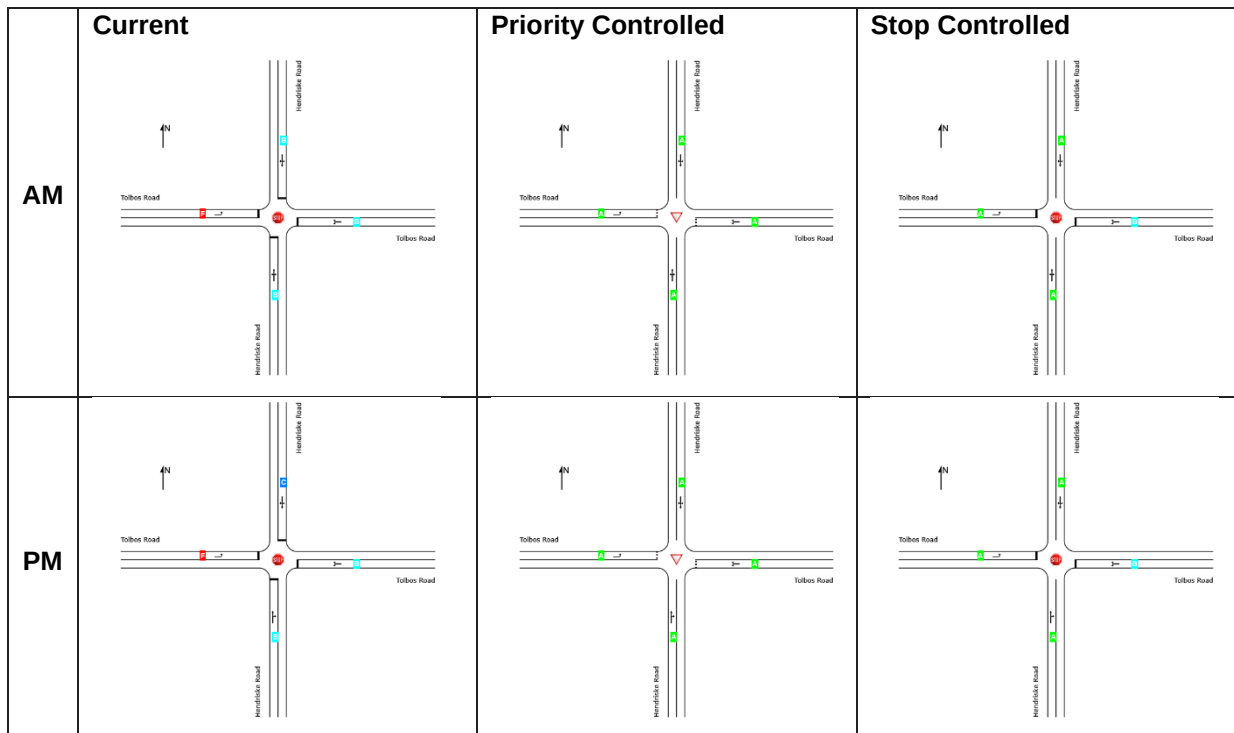


Figure 18: Intersection 2: Hendrikse Road / Tolbos Road Conversion affect 2026 Background Traffic plus All Developments

As shown in Figure 19 converting Intersection 5: Lang Road / Gabriels Road into only a priority or stop control on Gabriels Road improves the performance of the intersection.

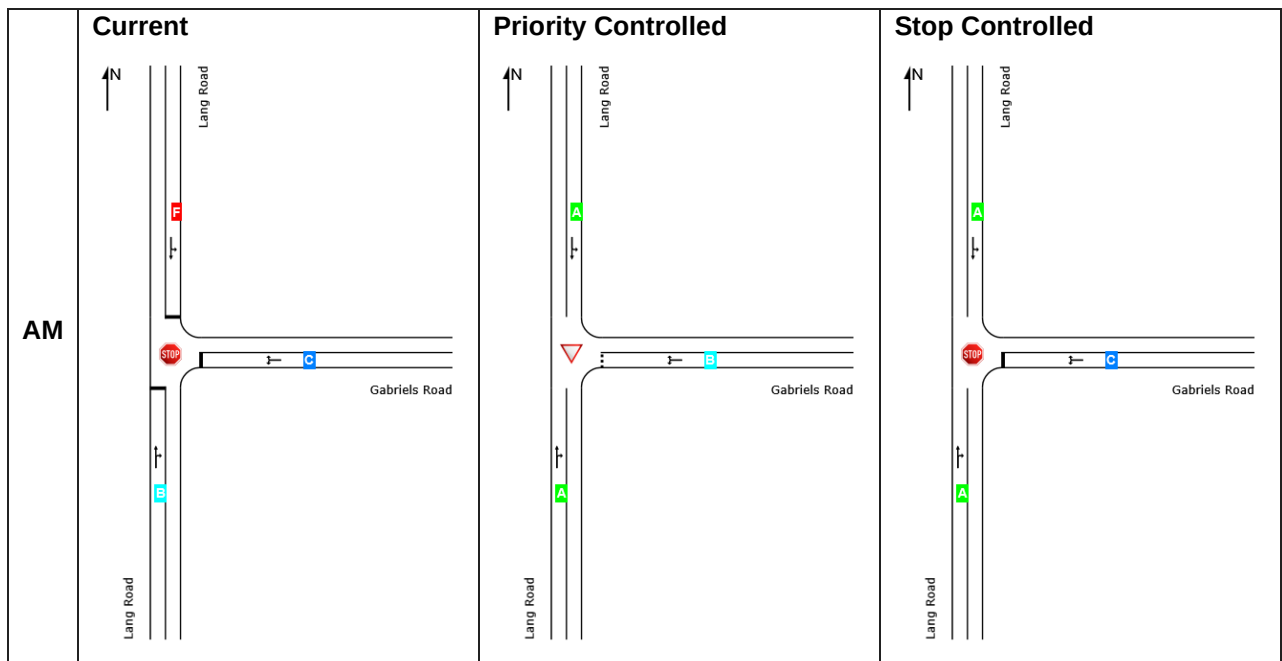


Figure 19: Intersection 5: Lang Road / Gabriels Road Conversion affect 2026 Background Traffic plus All Developments

3.7 2031 Future Traffic (Escalated Existing + All Developments)

The future traffic, 5 years post implementation of the Cloetesville development (2031) traffic conditions, was also evaluated. The future traffic consisted of the existing traffic escalated with a 2% growth rate over 9 or 7 years (depending on when the traffic counts were conducted), plus all development trips (which included the entire Kayamandi Northern Extension). The results of modelling this scenario are summarised in Table 8 and included as Appendix F.

As mentioned previously, Intersection 2: Hendrikse Road / Tolbos Road with the introduction of the Cloetesville development the intersection still operates at an overall acceptable LOS and is a minor intersection located in the residential area. Thus, this is not a major concern. However, the affects of converting this intersection into a stop control or priority control on just Tolbos Road is shown in Figure 21.

Intersection 5: Lang Road / Gabriels Road was found to operate under LOS F conditions. Due to the poor performance of the northern approach. As a mitigation measure, it may be beneficial to convert this intersection to only include a priority control or stop controlled on Gabriel Road, which is the minor approach. The effect of converting the intersection is shown in Figure 22.

The R304 / Welgevonden Boulevard intersection (Intersection 7) was found to operate under poor conditions during the AM and PM for estimated 2031 traffic conditions. It may be necessary to dual the R304 further beyond the Welgevonden Boulevard heading north, however this may only shift the problem area further north. Or an entirely separate solution may be required. Such as the potential of the Western Bypass that is planned to be implemented in the Stellenbosch area. The Western Bypass could relief some of the traffic congestion on the R304, however it can not be tested in this TIA since it is beyond the scope.

For Intersection 8: R44 / Fir Street the minor approaches were found to operate under LOS F conditions during the AM peak hour. The volumes on these minor approaches are insignificant compared to the volumes travelling on the major approach, on the R44. These approaches experience acceptable LOS, additionally the delays experienced on these minor approaches are just over a minute long (82 – 85 seconds). The performance of these minor approaches is thus not a major concern as of yet.

Table 8: 2031 Future Traffic Intersection Analyses

No.	Intersection Name	Peak Period	Delay (sec)	V/C Ratio	Overall LOS	Approach Leg Level of Service			
						South	East	North	West
1	R44 / Hendrikse Road Traffic Signal	AM	29.4	0.90	C	C	B	C	C
		PM	10.0	0.71	B	A	C	A	C
2	Hendrikse Road / Tolbos Road All-way stop	AM	18.3	0.53	C	B	B	B	F
		PM	30.9	1.00	D	B	B	C	F
3	Hendrikse Road / Williams Road All-way stop	AM	14.1	0.33	B	C	B	-	B
		PM	13.8	0.35	B	C	B	-	B
4	Hendrikse Road / Rhode Street Yield on southern side	AM	2.3	0.09	A	A	A	A	A
		PM	2.8	0.09	A	A	A	A	A
5	Lang Road / Gabriels Road All-way stop	AM	74.4	1.06	F	B	D	F	-
		PM	18.8	0.68	C	C	C	C	-
6	Lang Road / Welgevonden Stop on southern side	AM	6.1	0.50	A	A	A	-	A
		PM	5.9	0.33	A	A	A	-	A
7	R304 / Welgevonden Blvd Traffic Signal	AM	66.3	0.99	E	E	D	E	-
		PM	94.6	0.87	F	F	D	D	-
8	R44 / Fir Street Traffic Signal	AM	35.3	0.97	D	A	-	D	F
		PM	5.2	0.67	A	A	-	A	D

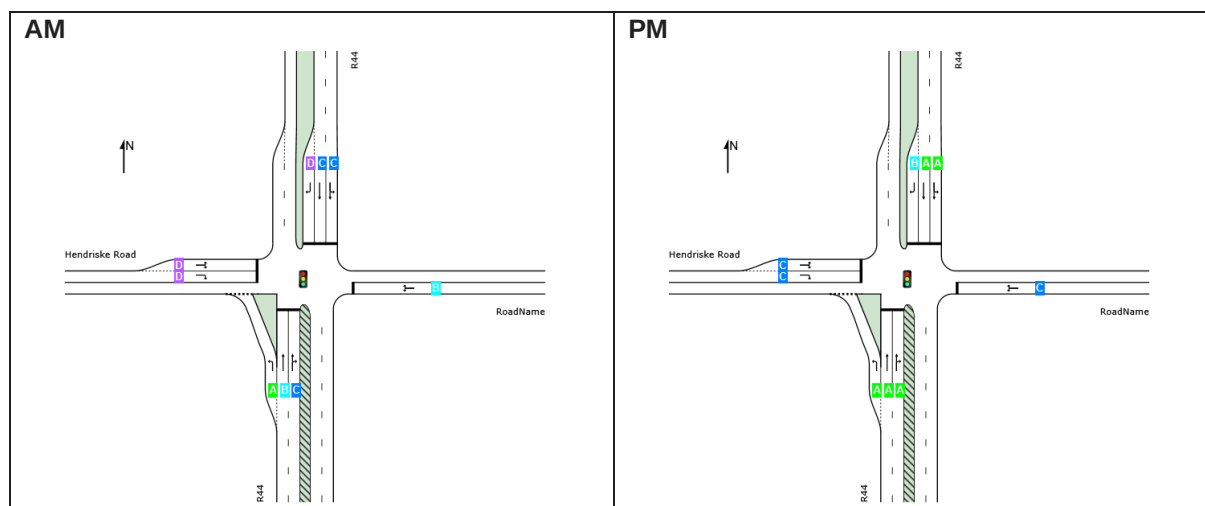


Figure 20: Intersection 1: R44 / Hendrikse Road - AM and PM LOS future 2031 Traffic Conditions

3.7.1 Mitigation Measures

As shown in Figure 21, converting Intersection 2: Hendrikse Road / Tolbos Road into either only a stop or priority control on Tolbos Road are both affective in improving the performance of the intersection.

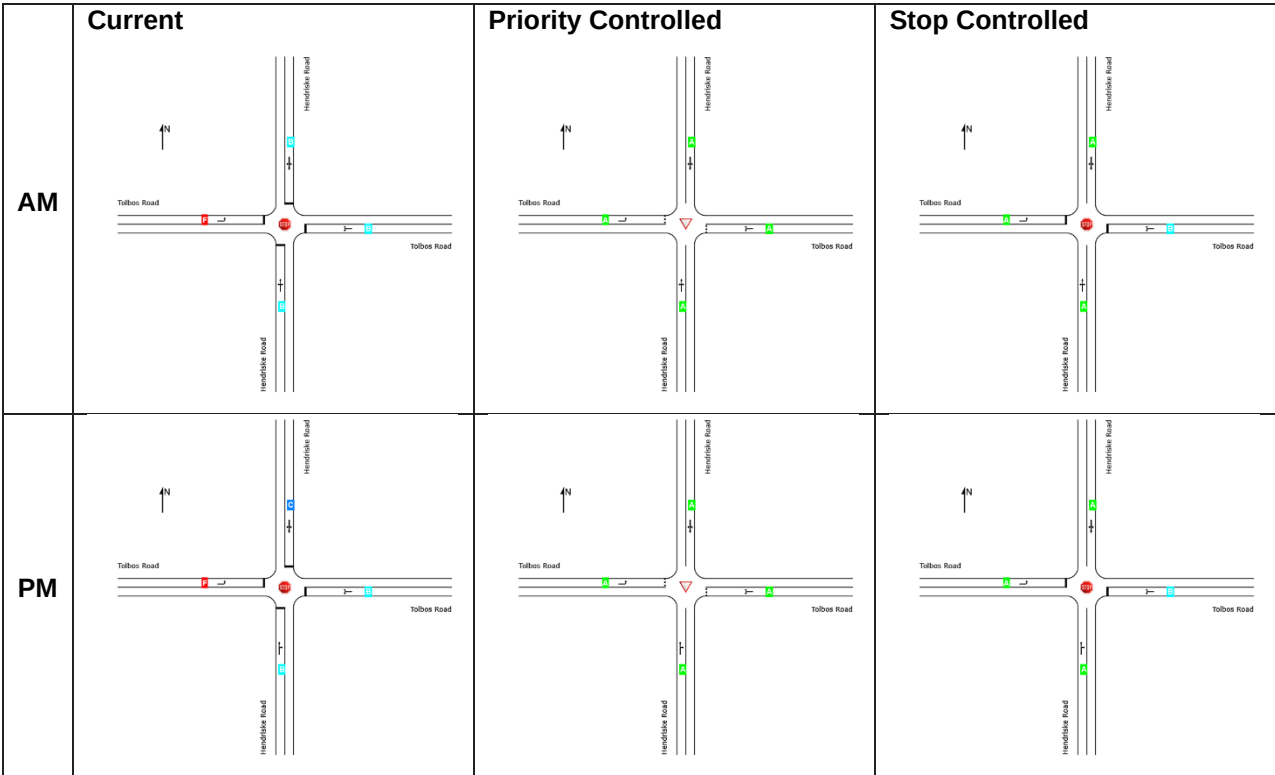


Figure 21: Intersection 2: Hendrikse Road / Tolbos Road Conversion affect future 2031 Traffic Conditions

As shown in Figure 22, converting Intersection 5: Lang Road / Gabriels Road into either only an stop or priority control on Gabriels Road are both affective in improving the performance of the intersection.

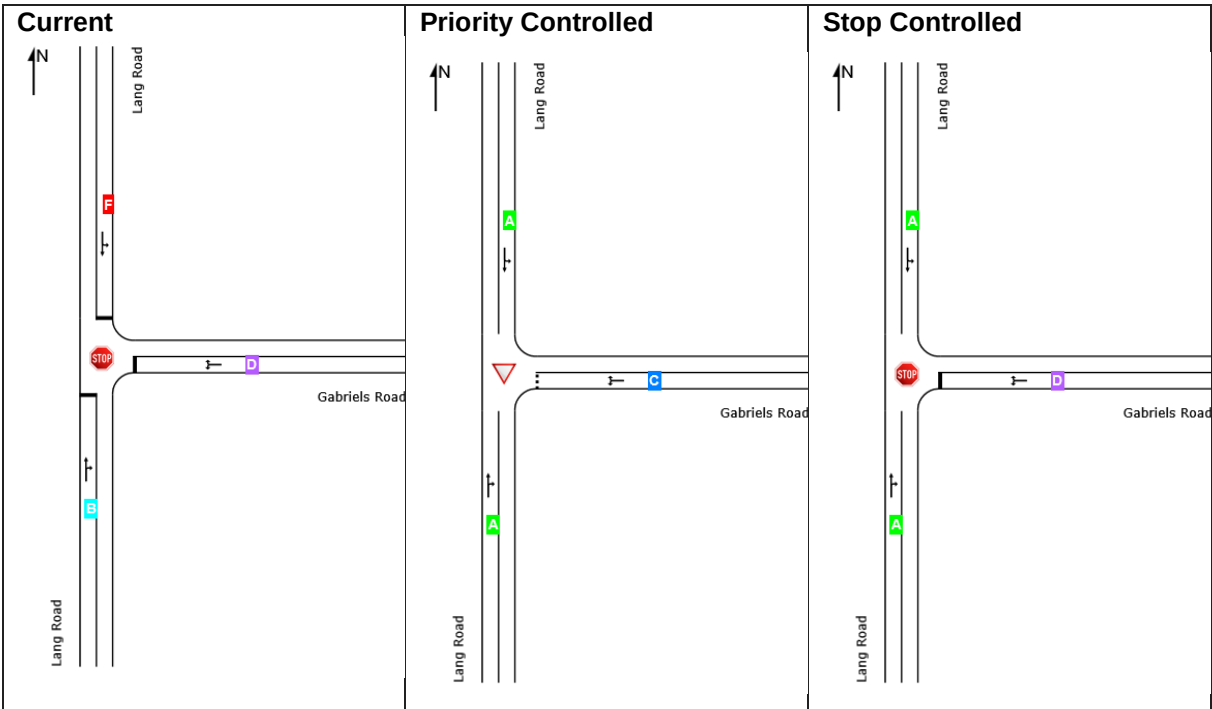


Figure 22: Intersection 5: Lang Road / Gabriels Road Converted affect during AM Peak hour future 2031 Traffic Conditions

4 Access Management

Based on the intersection modelling and analysis of traffic patterns in Cloeteville, it is evident that the intersection of R44 and Hendrikse requires some attention even with the already planned upgrades. However, the physical constraints of the site make upgrading the intersection, like providing a second right turn lane, a challenge. Hendrikse Road is one of the main access roads to both Cloeteville **and** Welgevonden Estate. There is also a *mini* commercial hub right at the intersection. For these reasons the traffic congestion is **already** quite bad and will likely only increase in the future, regardless of the proposed development.

A contributing factor to the poor LOS at R44 x Hendrikse is that this portion of the R44 is a single carriageway. The southern portion is a dual carriageway. This single carriageway portion is the location of the **only** signalised access to Cloeteville from the R44. Whereas over the dualled portion, there are two stop controlled accesses to Cloeteville.

An option to consider is providing another signalised access road from the R44 into Cloeteville. Currently both Fir Road is a two-way stop-controlled intersections onto the R44. This intersection easily facilitates left turn movements, but right turning vehicles rely on gaps in traffic and have to cross a 2-lane carriageway and median, because the R44 is dualled at these locations. In terms of signalised access spacing, Fir Road is located 1.1km from Hendrikse Road in the north and 1.2km north of the next signalised intersection. Providing another signalised access for Cloeteville will help distribute traffic and alleviate the pressure at Hendrikse Road.

On the western edge, the Welgevonden Blvd intersection will require some upgrading, however this is not caused by the Cloeteville development but rather by growth in background traffic and other planned developments. The R304 needs to be considered carefully, given the high traffic volumes and the size of the planned developments adjacent to the R304.

5 NMT and Public Transport

An increase in pedestrian activity can be expected on the Cloeteville road network, either as the main mode of transport or as a means of accessing public transport. Therefore, the Municipality should consider the existing and required expansion of NMT and PT facilities. Figure 23 shows the existing and proposed PT and NMT facilities.

As shown in Figure 23, the NMT facilities in the study area are extensive, with sidewalks along Williams Road, Rhode Road, Gabriels Road and most of Hendrikse Road. It is proposed to extend the sidewalks along Hendrikse Road along its entire length, from the R44 intersection to the February intersection. It is also proposed to provide sidewalk facilities along Tolbos Road and February Road.

A significant number of traffic calming elements are also found in the study area, in the form of speed bumps. Expansion on these elements are proposed in Figure 23, ten new traffic calming elements are proposed. Which include six new speed bumps and four new raised intersections. Due to the topography of the study area it will be essential to reduce the speeds of vehicles. Three speed bumps proposed are also located near turns in the road, February Road, Gabriels Road and Tolbos Road, to reduce vehicle speeds through the turns.

Two new potential PT drop off points are also proposed as shown in Figure 23. These areas have sufficient space available to accommodate an PT embayment stop.



Figure 23: Proposed PT and NMT Expansion

6 Conclusions

Based on the assessment of future traffic conditions, all the study intersections inside Cloetesville *can* operate at acceptable LOS. All the future scenarios continue to operate at the **same** Levels of Service as the background traffic scenario. This is evidence that the delay and LOS issues at the key intersections are systemic and not as a result of the introduction of the development. Adjustments to the R304 intersection can improve the LOS for all approaches. The intersection of R44 and Hendrikse Road is a concern, however it can operate under acceptable conditions with additional upgrades.

- The R44 x Hendrikse intersection requires attention from the Municipality and/or the Western Cape Government, regardless of the proposed development. Even with the current upgrades under construction, it may not be sufficient to accommodate the traffic volumes travelling through the intersection. Especially, the volumes turning right from Hendrikse Road. It has been demonstrated that changes to the layout can have a positive impact on the overall LOS, especially the R44 approaches. Providing an additional extended right turning lane is also recommended on the Hendrikse approach.

- An option for consideration is providing another signalised intersection on the R44 at Fir Road which is currently two-way stop controlled. Fir Road is approximately 1.2km south of Hendrikse Road. Providing another signalised access on the R44 for Cloeteville will help distribute traffic and alleviate the pressure at Hendrikse Road; and not impact overall mobility of the route.
- The intersection of R304 x Welgevonden is the only access from the West into Cloeteville. The R304 is one of the key links of the N1 and Stellenbosch CBD. As Cloeteville and Welgevonden continue to grow more and more pressure will be placed on this intersection.
 - Currently operates under acceptable LOS conditions.
 - This intersection needs to be upgraded later on to accommodate the growth in Background traffic and the introduction of the Newinbosch Development under construction. The Cloeteville Development has little impact on this intersection.
- The SIDRA modelling revealed that both the control systems for the Hendrikse / Tolbos and Lang Road / Gabriel Road can be converted into a stop or priority control on only the minor approaches. However, there are site constraints and safety concerns that are improved by having the stop controlled intersection.
- An increase in pedestrian activity is expected, consideration must be given to expanding the provision of sidewalks along Hendrikse Road and Gabriels Road to link with Lang Street which is the main route for public transport within Cloeteville.

7 Recommendations

From a traffic and transport point of view there is no reason for this infill housing project to not be approved. The additional traffic created by the development is not the cause of the failing intersection at the R44.

It is recommended that the signal phasing at the R304 x Welgevonden intersection be reviewed in light of intersection modelling results in this report. In addition, to upgrading this intersection by dualling of sections of the R304 leading up to the intersection.

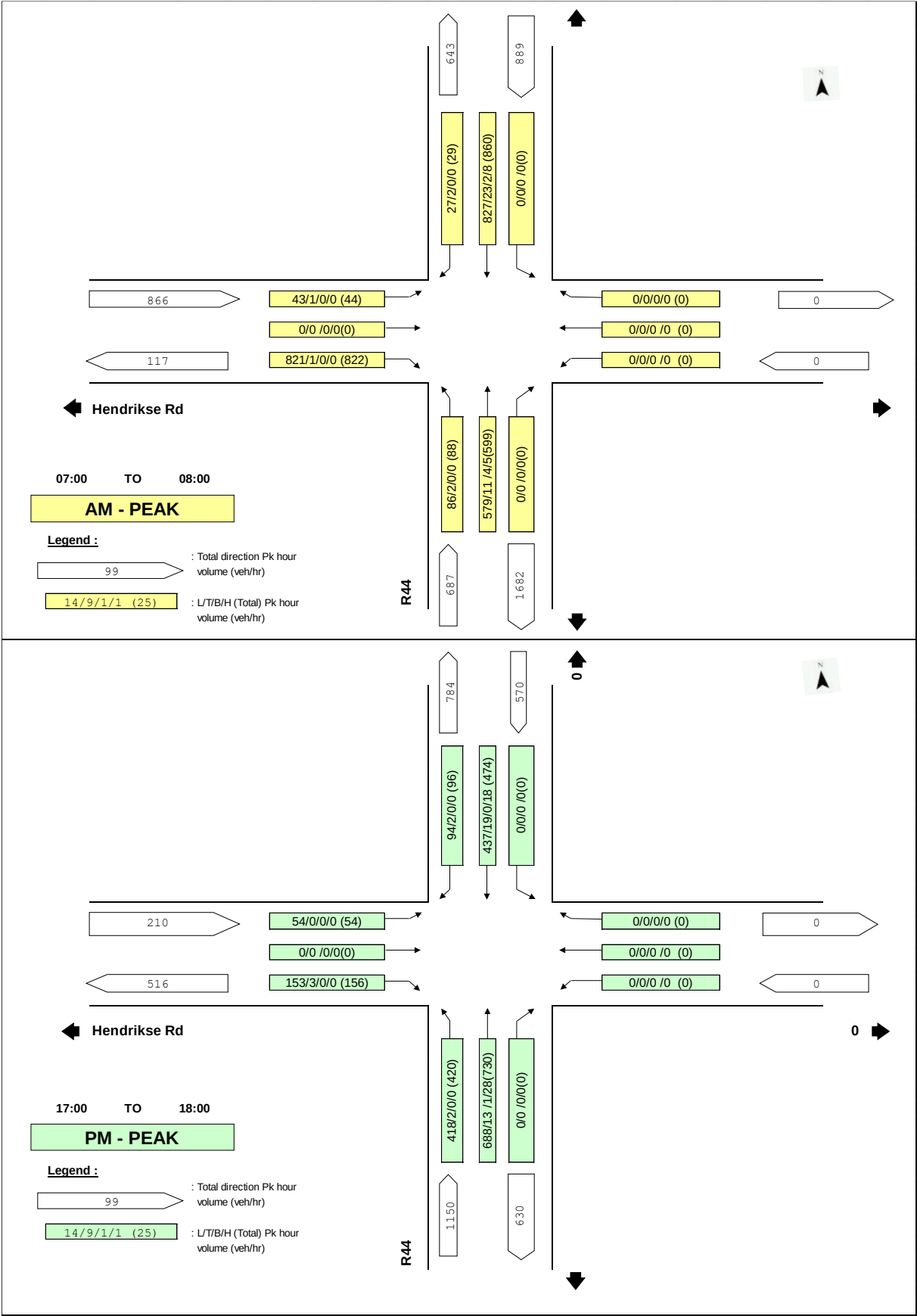
It is recommended that the signal phasing at the R44 x Hendrikse intersection be reviewed in light of intersection modelling results in this report. In addition, the R44 be fully dualled between the R44 / Hendrikse and R44 / Fir Street. Also, to extend the existing/planned short turning lane and make it an additional right turning lane.

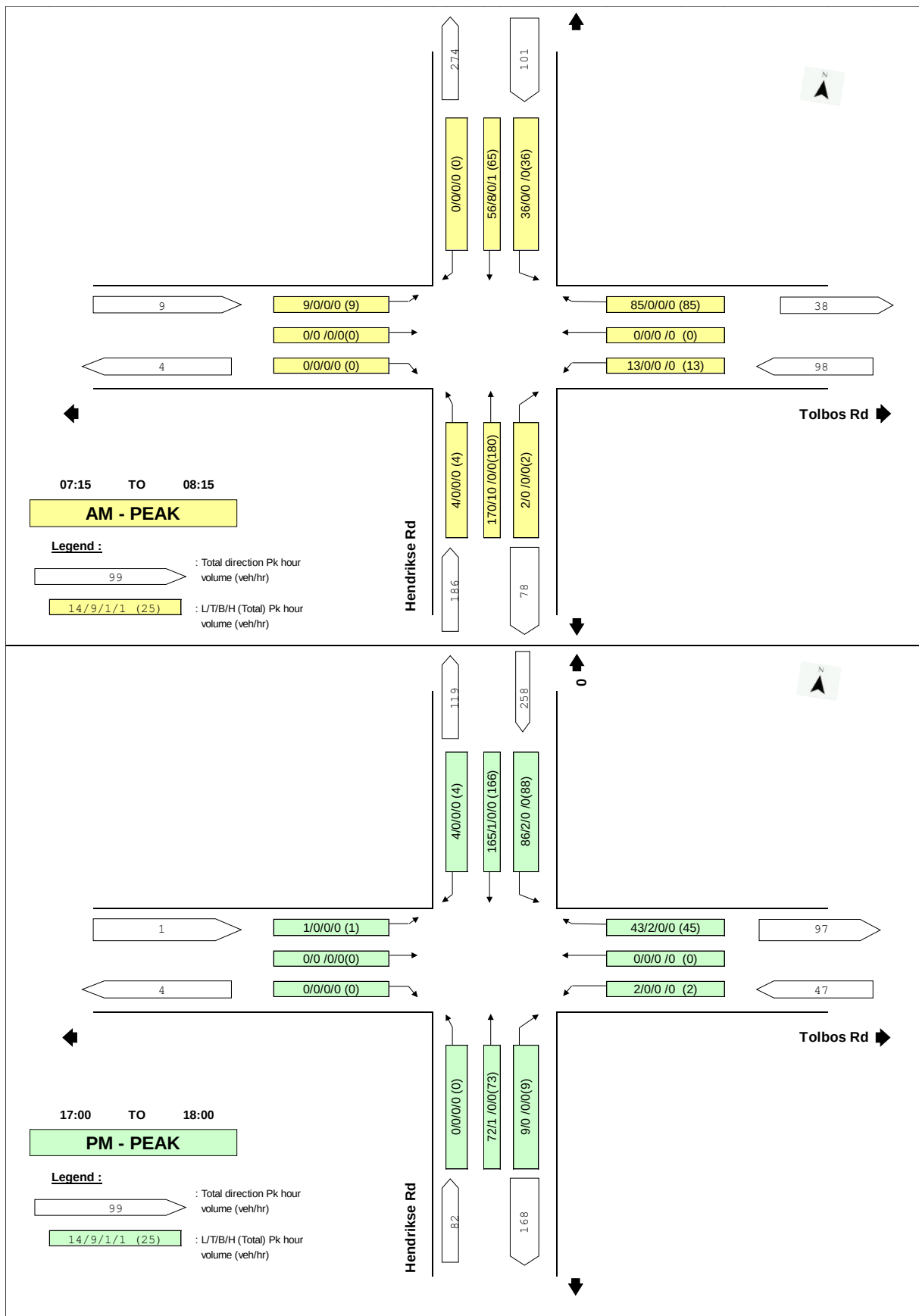
It is recommended to convert the existing R44 / Fir Street stop-controlled intersection into a signalised intersection.

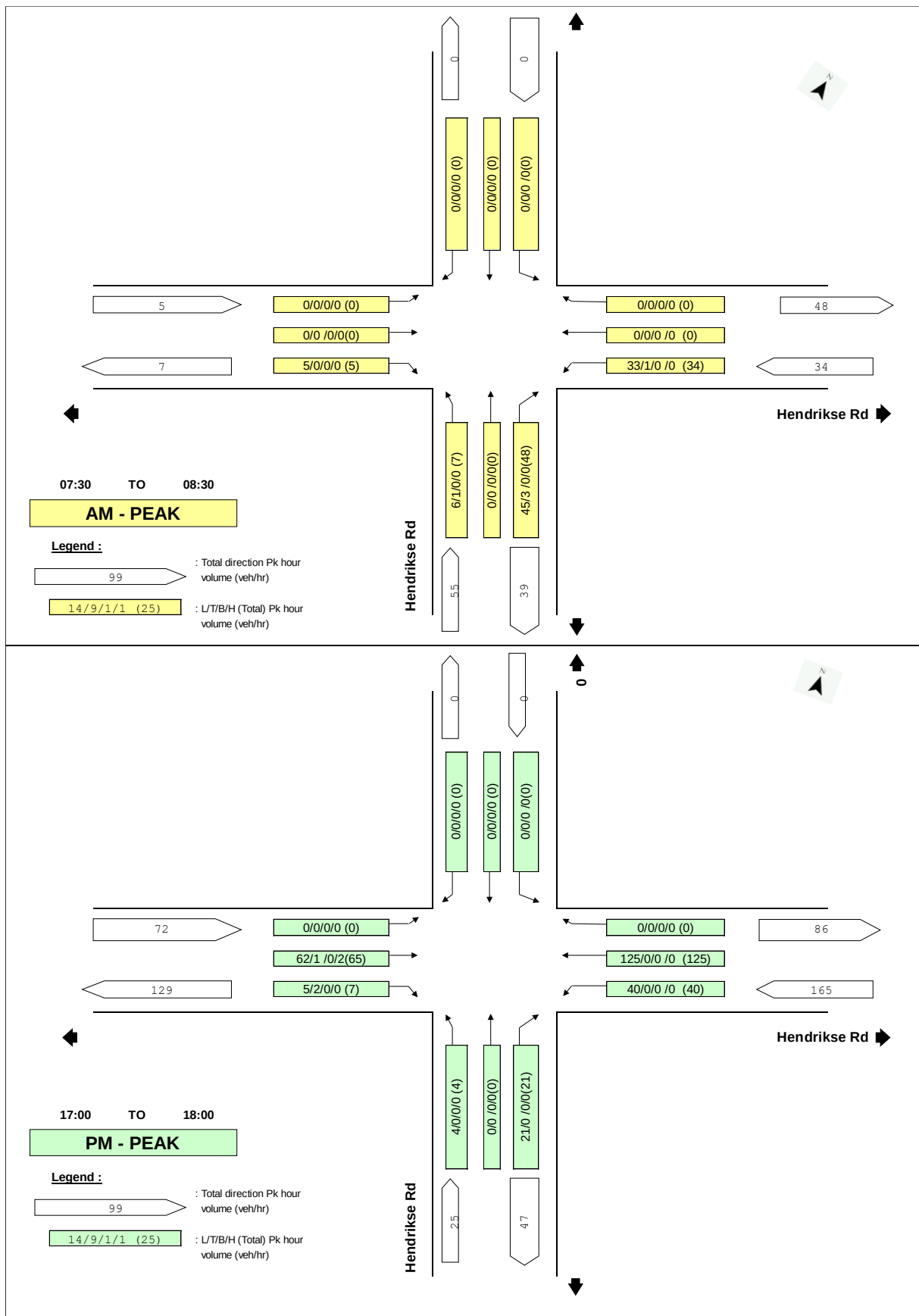
Finally, it is recommended that the Arterial Management plan for the R44 and R304 be reviewed in the light of the proposed signalisation of the Fir Road and R44 intersection and the plans for dualling the portion of the R44 adjacent to Cloeteville. Given the growth of the Cloeteville and its surrounding neighbourhoods, the dualling of the R44 will be needed in the near future. With the introduction of large development adjacent to the R304 and the high traffic volumes currently travelling on the R304, an alternative plan to alleviate traffic on the R304 must be further investigated, like the Western Bypass.

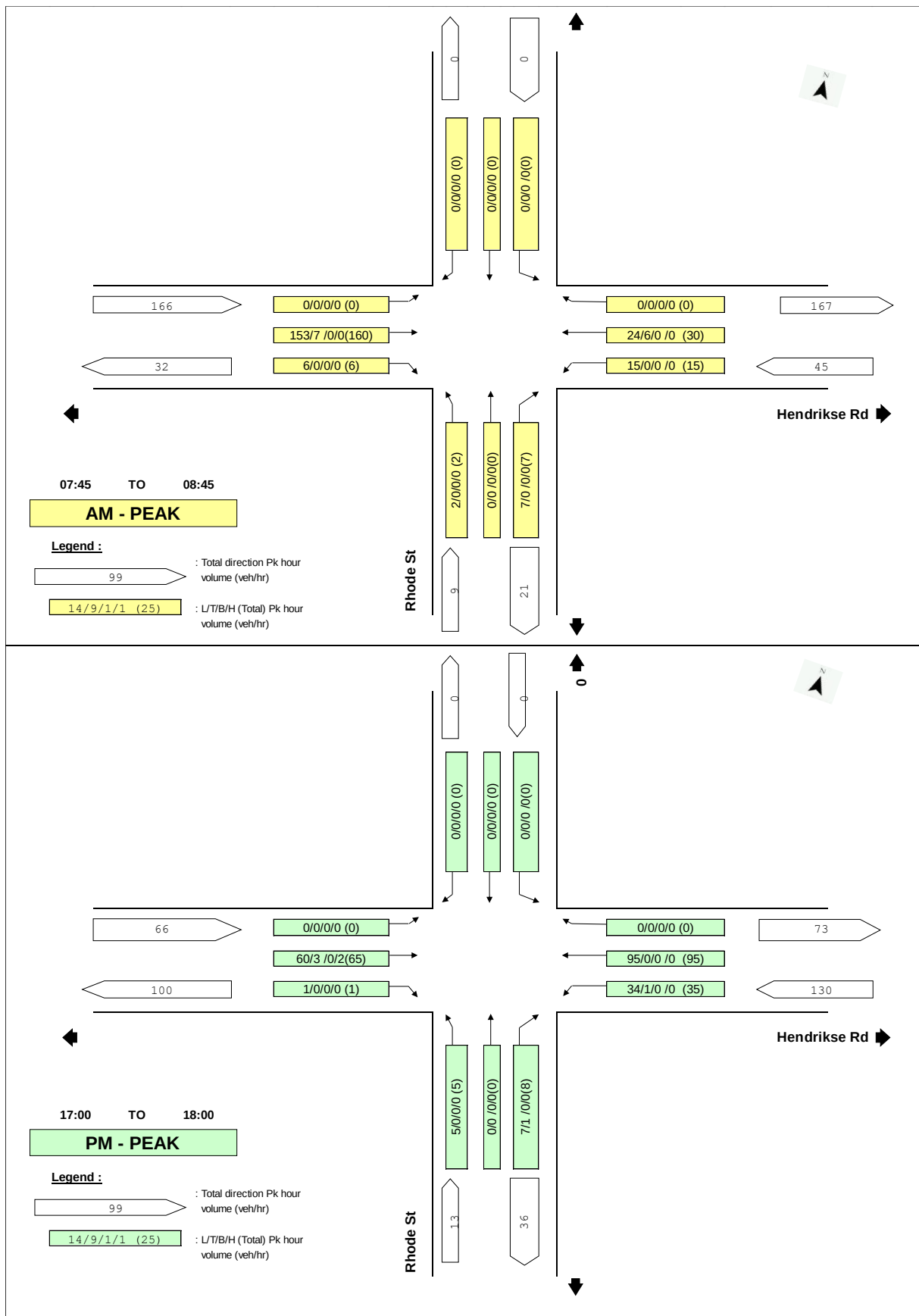
Appendix A

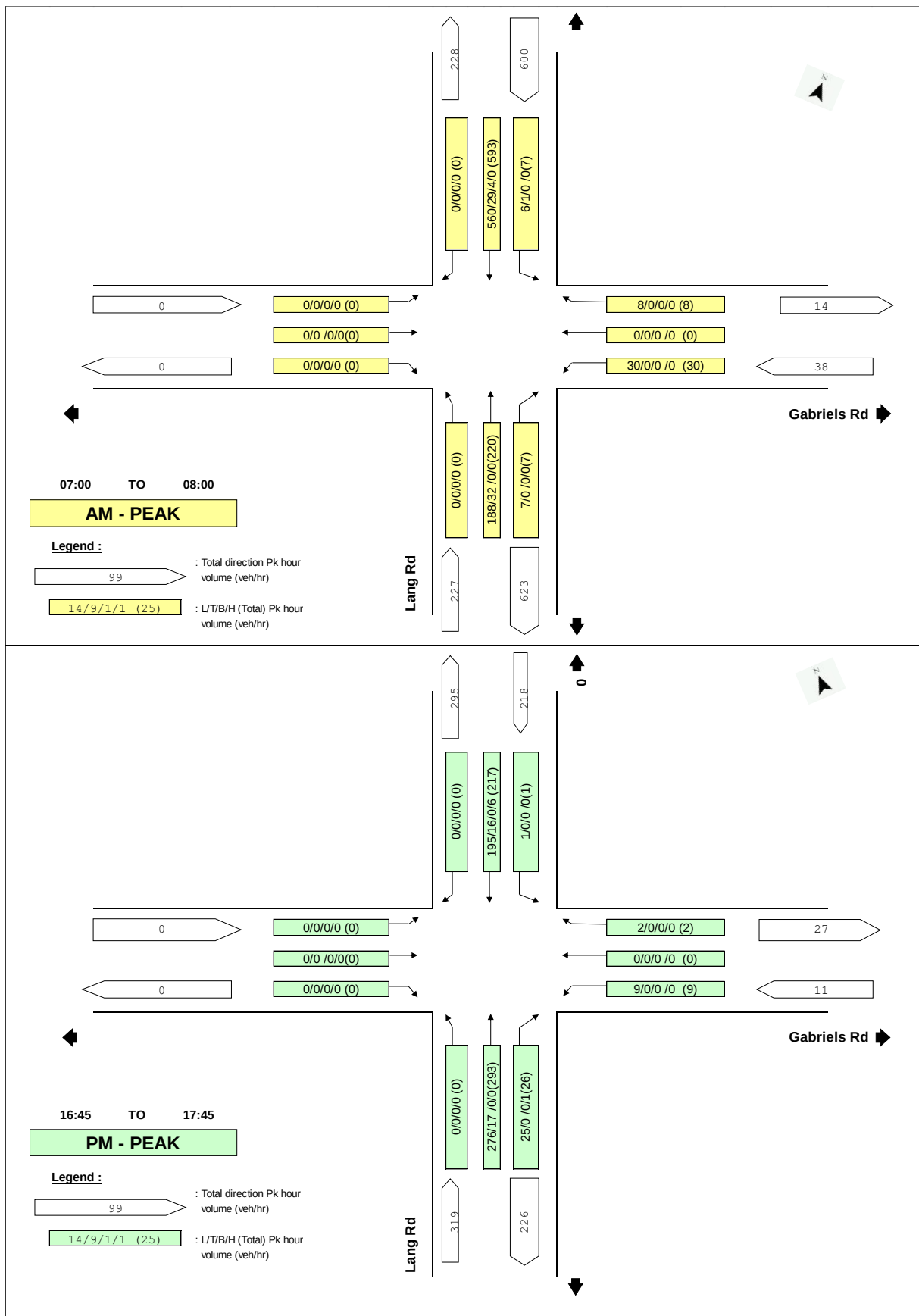
Traffic Counts

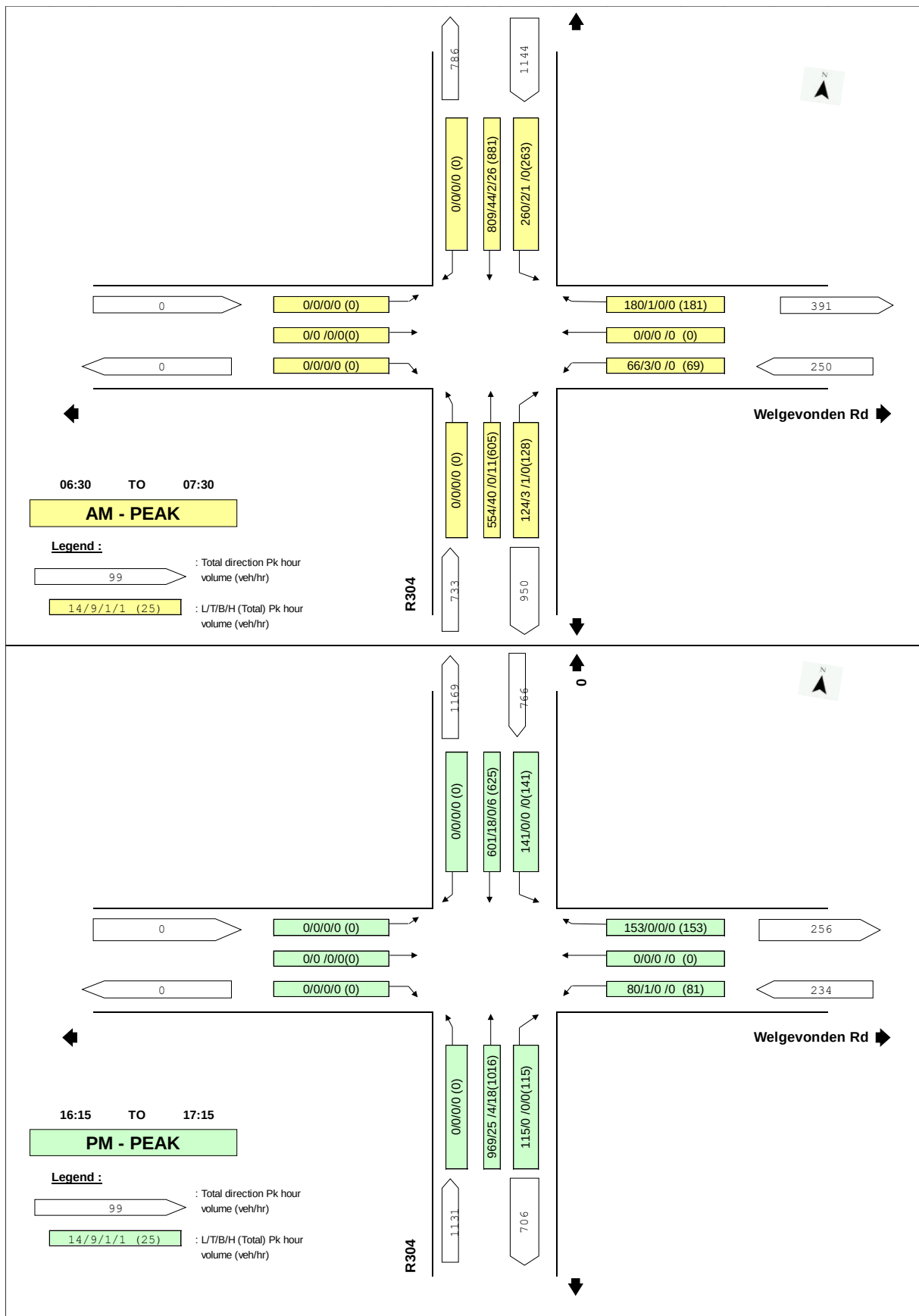


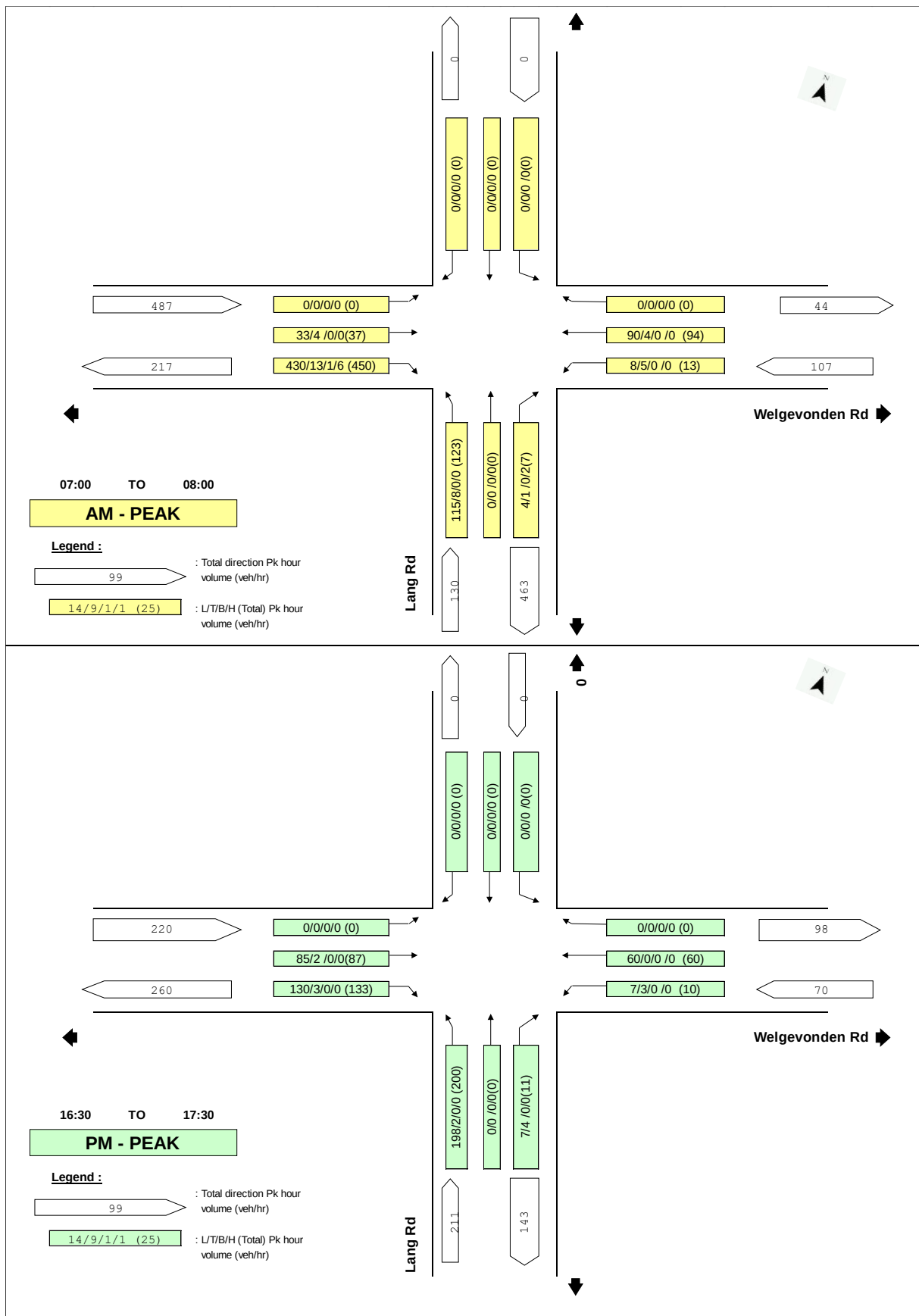


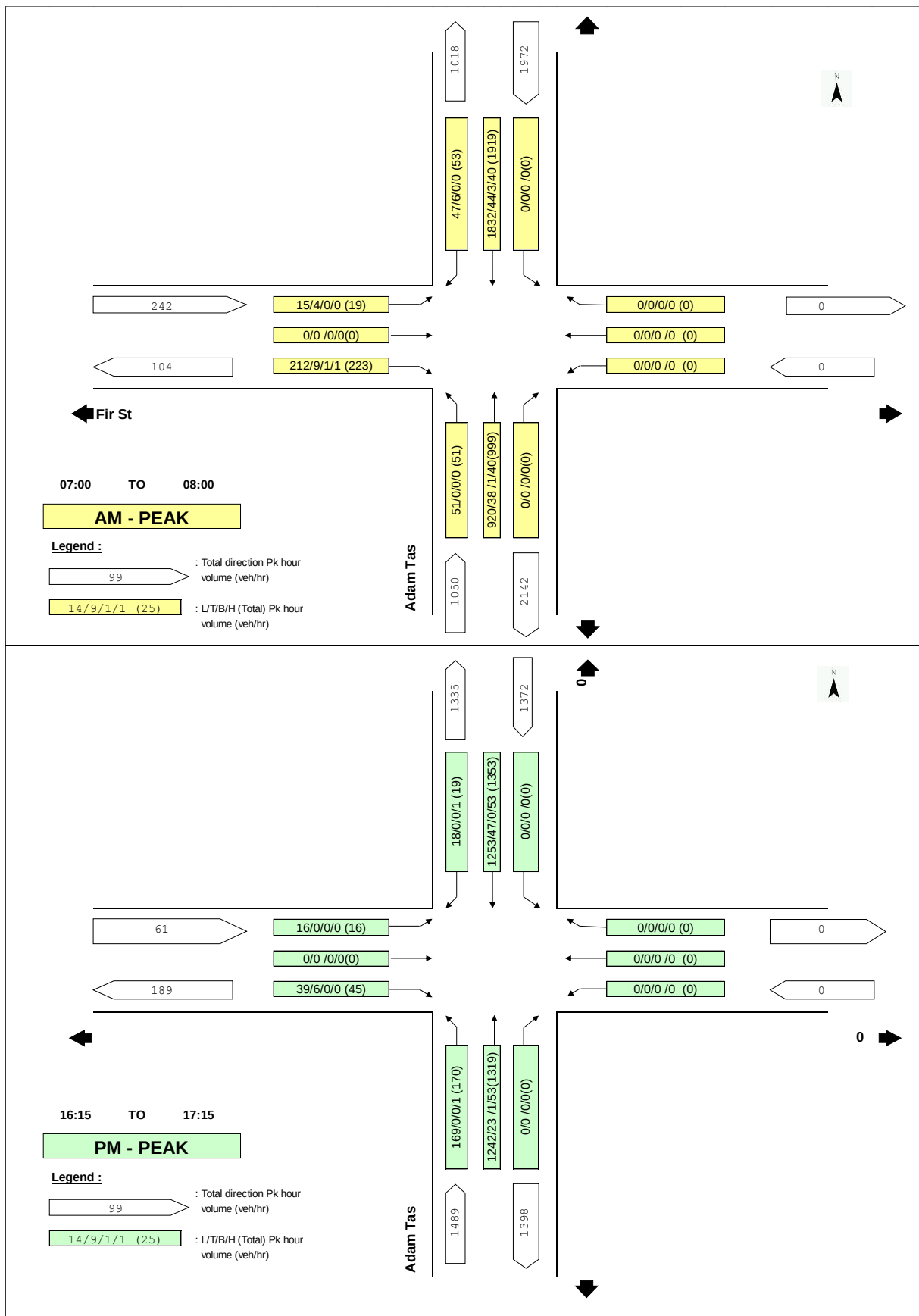












Appendix B

SIDRA Analysis Existing Traffic

Appendix C

Current Upgrades to R44 / Hendrikse Road Intersection

Appendix D

SIDRA Analysis 2026 Background Traffic

Appendix E

SIDRA Analysis 2026 Total Traffic

Appendix F

SIDRA Analysis Future 2031 Traffic

In diversity there is beauty and
there is strength.

MAYA ANGELOU

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22, Revision number

LANE SUMMARY

 Site: [Int 1: R44 / Hendriske Road_AM Peak (Site Folder: 2023 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob. Adj. Block.	
	[Total	HV]	[Total	HV]						[Veh	Dist]			%	%
	veh/h	%	veh/h	%	veh/h	v/c	%	sec	m	m	%	%			
South: R44															
Lane 1	93	0.0	93	0.0	1518	0.061	100	12.9	LOS B	0.4	2.5	Short	120	0.0	NA
Lane 2	631	1.5	631	1.5	647 ¹	0.974	100	81.4	LOS F	48.7	345.4	Full	500	0.0	0.0
Approach	723	1.3	723	1.3		0.974		72.6	LOS E	48.7	345.4				
North: R44															
Lane 1	905	1.2	905	1.2	837 ¹	1.081	100	155.0	LOS F	89.5	633.1	Full	500	0.0	26.5
Lane 2	31	0.0	31	0.0	151	0.202	100	58.9	LOS E	1.1	7.6	Short	80	0.0	NA
Approach	936	1.1	936	1.1		1.081		151.8	LOS F	89.5	633.1				
West: Hendriske Road															
Lane 1	46	0.0	46	0.0	1037	0.045	100	47.4	LOS D	1.2	8.4	Short	20	0.0	NA
Lane 2	865	0.0	865	0.0	812 ¹	1.065	100	156.7	LOS F	83.2	582.6	Full	500	0.0	18.9
Approach	912	0.0	912	0.0		1.065		151.2	LOS F	83.2	582.6				
All Vehicles	2571	0.8	2571	0.8		1.081		129.3	LOS F	89.5	633.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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 Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.	
From S					Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	W	N			veh/h	v/c	%	%	%	No.
Lane 1	93	-	93	0.0	1518	0.061	100	0.0	2	
Lane 2	-	631	631	1.5	647 ¹	0.974	100	NA	NA	
Approach	93	631	723	1.3		0.974				
North: R44										
Mov.	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From N					Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	S	W			veh/h	v/c	%	%	%	No.
Lane 1	905	-	905	1.2	837 ¹	1.081	100	NA	NA	
Lane 2	-	31	31	0.0	151	0.202	100	0.0	1	
Approach	905	31	936	1.1		1.081				

West: Hendriske Road										
Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	46	-	46	0.0	1037	0.045	100	0.0	2	
Lane 2	-	865	865	0.0	812 ¹	1.065	100	NA	NA	
Approach	46	865	912	0.0		1.065				
Total %HV Deg.Satn (v/c)										
All Vehicles	2571	0.8		1.081						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Lane Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	34.0	146.1	NA
Lane 2	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	26.5	117.4	NA

LANE SUMMARY

 Site: Int1 [Int 1: R44 / Hendriske Road_AM Peak_Upgraded
(Site Folder: 2023 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: R44															
Lane 1	93	0.0	93	0.0	1489	0.062	100	27.8	LOS C	0.4	2.5	Short	80	0.0	NA
Lane 2	631	1.5	631	1.5	530 ¹	1.190	100	263.6	LOS F	77.2	547.5	Full	500	0.0	13.2
Lane 3	1	0.0	1	0.0	114	0.009	100	86.7	LOS F	0.1	0.4	Short	45	0.0	NA
Approach	724	1.3	724	1.3		1.190		233.2	LOS F	77.2	547.5				
East: RoadName															
Lane 1	2	0.0	2	0.0	818	0.003	100	19.6	LOS B	0.1	0.4	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.003		19.6	LOS B	0.1	0.4				
North: R44															
Lane 1	553	1.2	553	1.2	726	0.762	100	35.4	LOS D	28.3	200.0	Full	500	0.0	0.0
Lane 2	354	1.2	354	1.2	726	0.487	64 ⁶	40.3	LOS D	15.7	111.1	Full	500	0.0	0.0
Lane 3	31	0.0	31	0.0	159	0.192	100	39.4	LOS D	1.2	8.5	Short	80	0.0	NA
Approach	937	1.1	937	1.1		0.762		37.4	LOS D	28.3	200.0				
West: Hendriske Road															
Lane 1	46	0.0	46	0.0	1161	0.040	100	41.3	LOS D	1.0	7.1	Short	20	0.0	NA
Lane 2	865	0.0	865	0.0	730 ¹	1.185	100	253.0	LOS F	107.3	750.9	Full	500	0.0	42.2
Approach	912	0.0	912	0.0		1.185		242.2	LOS F	107.3	750.9				
All Vehicles	2575	0.8	2575	0.8		1.190		165.0	LOS F	107.3	750.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

- ⁶ Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)											
South: R44											
Mov.	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			veh/h	v/c	%	%	No.	
Lane 1	93	-	-	93	0.0	1489	0.062	100	0.0	2	
Lane 2	-	631	-	631	1.5	530 ¹	1.190	100	NA	NA	
Lane 3	-	-	1	1	0.0	114	0.009	100	0.0	2	
Approach	93	631	1	724	1.3		1.190				

East: RoadName										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From E						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	S	N					v/c	%	%	No.
Lane 1	1	1	2	0.0		818	0.003	100	NA	NA
Approach	1	1	2	0.0			0.003			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Cap.	Deg.	Lane	Prob.
From N							veh/h	Satn	Util.	SL Ov.
To Exit:	E	S	W					v/c	%	%
Lane 1	1	552	-	553	1.2	726	0.762	100	NA	NA
Lane 2	-	354	-	354	1.2	726	0.487	64 ⁶	NA	NA
Lane 3	-	-	31	31	0.0	159	0.192	100	0.0	2
Approach	1	905	31	937	1.1		0.762			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From W						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	N	S					v/c	%	%	No.
Lane 1	46	-	46	0.0		1161	0.040	100	0.0	2
Lane 2	-	865	865	0.0		730 ¹	1.185	100	NA	NA
Approach	46	865	912	0.0			1.185			
Total %HV Deg.Satn (v/c)										
All Vehicles	2575	0.8		1.190						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
- ⁶ Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R44												
Merge Type: Priority												
Exit Short Lane	2	120	0.0	918	921	3.01	2.01	719	832	0.864	2.2	9.7
Merge Lane	1	-	100.0	Merge Lane is not Opposed				918	1800	0.510	0.0	0.0
North Exit: R44												
Merge Type: Priority												
Exit Short Lane	1	60	0.0	554	558	3.00	2.00	23	1225	0.019	1.0	1.1
Merge Lane	2	-	100.0	Merge Lane is not Opposed				554	1800	0.308	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	50.4	342.3	NA
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0

North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	67.4	332.1	NA

LANE SUMMARY

 Site: Int1 [Int 1: R44 / Hendriske Road_AM
Peak_NextUpgraded (Site Folder: 2023 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: R44															
Lane 1	93	0.0	93	0.0	1335	0.069	100	6.7	LOS A	0.3	2.1	Short	20	0.0	NA
Lane 2	166	1.5	166	1.5	579	0.286	35 ⁶	13.1	LOS B	2.6	18.4	Full	500	0.0	0.0
Lane 3	466	1.5	466	1.5	576	0.808	100	18.5	LOS B	10.2	72.1	Short	45	0.0	NA
Approach	724	1.3	724	1.3		0.808		15.8	LOS B	10.2	72.1				
East: RoadName															
Lane 1	2	0.0	2	0.0	633	0.003	100	13.3	LOS B	0.0	0.2	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.003		13.3	LOS B	0.0	0.2				
North: R44															
Lane 1	553	1.2	553	1.2	581	0.952	100	35.4	LOS D	17.5	123.9	Full	500	0.0	0.0
Lane 2	354	1.2	354	1.2	581	0.609	64 ⁶	37.6	LOS D	6.3	44.4	Full	500	0.0	0.0
Lane 3	31	0.0	31	0.0	199	0.153	100	24.9	LOS C	0.6	4.2	Short	80	0.0	NA
Approach	937	1.1	937	1.1		0.952		35.9	LOS D	17.5	123.9				
West: Hendriske Road															
Lane 1	537	0.0	537	0.0	486 ¹	1.104	100	139.2	LOS F	36.2	253.5	Short	20	0.0	NA
Lane 2	375	0.0	375	0.0	506 ¹	0.741	67 ⁶	49.4	LOS D	7.4	51.7	Full	500	0.0	0.0
Approach	912	0.0	912	0.0		1.104		102.2	LOS F	36.2	253.5				
All Vehicles	2575	0.8	2575	0.8		1.104		53.7	LOS D	36.2	253.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

- ⁶ Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)											
South: R44											
Mov.	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			veh/h	v/c	%	%	No.	
Lane 1	93	-	-	93	0.0	1335	0.069	100	0.0	2	
Lane 2	-	166	-	166	1.5	579	0.286	35 ⁶	NA	NA	
Lane 3	-	465	1	466	1.5	576	0.808	100	48.3	2	
Approach	93	631	1	724	1.3		0.808				

East: RoadName										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From E						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	S	N				veh/h	v/c	%	%	No.
Lane 1	1	1	2	0.0		633	0.003	100	NA	NA
Approach	1	1	2	0.0			0.003			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	1	552	-	553	1.2	581	0.952	100	NA	NA
Lane 2	-	354	-	354	1.2	581	0.609	64 ⁶	NA	NA
Lane 3	-	-	31	31	0.0	199	0.153	100	0.0	2
Approach	1	905	31	937	1.1		0.952			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	S				veh/h	v/c	%	%	No.
Lane 1	46	490	537	0.0		486 ¹	1.104	100	100.0	2
Lane 2	-	375	375	0.0		506 ¹	0.741	67 ⁶	NA	NA
Approach	46	865	912	0.0			1.104			
Total %HV Deg.Satn (v/c)										
All Vehicles	2575	0.8		1.104						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
- ⁶ Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R44 Merge Type: Priority												
Exit Short Lane	2	120	0.0	997	1000	3.01	2.01	728	748	0.973	2.7	23.8
Merge Lane	1	-	100.0	Merge Lane is not Opposed				997	1800	0.554	0.0	0.0
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	487	490	3.02	2.01	187	1283	0.146	0.8	1.1
Merge Lane	2	-	100.0	Merge Lane is not Opposed				487	1800	0.270	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0

North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	25.3	187.0	NA
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 2: Hendriske Road / Tolbos Road_AM Peak (Site Folder: 2023 AM Peak)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]						[Veh	Dist]				
	veh/h	%	veh/h	%						veh/h	v/c				
South: Hendriske Road															
Lane 1	183	0.0	183	0.0	648	0.283	100	13.4	LOS B	1.0	7.1	Full	500	0.0	0.0
Approach	183	0.0	183	0.0		0.283		13.4	LOS B	1.0	7.1				
East: Tolbos Road															
Lane 1	99	0.0	99	0.0	609	0.163	100	12.6	LOS B	0.5	3.7	Full	500	0.0	0.0
Approach	99	0.0	99	0.0		0.163		12.6	LOS B	0.5	3.7				
North: Hendriske Road															
Lane 1	116	0.9	116	0.9	525	0.221	100	14.6	LOS B	0.8	5.5	Full	500	0.0	0.0
Approach	116	0.9	116	0.9		0.221		14.6	LOS B	0.8	5.5				
West: Tolbos Road															
Lane 1	13	0.0	13	0.0	104	0.121	100	45.1	LOS E	0.4	3.0	Full	500	0.0	0.0
Approach	13	0.0	13	0.0		0.121		45.1	LOS E	0.4	3.0				
All Vehicles	411	0.3	411	0.3		0.283		14.5	LOS B	1.0	7.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)											
South: Hendriske Road											
Mov.	L2	T1	R2	Total	%HV						
From S						Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	W	N	E			veh/h	satn	Util.	SL	Lane	
							v/c	%	%	No.	
Lane 1	5	176	2	183	0.0	648	0.283	100	NA	NA	
Approach	5	176	2	183	0.0		0.283				
East: Tolbos Road											
Mov.	L2	R2	Total	%HV							
From E						Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	S	N				veh/h	satn	Util.	SL	Lane	
							v/c	%	%	No.	
Lane 1	12	87	99	0.0		609	0.163	100	NA	NA	
Approach	12	87	99	0.0			0.163				
North: Hendriske Road											
Mov.	L2	T1	Total	%HV							
From N						Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	E	S				veh/h	satn	Util.	SL	Lane	
							v/c	%	%	No.	
Lane 1	43	73	116	0.9		525	0.221	100	NA	NA	

Approach	43	73	116	0.9	0.221				
West: Tolbos Road									
Mov.	L2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From W To Exit:	N				Cap. veh/h	v/c	%	%	
Lane 1	13	13	0.0		104	0.121	100	NA	NA
Approach	13	13	0.0		0.121				
Total		%HV Deg.Satn (v/c)							
All Vehicles	411	0.3	0.283						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis										
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap pcu/h	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.										

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 3: Hendriske Road / Williams Road_AM Peak (Site Folder: 2023 AM Peak)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance																
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.	
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]						[Veh]	[Dist m]					
South: Williams Road																
Lane 1	54	2.0	54	2.0	427	0.126	100	15.2	LOS C	0.4	3.0	Full	500	0.0	0.0	
Approach	54	2.0	54	2.0		0.126		15.2	LOS C	0.4	3.0					
East: Hendriske Road																
Lane 1	84	1.3	84	1.3	513	0.164	100	14.2	LOS B	0.6	3.9	Full	500	0.0	0.0	
Approach	84	1.3	84	1.3		0.164		14.2	LOS B	0.6	3.9					
West: RoadName																
Lane 1	140	0.0	140	0.0	659	0.212	100	12.6	LOS B	0.7	5.0	Full	500	0.0	0.0	
Approach	140	0.0	140	0.0		0.212		12.6	LOS B	0.7	5.0					
All Vehicles	278	0.8	278	0.8		0.212		13.6	LOS B	0.7	5.0					

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

Approach Lane Flows (veh/h)									
South: Williams Road									
Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	6	47	54	2.0	427	0.126	100	NA	NA
Approach	6	47	54	2.0	0.126				
East: Hendriske Road									
Mov. From E To Exit:	L2 S	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	32	53	84	1.3	513	0.164	100	NA	NA
Approach	32	53	84	1.3	0.164				
West: RoadName									
Mov. From W To Exit:	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	136	4	140	0.0	659	0.212	100	NA	NA
Approach	136	4	140	0.0	0.212				
Total %HV Deg.Satn (v/c)									

All Vehicles	278	0.8	0.212
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Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Williams Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: RoadName				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 101 [Int 4: Hendriske Road / Rhode Road_AM Peak (Site Folder: 2023 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]						[Veh	Dist]				
	veh/h	%	veh/h	%											
South: Rhode Road															
Lane 1	20	0.0	20	0.0	1263	0.016	100	5.9	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	20	0.0	20	0.0		0.016		5.9	LOS A	0.1	0.4				
East: Hendriske Road															
Lane 1	59	0.0	59	0.0	1919	0.031	100	1.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	59	0.0	59	0.0		0.031		1.8	NA	0.0	0.0				
West: Hendriske Road															
Lane 1	132	0.0	132	0.0	1941	0.068	100	0.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	132	0.0	132	0.0		0.068		0.1	NA	0.0	0.1				
All Vehicles	211	0.0	211	0.0		0.068		1.1	NA	0.1	0.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Rhode Road										
Mov.	L2	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util.	Prob. SL	Ov. %	Ov. Lane No.
From S To Exit:	W	E								
Lane 1	8	12	20	0.0	1263	0.016	100	NA	NA	
Approach	8	12	20	0.0		0.016				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util.	Prob. SL	Ov. %	Ov. Lane No.
From E To Exit:	S	W								
Lane 1	19	40	59	0.0	1919	0.031	100	NA	NA	
Approach	19	40	59	0.0		0.031				
West: Hendriske Road										
Mov.	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util.	Prob. SL	Ov. %	Ov. Lane No.
From W To Exit:	E	S								
Lane 1	128	3	132	0.0	1941	0.068	100	NA	NA	

Approach	128	3	132	0.0	0.068
Total %HV Deg.Satn (v/c)					
All Vehicles	211	0.0	0.068		

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Rhode Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

STOP Site: [Int 5: Lang Road / Gabriels Road_AM Peak (Site Folder: 2023 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %]	[Total veh/h	HV %]						[Veh	Dist] m				
South: Lang Road															
Lane 1	239	0.0	239	0.0	1024	0.233	100	10.2	LOS B	0.7	5.0	Full	500	0.0	0.0
Approach	239	0.0	239	0.0		0.233		10.2	LOS B	0.7	5.0				
East: Gabriels Road															
Lane 1	40	0.0	40	0.0	244	0.164	100	23.5	LOS C	0.6	4.1	Full	500	0.0	0.0
Approach	40	0.0	40	0.0		0.164		23.5	LOS C	0.6	4.1				
North: Lang Road															
Lane 1	632	0.7	632	0.7	1138	0.555	100	12.7	LOS B	2.6	18.5	Full	500	0.0	0.0
Approach	632	0.7	632	0.7		0.555		12.7	LOS B	2.6	18.5				
All Vehicles	911	0.5	911	0.5		0.555		12.6	LOS B	2.6	18.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

Approach Lane Flows (veh/h)									
South: Lang Road									
Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	232	7	239	0.0	1024	0.233	100	NA	NA
Approach	232	7	239	0.0	0.233				
East: Gabriels Road									
Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	32	8	40	0.0	244	0.164	100	NA	NA
Approach	32	8	40	0.0	0.164				
North: Lang Road									
Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	624	632	0.7	1138	0.555	100	NA	NA
Approach	7	624	632	0.7	0.555				
Total %HV Deg.Satn (v/c)									

All Vehicles	911	0.5	0.555
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Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 6: Welgevonden Blvd / Lang Road_AM Peak (Site Folder: 2023 AM Peak)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Lang Road															
Lane 1	137	1.5	137	1.5	1179	0.116	100	8.8	LOS A	0.5	3.4	Full	500	0.0	0.0
Approach	137	1.5	137	1.5		0.116		8.8	LOS A	0.5	3.4				
East: Welgevonden Blvd															
Lane 1	113	0.0	113	0.0	1938	0.058	100	0.7	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	113	0.0	113	0.0		0.058		0.7	NA	0.0	0.0				
West: Welgevonden Blvd															
Lane 1	513	1.4	513	1.4	1633	0.314	100	5.5	LOS A	1.8	13.0	Full	500	0.0	0.0
Approach	513	1.4	513	1.4		0.314		5.5	NA	1.8	13.0				
All Vehicles	762	1.2	762	1.2		0.314		5.4	NA	1.8	13.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From S					Cap. veh/h	v/c	%	%		
To Exit:	W	E								
Lane 1	129	7	137	1.5	1179	0.116	100	NA	NA	
Approach	129	7	137	1.5		0.116				
East: Welgevonden Blvd										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From E					Cap. veh/h	v/c	%	%		
To Exit:	S	W								
Lane 1	14	99	113	0.0	1938	0.058	100	NA	NA	
Approach	14	99	113	0.0		0.058				
West: Welgevonden Blvd										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From W					Cap. veh/h	v/c	%	%		
To Exit:	E	S								
Lane 1	39	474	513	1.4	1633	0.314	100	NA	NA	

Approach	39	474	513	1.4	0.314
Total %HV Deg.Satn (v/c)					
All Vehicles	762	1.2	0.314		

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
West: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_AM Peak (Site Folder: 2023 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob. Adj. Block.	
	[Total	HV]	[Total	HV]						[Veh	Dist]			%	%
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			m		m		
South: R304															
Lane 1	604	2.4	604	2.4	1130	0.535	100	11.8	LOS B	15.8	112.8	Full	500	0.0	0.0
Lane 2	155	0.0	155	0.0	279	0.554	100	21.3	LOS C	4.0	27.9	Short	70	0.0	NA
Approach	759	1.9	759	1.9		0.554		13.8	LOS B	15.8	112.8				
East: Welgevonden Blvd															
Lane 1	68	0.0	68	0.0	516	0.133	100	31.9	LOS C	2.3	15.8	Short	45	0.0	NA
Lane 2	186	0.0	186	0.0	268	0.695	100	47.7	LOS D	8.3	58.0	Full	500	0.0	0.0
Approach	255	0.0	255	0.0		0.695		43.4	LOS D	8.3	58.0				
North: R304															
Lane 1	299	0.7	299	0.7	1088	0.275	100	16.2	LOS B	6.4	44.8	Short	100	0.0	NA
Lane 2	826	3.2	826	3.2	1086 ¹	0.761	100	15.7	LOS B	26.9	193.1	Full	500	0.0	0.0
Approach	1125	2.5	1125	2.5		0.761		15.8	LOS B	26.9	193.1				
All Vehicles	2139	2.0	2139	2.0		0.761		18.4	LOS B	26.9	193.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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 Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From S To Exit:	N	E			Cap. veh/h	v/c	%	%		
Lane 1	604	-	604	2.4	1130	0.535	100	NA	NA	
Lane 2	-	155	155	0.0	279	0.554	100	0.0	1	
Approach	604	155	759	1.9		0.554				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From E To Exit:	S	N			Cap. veh/h	v/c	%	%		
Lane 1	68	-	68	0.0	516	0.133	100	0.0	2	
Lane 2	-	186	186	0.0	268	0.695	100	NA	NA	
Approach	68	186	255	0.0		0.695				

North: R304										
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.	
From N To Exit:	E	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	299	-	299	0.7	1088	0.275	100	0.0	2	
Lane 2	-	826	826	3.2	1086 ¹	0.761	100	NA	NA	
Approach	299	826	1125	2.5		0.761				
Total %HV Deg.Satn (v/c)										
All Vehicles	2139	2.0		0.761						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Lane Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: 101 [Int 8: R44 / Fir Street_AMPeak (Site Folder: 2023 AM Peak)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob. Adj. Block.	
	[Total veh/h	HV %	[Total veh/h	HV %						[Veh	Dist] m			%	%
South: R44															
Lane 1	552	3.7	552	3.7	1895	0.291	100	0.6	LOS A	0.0	0.0	Full	490	0.0	0.0
Lane 2	553	4.1	553	4.1	1899	0.291	100	0.1	LOS A	0.0	0.0	Full	490	0.0	0.0
Approach	1105	3.9	1105	3.9		0.291		0.4	NA	0.0	0.0				
North: R44															
Lane 1	1010	2.2	1010	2.2	1922	0.525	100	0.5	LOS A	0.0	0.0	Full	1150	0.0	0.0
Lane 2	1010	2.2	1010	2.2	1922	0.525	100	0.5	LOS A	0.0	0.0	Full	1150	0.0	0.0
Lane 3	56	0.0	56	0.0	363	0.154	100	15.0	LOS C	0.5	3.7	Short	60	0.0	NA
Approach	2076	2.2	2076	2.2		0.525		0.9	NA	0.5	3.7				
West: Fir Street															
Lane 1	255	0.8	255	0.8	7	39.154	100	34526.6	LOS F	156.2	1101.1	Full	260	0.0	100.0
Approach	255	0.8	255	0.8		39.154		34526.6	LOS F	156.2	1101.1				
All Vehicles	3436	2.6	3436	2.6		39.154		2560.5	NA	156.2	1101.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From S To Exit:	W	N								
Lane 1	54	498	552	3.7	1895	0.291	100	NA	NA	
Lane 2	-	553	553	4.1	1899	0.291	100	NA	NA	
Approach	54	1052	1105	3.9		0.291				
North: R44										
Mov.	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From N To Exit:	S	W								
Lane 1	1010	-	1010	2.2	1922	0.525	100	NA	NA	
Lane 2	1010	-	1010	2.2	1922	0.525	100	NA	NA	

Lane 3	-	56	56	0.0	363	0.154	100	0.0	2
Approach	2020	56	2076	2.2	0.525				
West: Fir Street									
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From W					Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	S			veh/h	v/c	%	%	No.
Lane 1	20	235	255	0.8	7	39.154	100	NA	NA
Approach	20	235	255	0.8	39.154				
Total %HV Deg.Satn (v/c)									
All Vehicles	3436	2.6	39.154						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	124.1	68676.5	NA

LANE SUMMARY

 Site: 101v [Int 8: R44 / Fir Street_AMPeak - Conversion (Site Folder: 2023 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: R44															
Lane 1	553	3.7	553	3.7	1310	0.422	100	7.0	LOS A	10.3	74.1	Full	490	0.0	0.0
Lane 2	552	4.1	552	4.1	1308	0.422	100	6.5	LOS A	10.5	76.1	Full	490	0.0	0.0
Approach	1105	3.9	1105	3.9		0.422		6.8	LOS A	10.5	76.1				
North: R44															
Lane 1	1064	2.2	1064	2.2	1324	0.804	100	10.4	LOS B	32.2	229.9	Full	1150	0.0	0.0
Lane 2	956	2.2	956	2.2	1190 ¹	0.804	100	15.4	LOS B	29.7	211.7	Full	1150	0.0	0.0
Lane 3	56	0.0	56	0.0	276	0.202	100	20.5	LOS C	1.3	8.8	Short	60	0.0	NA
Approach	2076	2.2	2076	2.2		0.804		13.0	LOS B	32.2	229.9				
West: Fir Street															
Lane 1	255	0.8	255	0.8	328	0.776	100	47.8	LOS D	11.6	82.0	Full	260	0.0	0.0
Approach	255	0.8	255	0.8		0.776		47.8	LOS D	11.6	82.0				
All Vehicles	3436	2.6	3436	2.6		0.804		13.6	LOS B	32.2	229.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From S To Exit:	W	N			veh/h	v/c	%	%		
Lane 1	54	499	553	3.7	1310	0.422	100	NA	NA	
Lane 2	-	552	552	4.1	1308	0.422	100	NA	NA	
Approach	54	1052	1105	3.9		0.422				
North: R44										
Mov.	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From N To Exit:	S	W			veh/h	v/c	%	%		
Lane 1	1064	-	1064	2.2	1324	0.804	100	NA	NA	
Lane 2	956	-	956	2.2	1190 ¹	0.804	100	NA	NA	
Lane 3	-	56	56	0.0	276	0.202	100	0.0	2	

Approach	2020	56	2076	2.2		0.804				
West: Fir Street										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W						Satn	Util.	SL	Ov.	Lane
To Exit:	N	S				v/c	%	%	%	No.
Lane 1	20	235	255	0.8		328	0.776	100	NA	NA
Approach	20	235	255	0.8		0.776				
Total %HV Deg.Satn (v/c)										
All Vehicles	3436	2.6		0.804						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1
- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: [Int 1: R44 / Hendriske Road_PM Peak (Site Folder: 2023 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist m]		m	%	%
South: R44															
Lane 1	372	0.0	372	0.0	1388	0.268	100	6.8	LOS A	2.3	16.1	Short	120	0.0	NA
Lane 2	836	4.2	836	4.2	1097	0.762	100	15.3	LOS B	27.5	199.6	Full	500	0.0	0.0
Approach	1207	2.9	1207	2.9		0.762		12.7	LOS B	27.5	199.6				
North: R44															
Lane 1	478	3.5	478	3.5	1356	0.353	100	5.3	LOS A	8.0	57.5	Full	500	0.0	0.0
Lane 2	85	0.0	85	0.0	306	0.279	100	19.0	LOS B	1.8	12.4	Short	80	0.0	NA
Approach	563	3.0	563	3.0		0.353		7.4	LOS A	8.0	57.5				
West: Hendriske Road															
Lane 1	52	0.0	52	0.0	537	0.096	100	44.1	LOS D	1.7	11.6	Short	20	0.0	NA
Lane 2	191	1.1	191	1.1	260 ¹	0.733	100	61.4	LOS E	8.6	60.7	Full	500	0.0	0.0
Approach	242	0.9	242	0.9		0.733		57.7	LOS E	8.6	60.7				
All Vehicles	2013	2.7	2013	2.7		0.762		16.6	LOS B	27.5	199.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S To Exit:	W	N			veh/h	v/c	%	%	Lane No.	
Lane 1	372	-	372	0.0	1388	0.268	100	0.0	2	
Lane 2	-	836	836	4.2	1097	0.762	100	NA	NA	
Approach	372	836	1207	2.9		0.762				
North: R44										
Mov.	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	
From N To Exit:	S	W			veh/h	v/c	%	%	Lane No.	
Lane 1	478	-	478	3.5	1356	0.353	100	NA	NA	
Lane 2	-	85	85	0.0	306	0.279	100	0.0	1	
Approach	478	85	563	3.0		0.353				

West: Hendriske Road										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL %	Ov. %	Lane No.
Lane 1	52	-	52	0.0	537	0.096	100	0.0		2
Lane 2	-	191	191	1.1	260 ¹	0.733	100	NA		NA
Approach	52	191	242	0.9		0.733				
Total %HV Deg.Satn (v/c)										
All Vehicles	2013	2.7		0.762						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Lane Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: Int1 [Int 1: R44 / Hendriske Road_PM Peak_Upgraded
(Site Folder: 2023 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob. Adj. Block.	
	[Total	HV]	[Total	HV]						[Veh	Dist]			%	%
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			m		m		
South: R44															
Lane 1	372	0.0	372	0.0	1375	0.270	100	11.3	LOS B	2.5	17.6	Short	80	0.0	NA
Lane 2	836	4.2	836	4.2	1042 ¹	0.802	100	26.3	LOS C	27.9	202.1	Full	500	0.0	0.0
Lane 3	1	0.0	1	0.0	282	0.004	100	27.8	LOS C	0.0	0.2	Short	45	0.0	NA
Approach	1208	2.9	1208	2.9		0.802		21.7	LOS C	27.9	202.1				
East: RoadName															
Lane 1	2	0.0	2	0.0	246	0.009	100	37.0	LOS D	0.1	0.5	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.009		37.0	LOS D	0.1	0.5				
North: R44															
Lane 1	557	1.8	557	1.8	1349	0.413	100	5.4	LOS A	9.1	64.5	Full	500	0.0	0.0
Lane 2	356	1.8	356	1.8	1349	0.264	64 ⁶	7.2	LOS A	5.0	35.9	Full	500	0.0	0.0
Lane 3	85	0.0	85	0.0	308	0.277	100	27.7	LOS C	2.6	18.2	Short	80	0.0	NA
Approach	998	1.7	998	1.7		0.413		7.9	LOS A	9.1	64.5				
West: Hendriske Road															
Lane 1	52	0.0	52	0.0	557	0.093	100	38.4	LOS D	1.5	10.2	Short	20	0.0	NA
Lane 2	191	1.1	191	1.1	234 ¹	0.814	100	58.9	LOS E	8.2	58.1	Full	500	0.0	0.0
Approach	242	0.9	242	0.9		0.814		54.5	LOS D	8.2	58.1				
All Vehicles	2451	2.2	2451	2.2		0.814		19.3	LOS B	27.9	202.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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 Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
- ⁶ Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)											
South: R44											
Mov.	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From S To Exit:	W	N	E								
Lane 1	372	-	-	372	0.0	1375	0.270	100	0.0	2	
Lane 2	-	836	-	836	4.2	1042 ¹	0.802	100	NA	NA	
Lane 3	-	-	1	1	0.0	282	0.004	100	0.0	2	
Approach	372	836	1	1208	2.9		0.802				

East: RoadName										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From E						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	S	N					v/c	%	%	No.
Lane 1	1	1	2	0.0		246	0.009	100	NA	NA
Approach	1	1	2	0.0			0.009			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Cap.	Deg.	Lane	Prob.
From N							veh/h	Satn	Util.	SL Ov.
To Exit:	E	S	W					v/c	%	%
Lane 1	1	556	-	557	1.8	1349	0.413	100	NA	NA
Lane 2	-	356	-	356	1.8	1349	0.264	64 ⁶	NA	NA
Lane 3	-	-	85	85	0.0	308	0.277	100	0.0	2
Approach	1	912	85	998	1.7		0.413			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From W						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	N	S					v/c	%	%	No.
Lane 1	52	-	52	0.0		557	0.093	100	0.0	2
Lane 2	-	191	191	1.1		234 ¹	0.814	100	NA	NA
Approach	52	191	242	0.9			0.814			
Total %HV Deg.Satn (v/c)										
All Vehicles	2451	2.2		0.814						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
- ⁶ Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R44 Merge Type: Priority												
Exit Short Lane	2	120	0.0	652	658	3.03	2.02	451	1102	0.410	1.3	2.5
Merge Lane	1	-	100.0	Merge Lane is not Opposed				652	1800	0.362	0.0	0.0
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	863	880	3.00	2.00	26	883	0.029	2.0	2.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				863	1800	0.479	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0

North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int1 [Int 1: R44 / Hendriske Road_PM
Peak_NextUpgraded (Site Folder: 2023 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	372	0.0	372	0.0	1329	0.280	100	7.0	LOS A	2.1	14.6	Short	80	0.0	NA
Lane 2	233	4.2	233	4.2	918	0.254	35 ⁶	14.0	LOS B	4.0	29.3	Full	500	0.0	0.0
Lane 3	604	4.1	604	4.1	843 ¹	0.716	100	16.4	LOS B	14.6	105.8	Short	45	0.0	NA
Approach	1208	2.9	1208	2.9		0.716		13.0	LOS B	14.6	105.8				
East: RoadName															
Lane 1	2	0.0	2	0.0	183	0.011	100	31.8	LOS C	0.1	0.4	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.011		31.8	LOS C	0.1	0.4				
North: R44															
Lane 1	557	1.8	557	1.8	1317	0.423	100	4.6	LOS A	7.3	51.6	Full	500	0.0	0.0
Lane 2	356	1.8	356	1.8	1317	0.270	64 ⁶	6.4	LOS A	4.0	28.7	Full	500	0.0	0.0
Lane 3	85	0.0	85	0.0	399	0.214	100	19.0	LOS B	1.7	12.1	Short	80	0.0	NA
Approach	998	1.7	998	1.7		0.423		6.4	LOS A	7.3	51.6				
West: Hendriske Road															
Lane 1	140	0.7	140	0.7	203	0.687	100	36.4	LOS D	4.3	30.6	Short	20	0.0	NA
Lane 2	103	1.1	103	1.1	222	0.461	67 ⁶	36.6	LOS D	3.0	21.3	Full	500	0.0	0.0
Approach	242	0.9	242	0.9		0.687		36.5	LOS D	4.3	30.6				
All Vehicles	2451	2.2	2451	2.2		0.716		12.7	LOS B	14.6	105.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

- ⁶ Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)											
South: R44											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			Cap. veh/h	v/c	%	%	No.	
Lane 1	372	-	-	372	0.0	1329	0.280	100	0.0	2	
Lane 2	-	233	-	233	4.2	918	0.254	35 ⁶	NA	NA	
Lane 3	-	603	1	604	4.1	843 ¹	0.716	100	85.1	2	
Approach	372	836	1	1208	2.9		0.716				

East: RoadName										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From E						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	S	N					v/c	%	%	No.
Lane 1	1	1	2	0.0		183	0.011	100	NA	NA
Approach	1	1	2	0.0			0.011			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Cap.	Deg.	Lane	Prob.
From N							veh/h	Satn	Util.	SL Ov.
To Exit:	E	S	W					v/c	%	%
Lane 1	1	556	-	557	1.8	1317	0.423	100	NA	NA
Lane 2	-	356	-	356	1.8	1317	0.270	64 ⁶	NA	NA
Lane 3	-	-	85	85	0.0	399	0.214	100	0.0	2
Approach	1	912	85	998	1.7		0.423			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From W						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	N	S					v/c	%	%	No.
Lane 1	52	88	140	0.7		203	0.687	100	43.8	2
Lane 2	-	103	103	1.1		222	0.461	67 ⁶	NA	NA
Approach	52	191	242	0.9			0.687			
Total %HV Deg.Satn (v/c)										
All Vehicles	2451	2.2		0.716						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
- 6 Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R44 Merge Type: Priority												
Exit Short Lane	2	120	0.0	645	650	3.03	2.02	459	1110	0.413	1.2	2.4
Merge Lane	1	-	100.0	Merge Lane is not Opposed				645	1800	0.358	0.0	0.0
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	630	642	3.06	2.04	259	1097	0.236	1.3	1.8
Merge Lane	2	-	100.0	Merge Lane is not Opposed				630	1800	0.350	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0

North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: [Int 2: Hendriske Road / Tolbos Road_PM Peak (Site Folder: 2023 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Hendriske Road															
Lane 1	89	1.2	89	1.2	569	0.157	100	13.2	LOS B	0.5	3.7	Full	500	0.0	0.0
Approach	89	1.2	89	1.2		0.157		13.2	LOS B	0.5	3.7				
East: Tolbos Road															
Lane 1	51	0.0	51	0.0	497	0.102	100	13.5	LOS B	0.3	2.3	Full	500	0.0	0.0
Approach	51	0.0	51	0.0		0.102		13.5	LOS B	0.3	2.3				
North: Hendriske Road															
Lane 1	232	0.0	232	0.0	602	0.385	100	15.4	LOS C	1.6	11.0	Full	500	0.0	0.0
Approach	232	0.0	232	0.0		0.385		15.4	LOS C	1.6	11.0				
West: Tolbos Road															
Lane 1	1	0.0	1	0.0	1	1.000 ⁴	100	4165.9	LOS F	2.2	15.4	Full	500	0.0	0.0
Approach	1	0.0	1	0.0		1.000		4165.9	LOS F	2.2	15.4				
All Vehicles	373	0.3	373	0.3		1.000		26.4	LOS D	2.2	15.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

⁴ x = 1.00 due to minimum capacity

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	T1	R2	Total	%HV						
From S					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	N	E			veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	82	7	89	1.2	569	0.157	100	NA	NA	
Approach	82	7	89	1.2		0.157				
East: Tolbos Road										
Mov.	L2	R2	Total	%HV						
From E					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	S	N			veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	2	48	51	0.0	497	0.102	100	NA	NA	
Approach	2	48	51	0.0		0.102				
North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV					
From N					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	E	S	W		veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	

Lane 1	75	154	3	232	0.0	602	0.385	100	NA	NA
Approach	75	154	3	232	0.0		0.385			
West: Tolbos Road										
Mov.	L2	Total	%HV			Cap.	Deg.	Lane	Prob.	Ov.
From W						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	N						v/c	%	%	No.
Lane 1	1	1	0.0			1	1.000 ⁴	100	NA	NA
Approach	1	1	0.0				1.000			
Total %HV Deg.Satn (v/c)										
All Vehicles	373	0.3		1.000						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

⁴ x = 1.00 due to minimum capacity

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	NA

LANE SUMMARY

 **Site: [Int 3: Hendriske Road / Williams Road_PM Peak (Site Folder: 2023 PM Peak)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV] %	[Total veh/h	HV] %						[Veh	Dist] m				
South: Williams Road															
Lane 1	32	0.0	32	0.0	371	0.085	100	16.1	LOS C	0.3	2.0	Full	500	0.0	0.0
Approach	32	0.0	32	0.0		0.085		16.1	LOS C	0.3	2.0				
East: Hendriske Road															
Lane 1	155	0.0	155	0.0	648	0.239	100	13.0	LOS B	0.8	5.8	Full	500	0.0	0.0
Approach	155	0.0	155	0.0		0.239		13.0	LOS B	0.8	5.8				
West: RoadName															
Lane 1	71	3.0	71	3.0	624	0.113	100	12.3	LOS B	0.4	2.5	Full	500	0.0	0.0
Approach	71	3.0	71	3.0		0.113		12.3	LOS B	0.4	2.5				
All Vehicles	257	0.8	257	0.8		0.239		13.2	LOS B	0.8	5.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

Approach Lane Flows (veh/h)									
South: Williams Road									
Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	27	32	0.0	371	0.085	100	NA	NA
Approach	4	27	32	0.0		0.085			
East: Hendriske Road									
Mov. From E To Exit:	L2 S	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	43	112	155	0.0	648	0.239	100	NA	NA
Approach	43	112	155	0.0		0.239			
West: RoadName									
Mov. From W To Exit:	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	64	6	71	3.0	624	0.113	100	NA	NA
Approach	64	6	71	3.0		0.113			
Total %HV Deg.Satn (v/c)									

All Vehicles	257	0.8	0.239
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Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Williams Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: RoadName				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: 101 [Int 4: Hendriske Road / Rhode Road_PM Peak (Site Folder: 2023 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Rhode Road															
Lane 1	19	0.0	19	0.0	1255	0.015	100	5.9	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	19	0.0	19	0.0		0.015		5.9	LOS A	0.1	0.4				
East: Hendriske Road															
Lane 1	114	0.0	114	0.0	1920	0.059	100	1.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	114	0.0	114	0.0		0.059		1.8	NA	0.0	0.0				
West: Hendriske Road															
Lane 1	62	3.4	62	3.4	1887	0.033	100	0.3	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	62	3.4	62	3.4		0.033		0.3	NA	0.0	0.1				
All Vehicles	195	1.1	195	1.1		0.059		1.7	NA	0.1	0.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Rhode Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	E								
Lane 1	7	12	19	0.0	1255	0.015	100	NA	NA	
Approach	7	12	19	0.0		0.015				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	36	78	114	0.0	1920	0.059	100	NA	NA	
Approach	36	78	114	0.0		0.059				
West: Hendriske Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From W					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								
Lane 1	59	3	62	3.4	1887	0.033	100	NA	NA	

Approach	59	3	62	3.4	0.033
Total %HV Deg.Satn (v/c)					
All Vehicles	195	1.1	0.059		

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Rhode Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: [Int 5: Lang Road / Gabriels Road_PM Peak (Site Folder: 2023 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %]	[Total veh/h	HV %]						[Veh	Dist] m				
South: Lang Road															
Lane 1	340	0.3	340	0.3	1197	0.284	100	9.9	LOS A	0.9	6.1	Full	500	0.0	0.0
Approach	340	0.3	340	0.3		0.284		9.9	LOS A	0.9	6.1				
East: Gabriels Road															
Lane 1	8	0.0	8	0.0	204	0.041	100	24.3	LOS C	0.1	1.0	Full	500	0.0	0.0
Approach	8	0.0	8	0.0		0.041		24.3	LOS C	0.1	1.0				
North: Lang Road															
Lane 1	208	1.5	208	1.5	1100	0.190	100	9.8	LOS A	0.5	3.8	Full	500	0.0	0.0
Approach	208	1.5	208	1.5		0.190		9.8	LOS A	0.5	3.8				
All Vehicles	557	0.8	557	0.8		0.284		10.0	LOS B	0.9	6.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

Approach Lane Flows (veh/h)									
South: Lang Road									
Mov. From S To Exit:	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	319	21	340	0.3	1197	0.284	100	NA	NA
Approach	319	21	340	0.3	0.284				
East: Gabriels Road									
Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	1	8	0.0	204	0.041	100	NA	NA
Approach	7	1	8	0.0	0.041				
North: Lang Road									
Mov. From N To Exit:	L2 E	T1 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	2	206	208	1.5	1100	0.190	100	NA	NA
Approach	2	206	208	1.5	0.190				
Total %HV Deg.Satn (v/c)									

All Vehicles	557	0.8	0.284
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Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 6: Welgevonden Blvd / Lang Road_PM Peak (Site Folder: 2023 PM Peak)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]						[Veh	Dist]				
	veh/h	%	veh/h	%											
South: Lang Road															
Lane 1	222	0.0	222	0.0	1318	0.168	100	8.3	LOS A	0.7	5.2	Full	500	0.0	0.0
Approach	222	0.0	222	0.0		0.168		8.3	LOS A	0.7	5.2				
East: Welgevonden Blvd															
Lane 1	74	0.0	74	0.0	1936	0.038	100	0.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	74	0.0	74	0.0		0.038		0.8	NA	0.0	0.0				
West: Welgevonden Blvd															
Lane 1	232	0.0	232	0.0	1765	0.131	100	3.5	LOS A	0.6	4.5	Full	500	0.0	0.0
Approach	232	0.0	232	0.0		0.131		3.5	NA	0.6	4.5				
All Vehicles	527	0.0	527	0.0		0.168		5.2	NA	0.7	5.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	L2	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From S To Exit:	W	E								
Lane 1	211	12	222	0.0	1318	0.168	100	NA	NA	
Approach	211	12	222	0.0		0.168				
East: Welgevonden Blvd										
Mov.	L2	T1	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From E To Exit:	S	W								
Lane 1	11	63	74	0.0	1936	0.038	100	NA	NA	
Approach	11	63	74	0.0		0.038				
West: Welgevonden Blvd										
Mov.	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
From W To Exit:	E	S								
Lane 1	92	140	232	0.0	1765	0.131	100	NA	NA	

Approach	92	140	232	0.0	0.131
Total %HV Deg.Satn (v/c)					
All Vehicles	527	0.0	0.168		

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
West: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_PM Peak (Site Folder: 2023 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist m]		m	%	%
South: R304															
Lane 1	1057	3.4	1057	3.4	1280 ¹	0.826	100	23.7	LOS C	45.6	328.7	Full	500	0.0	0.0
Lane 2	115	0.0	115	0.0	436	0.263	100	21.6	LOS C	1.7	11.8	Short	70	0.0	NA
Approach	1172	3.1	1172	3.1		0.826		23.5	LOS C	45.6	328.7				
East: Welgevonden Blvd															
Lane 1	87	0.0	87	0.0	357	0.245	100	53.7	LOS D	4.7	33.1	Short	45	0.0	NA
Lane 2	153	0.0	153	0.0	186	0.822	100	74.4	LOS E	10.4	72.7	Full	500	0.0	0.0
Approach	240	0.0	240	0.0		0.822		66.8	LOS E	10.4	72.7				
North: R304															
Lane 1	156	0.0	156	0.0	1329	0.117	100	11.5	LOS B	3.0	20.9	Short	100	0.0	NA
Lane 2	653	0.8	653	0.8	1388	0.470	100	8.3	LOS A	17.3	122.2	Full	500	0.0	0.0
Approach	808	0.7	808	0.7		0.470		9.0	LOS A	17.3	122.2				
All Vehicles	2220	1.8	2220	1.8		0.826		22.9	LOS C	45.6	328.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S To Exit:	N	E			Cap. veh/h	v/c	%	%	Lane No.	
Lane 1	1057	-	1057	3.4	1280 ¹	0.826	100	NA	NA	
Lane 2	-	115	115	0.0	436	0.263	100	0.0	1	
Approach	1057	115	1172	3.1		0.826				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E To Exit:	S	N			Cap. veh/h	v/c	%	%	Lane No.	
Lane 1	87	-	87	0.0	357	0.245	100	0.0	2	
Lane 2	-	153	153	0.0	186	0.822	100	NA	NA	
Approach	87	153	240	0.0		0.822				

North: R304										
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.	
From N					Cap.	Satn	Util.	SL	OV.	Lane
To Exit:	E	S			veh/h	v/c	%	%		No.
Lane 1	156	-	156	0.0	1329	0.117	100	0.0		2
Lane 2	-	653	653	0.8	1388	0.470	100	NA		NA
Approach	156	653	808	0.7		0.470				
Total %HV Deg.Satn (v/c)										
All Vehicles	2220	1.8		0.826						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1
- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.

Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: 101 [Int 8: R44 / Fir Street_PMPeak (Site Folder: 2023 PM Peak)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	824	3.1	824	3.1	1889	0.436	100	1.5	LOS A	0.0	0.0	Full	490	0.0	0.0
Lane 2	829	3.9	829	3.9	1902	0.436	100	0.2	LOS A	0.0	0.0	Full	490	0.0	0.0
Approach	1653	3.5	1653	3.5		0.436		0.8	NA	0.0	0.0				
North: R44															
Lane 1	644	4.3	644	4.3	1897	0.340	100	0.2	LOS A	0.0	0.0	Full	1150	0.0	0.0
Lane 2	644	4.3	644	4.3	1897	0.340	100	0.2	LOS A	0.0	0.0	Full	1150	0.0	0.0
Lane 3	18	5.9	18	5.9	96	0.186	100	44.0	LOS E	0.5	3.5	Short	60	0.0	NA
Approach	1306	4.4	1306	4.4		0.340		0.8	NA	0.5	3.5				
West: Fir Street															
Lane 1	68	0.0	68	0.0	8	8.455	100	6870.8	LOS F	39.6	276.9	Full	260	0.0	6.9
Approach	68	0.0	68	0.0		8.455		6870.8	LOS F	39.6	276.9				
All Vehicles	3027	3.8	3027	3.8		8.455		156.1	NA	39.6	276.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S To Exit:	W	N			Cap. veh/h	v/c	%	%	Lane No.	
Lane 1	195	629	824	3.1	1889	0.436	100	NA	NA	
Lane 2	-	829	829	3.9	1902	0.436	100	NA	NA	
Approach	195	1458	1653	3.5		0.436				
North: R44										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From N To Exit:	S	W			Cap. veh/h	v/c	%	%	Lane No.	
Lane 1	644	-	644	4.3	1897	0.340	100	NA	NA	
Lane 2	644	-	644	4.3	1897	0.340	100	NA	NA	
Lane 3	-	18	18	5.9	96	0.186	100	0.0	2	

Approach	1288	18	1306	4.4		0.340				
West: Fir Street										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From W To Exit:	N	S			Cap. veh/h	v/c	%	%		
Lane 1	18	51	68	0.0	8	8.455	100	NA	NA	
Approach	18	51	68	0.0		8.455				
Total %HV Deg.Satn (v/c)										
All Vehicles	3027	3.8		8.455						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis					
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec	
South: R44					
Lane 1	0.0	0.0	0.0	0.0	
Lane 2	0.0	0.0	0.0	0.0	
North: R44					
Lane 1	0.0	0.0	0.0	0.0	
Lane 2	0.0	0.0	0.0	0.0	
Lane 3	0.0	0.0	0.0	0.0	
West: Fir Street					
Lane 1	0.0	30.2	13419.2	NA	

LANE SUMMARY

Site: 101v [Int 8: R44 / Fir Street_PMPeak - Conversion (Site Folder: 2023 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob.	
	[Total veh/h	HV %	[Total veh/h	HV %						[Veh	Dist] m			Adj. Block.	
					veh/h	v/c	%	sec					m	%	%
South: R44															
Lane 1	827	3.1	827	3.1	1524	0.543	100	4.5	LOS A	11.8	84.6	Full	490	0.0	0.0
Lane 2	826	3.9	826	3.9	1521	0.543	100	3.4	LOS A	12.6	91.3	Full	490	0.0	0.0
Approach	1653	3.5	1653	3.5		0.543		3.9	LOS A	12.6	91.3				
North: R44															
Lane 1	644	4.3	644	4.3	1517	0.425	100	2.9	LOS A	8.4	61.2	Full	1150	0.0	0.0
Lane 2	644	4.3	644	4.3	1517	0.425	100	2.9	LOS A	8.4	61.2	Full	1150	0.0	0.0
Lane 3	18	5.9	18	5.9	153	0.117	100	12.3	LOS B	0.3	2.3	Short	60	0.0	NA
Approach	1306	4.4	1306	4.4		0.425		3.0	LOS A	8.4	61.2				
West: Fir Street															
Lane 1	68	0.0	68	0.0	124	0.553	100	53.1	LOS D	3.2	22.1	Full	260	0.0	0.0
Approach	68	0.0	68	0.0		0.553		53.1	LOS D	3.2	22.1				
All Vehicles	3027	3.8	3027	3.8		0.553		4.6	LOS A	12.6	91.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

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.

Approach Lane Flows (veh/h)									
South: R44									
Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util.	Prob. SL Ov. %	Ov. Lane No.
Lane 1	195	632	827	3.1	1524	0.543	100	NA	NA
Lane 2	-	826	826	3.9	1521	0.543	100	NA	NA
Approach	195	1458	1653	3.5		0.543			
North: R44									
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util.	Prob. SL Ov. %	Ov. Lane No.
Lane 1	644	-	644	4.3	1517	0.425	100	NA	NA
Lane 2	644	-	644	4.3	1517	0.425	100	NA	NA
Lane 3	-	18	18	5.9	153	0.117	100	0.0	2
Approach	1288	18	1306	4.4		0.425			
West: Fir Street									

Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	18	51	68	0.0	124	0.553	100	NA	NA
Approach	18	51	68	0.0		0.553			
Total %HV Deg.Satn (v/c)									
All Vehicles	3027	3.8		0.553					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Lane Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int1 [Int 1: R44 / Hendriske Road_AM
Peak_NextUpgraded - Esc Existing + Prev Devs (Site Folder:
2026 AM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	100	0.0	100	0.0	1185	0.084	100	7.0	LOS A	0.3	2.3	Short	20	0.0	NA
Lane 2	192	1.3	192	1.3	580	0.330	35 ⁶	10.7	LOS B	2.3	16.4	Full	500	0.0	0.0
Lane 3	539	1.3	539	1.3	578	0.932	100	25.6	LOS C	12.6	89.3	Short	45	0.0	NA
Approach	831	1.1	831	1.1		0.932		19.9	LOS B	12.6	89.3				
East: RoadName															
Lane 1	2	0.0	2	0.0	481	0.004	100	13.7	LOS B	0.0	0.2	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.004		13.7	LOS B	0.0	0.2				
North: R44															
Lane 1	682	1.0	682	1.0	581	1.173	100	177.7	LOS F	53.4	376.9	Full	500	0.0	0.0
Lane 2	436	1.0	436	1.0	581	0.750	64 ⁶	133.8	LOS F	6.9	48.4	Full	500	0.0	0.0
Lane 3	33	0.0	33	0.0	264	0.124	100	20.0	LOS C	0.5	3.3	Short	80	0.0	NA
Approach	1151	1.0	1151	1.0		1.173		156.6	LOS F	53.4	376.9				
West: Hendriske Road															
Lane 1	583	0.0	583	0.0	454 ¹	1.283	100	284.7	LOS F	61.5	430.6	Short	20	0.0	NA
Lane 2	405	0.0	405	0.0	469 ¹	0.862	67 ⁶	149.4	LOS F	7.8	54.7	Full	500	0.0	0.0
Approach	987	0.0	987	0.0		1.283		229.3	LOS F	61.5	430.6				
All Vehicles	2971	0.7	2971	0.7		1.283		142.4	LOS F	61.5	430.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.

Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

⁶ Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)											
South: R44											
Mov.	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			veh/h	v/c	%	%	No.	
Lane 1	100	-	-	100	0.0	1185	0.084	100	0.0	2	
Lane 2	-	192	-	192	1.3	580	0.330	35 ⁶	NA	NA	
Lane 3	-	538	1	539	1.3	578	0.932	100	68.6	2	

Approach	100	729	1	831	1.1		0.932			
East: RoadName										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From E						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	S	N				veh/h	v/c	%	%	No.
Lane 1	1	1	2	0.0		481	0.004	100	NA	NA
Approach	1	1	2	0.0			0.004			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	1	681	-	682	1.0	581	1.173	100	NA	NA
Lane 2	-	436	-	436	1.0	581	0.750	64 ⁶	NA	NA
Lane 3	-	-	33	33	0.0	264	0.124	100	0.0	2
Approach	1	1117	33	1151	1.0		1.173			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	S				veh/h	v/c	%	%	No.
Lane 1	51	532	583	0.0		454 ¹	1.283	100	100.0	2
Lane 2	-	405	405	0.0		469 ¹	0.862	67 ⁶	NA	NA
Approach	51	937	987	0.0			1.283			
Total %HV Deg.Satn (v/c)										
All Vehicles	2971	0.7		1.283						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.

Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

⁶ Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Lane Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R44 Merge Type: Priority												
Exit Short Lane	2	120	0.0	996	999	3.01	2.01	841	750	1.121	2.7	120.8
Merge Lane	1	-	100.0	Merge Lane is not Opposed				996	1800	0.553	0.0	0.0
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	559	562	3.02	2.01	211	1209	0.175	1.0	1.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				559	1800	0.310	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				

Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	50.4	312.2	NA
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	64.3	509.9	NA
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int1 [Int 1: R44 / Hendriske Road_AM Peak_Duel - Esc Existing + Prev Devs (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	100	0.0	100	0.0	1443	0.069	100	6.4	LOS A	0.3	2.2	Short	80	0.0	NA
Lane 2	192	1.3	192	1.3	619	0.311	35 ⁶	15.6	LOS B	3.6	25.8	Full	500	0.0	0.0
Lane 3	538	1.3	538	1.3	615	0.876	100	26.5	LOS C	16.1	113.8	Full	500	0.0	0.0
Approach	831	1.1	831	1.1		0.876		21.6	LOS C	16.1	113.8				
East: RoadName															
Lane 1	2	0.0	2	0.0	679	0.003	100	13.9	LOS B	0.0	0.2	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.003		13.9	LOS B	0.0	0.2				
North: R44															
Lane 1	559	1.0	559	1.0	620	0.902	100	29.7	LOS C	17.8	125.6	Full	500	0.0	0.0
Lane 2	559	1.0	559	1.0	620	0.902	100	29.6	LOS C	17.8	125.7	Full	500	0.0	0.0
Lane 3	33	0.0	33	0.0	156	0.209	100	31.9	LOS C	0.8	5.8	Short	80	0.0	NA
Approach	1151	1.0	1151	1.0		0.902		29.7	LOS C	17.8	125.7				
West: Hendriske Road															
Lane 1	494	0.0	494	0.0	446 ¹	1.108	100	150.3	LOS F	37.1	260.0	Short	20	0.0	NA
Lane 2	493	0.0	493	0.0	445 ¹	1.108	100	150.2	LOS F	37.1	259.4	Full	500	0.0	0.0
Approach	987	0.0	987	0.0		1.108		150.2	LOS F	37.1	260.0				
All Vehicles	2971	0.7	2971	0.7		1.108		67.5	LOS E	37.1	260.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.

Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

⁶ Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)											
South: R44											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			Cap. veh/h	v/c	%	%	No.	
Lane 1	100	-	-	100	0.0	1443	0.069	100	0.0	2	
Lane 2	-	192	-	192	1.3	619	0.311	35 ⁶	NA	NA	
Lane 3	-	537	1	538	1.3	615	0.876	100	NA	NA	

Approach	100	729	1	831	1.1		0.876			
East: RoadName										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From E						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	S	N				veh/h	v/c	%	%	No.
Lane 1	1	1	2	0.0		679	0.003	100	NA	NA
Approach	1	1	2	0.0			0.003			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	1	558	-	559	1.0	620	0.902	100	NA	NA
Lane 2	-	559	-	559	1.0	620	0.902	100	NA	NA
Lane 3	-	-	33	33	0.0	156	0.209	100	0.0	2
Approach	1	1117	33	1151	1.0		0.902			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	S				veh/h	v/c	%	%	No.
Lane 1	51	444	494	0.0		446 ¹	1.108	100	100.0	2
Lane 2	-	493	493	0.0		445 ¹	1.108	100	NA	NA
Approach	51	937	987	0.0			1.108			
Total %HV Deg.Satn (v/c)										
All Vehicles	2971	0.7		1.108						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
- ⁶ Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	561	565	3.02	2.01	215	1206	0.178	1.0	1.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				561	1800	0.312	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	24.1	194.6	NA
Lane 2	0.0	24.1	194.6	NA

LANE SUMMARY

 **Site: [Int 2: Hendriske Road / Tolbos Road_AM Peak - Esc Existing + Prev Devs (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Hendriske Road															
Lane 1	198	0.0	198	0.0	647	0.306	100	13.7	LOS B	1.1	7.9	Full	500	0.0	0.0
Approach	198	0.0	198	0.0		0.306		13.7	LOS B	1.1	7.9				
East: Tolbos Road															
Lane 1	107	0.0	107	0.0	609	0.176	100	12.7	LOS B	0.6	4.1	Full	500	0.0	0.0
Approach	107	0.0	107	0.0		0.176		12.7	LOS B	0.6	4.1				
North: Hendriske Road															
Lane 1	125	0.8	125	0.8	525	0.239	100	14.8	LOS B	0.9	6.0	Full	500	0.0	0.0
Approach	125	0.8	125	0.8		0.239		14.8	LOS B	0.9	6.0				
West: Tolbos Road															
Lane 1	14	0.0	14	0.0	104	0.131	100	45.4	LOS E	0.5	3.3	Full	500	0.0	0.0
Approach	14	0.0	14	0.0		0.131		45.4	LOS E	0.5	3.3				
All Vehicles	444	0.2	444	0.2		0.306		14.7	LOS B	1.1	7.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)											
South: Hendriske Road											
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From S						Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	W	N	E			veh/h	v/c	%	%		No.
Lane 1	5	191	2	198	0.0	647	0.306	100	NA	NA	
Approach	5	191	2	198	0.0		0.306				
East: Tolbos Road											
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.		
From E						Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	S	N				veh/h	v/c	%	%		No.
Lane 1	13	95	107	0.0		609	0.176	100	NA	NA	
Approach	13	95	107	0.0			0.176				
North: Hendriske Road											
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.		
From N						Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	E	S				veh/h	v/c	%	%		No.

Lane 1	46	79	125	0.8	525	0.239	100	NA	NA
Approach	46	79	125	0.8	0.239				
West: Tolbos Road									
Mov.	L2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From W					veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	N					v/c	%	%	No.
Lane 1	14	14	0.0		104	0.131	100	NA	NA
Approach	14	14	0.0		0.131				
Total %HV Deg.Satn (v/c)									
All Vehicles	444	0.2	0.306						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY



Site: [Int 3: Hendriske Road / Williams Road_AM Peak - Esc Existing + Prev Devs (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%											
South: Williams Road															
Lane 1	58	1.8	58	1.8	426	0.136	100	15.4	LOS C	0.5	3.2	Full	500	0.0	0.0
Approach	58	1.8	58	1.8		0.136		15.4	LOS C	0.5	3.2				
East: Hendriske Road															
Lane 1	92	1.1	92	1.1	510	0.180	100	14.4	LOS B	0.6	4.3	Full	500	0.0	0.0
Approach	92	1.1	92	1.1		0.180		14.4	LOS B	0.6	4.3				
West: RoadName															
Lane 1	152	0.0	152	0.0	653	0.232	100	12.8	LOS B	0.8	5.6	Full	500	0.0	0.0
Approach	152	0.0	152	0.0		0.232		12.8	LOS B	0.8	5.6				
All Vehicles	301	0.7	301	0.7		0.232		13.8	LOS B	0.8	5.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Williams Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	E								
Lane 1	6	52	58	1.8	426	0.136	100	NA	NA	
Approach	6	52	58	1.8		0.136				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	34	58	92	1.1	510	0.180	100	NA	NA	
Approach	34	58	92	1.1		0.180				
West: RoadName										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From W					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								
Lane 1	147	4	152	0.0	653	0.232	100	NA	NA	
Approach	147	4	152	0.0		0.232				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	301	0.7	0.232

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Williams Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: RoadName				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: 101 [Int 4: Hendriske Road / Rhode Road_AM Peak - Esc Existing + Prev Devs (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%											
South: Rhode Road															
Lane 1	22	0.0	22	0.0	1255	0.018	100	5.9	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	22	0.0	22	0.0		0.018		5.9	LOS A	0.1	0.4				
East: Hendriske Road															
Lane 1	63	0.0	63	0.0	1920	0.033	100	1.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	63	0.0	63	0.0		0.033		1.8	NA	0.0	0.0				
West: Hendriske Road															
Lane 1	142	0.0	142	0.0	1942	0.073	100	0.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	142	0.0	142	0.0		0.073		0.1	NA	0.0	0.1				
All Vehicles	227	0.0	227	0.0		0.073		1.1	NA	0.1	0.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Rhode Road										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From S					Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	W	E			veh/h	v/c	%	%	%	No.
Lane 1	9	13	22	0.0	1255	0.018	100	NA	NA	
Approach	9	13	22	0.0		0.018				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.	
From E					Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	S	W			veh/h	v/c	%	%	%	No.
Lane 1	20	43	63	0.0	1920	0.033	100	NA	NA	
Approach	20	43	63	0.0		0.033				
West: Hendriske Road										
Mov.	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W					Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	E	S			veh/h	v/c	%	%	%	No.

Lane 1	139	3	142	0.0	1942	0.073	100	NA	NA
Approach	139	3	142	0.0		0.073			
Total %HV Deg.Satn (v/c)									
All Vehicles	227	0.0		0.073					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Rhode Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 5: Lang Road / Gabriels Road_AM Peak - Esc Existing + Prev Devs (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob.	
	[Total	HV]	[Total	HV]										Adj. Block.	
	veh/h	%	veh/h	%						veh/h	v/c			%	sec
South: Lang Road															
Lane 1	337	0.0	337	0.0	1028	0.328	100	10.9	LOS B	1.1	7.9	Full	500	0.0	0.0
Approach	337	0.0	337	0.0		0.328		10.9	LOS B	1.1	7.9				
East: Gabriels Road															
Lane 1	43	0.0	43	0.0	235	0.184	100	24.6	LOS C	0.7	4.7	Full	500	0.0	0.0
Approach	43	0.0	43	0.0		0.184		24.6	LOS C	0.7	4.7				
North: Lang Road															
Lane 1	839	0.5	839	0.5	1140	0.736	100	17.3	LOS C	5.4	37.8	Full	500	0.0	0.0
Approach	839	0.5	839	0.5		0.736		17.3	LOS C	5.4	37.8				
All Vehicles	1219	0.3	1219	0.3		0.736		15.7	LOS C	5.4	37.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From S To Exit:	N	E								
Lane 1	328	8	337	0.0	1028	0.328	100	NA	NA	
Approach	328	8	337	0.0		0.328				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From E To Exit:	S	N								
Lane 1	34	9	43	0.0	235	0.184	100	NA	NA	
Approach	34	9	43	0.0		0.184				
North: Lang Road										
Mov.	L2	T1	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From N To Exit:	E	S								
Lane 1	7	832	839	0.5	1140	0.736	100	NA	NA	
Approach	7	832	839	0.5		0.736				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1219	0.3	0.736

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 6: Welgevonden Blvd / Lang Road_AM Peak - Esc Existing + Prev Devs (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Lang Road															
Lane 1	209	1.0	209	1.0	1169	0.179	100	8.9	LOS A	0.8	5.4	Full	500	0.0	0.0
Approach	209	1.0	209	1.0		0.179		8.9	LOS A	0.8	5.4				
East: Welgevonden Blvd															
Lane 1	121	0.0	121	0.0	1938	0.062	100	0.7	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	121	0.0	121	0.0		0.062		0.7	NA	0.0	0.0				
West: Welgevonden Blvd															
Lane 1	663	1.1	663	1.1	1622	0.409	100	5.7	LOS A	2.6	18.7	Full	500	0.0	0.0
Approach	663	1.1	663	1.1		0.409		5.7	NA	2.6	18.7				
All Vehicles	994	1.0	994	1.0		0.409		5.8	NA	2.6	18.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	W	E								
Lane 1	202	7	209	1.0	1169	0.179	100	NA	NA	
Approach	202	7	209	1.0		0.179				
East: Welgevonden Blvd										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	W								
Lane 1	15	106	121	0.0	1938	0.062	100	NA	NA	
Approach	15	106	121	0.0		0.062				
West: Welgevonden Blvd										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From W					Cap. veh/h	v/c	%	%	No.	
To Exit:	E	S								

Lane 1	42	621	663	1.1	1622	0.409	100	NA	NA
Approach	42	621	663	1.1		0.409			
Total %HV Deg.Satn (v/c)									
All Vehicles	994	1.0		0.409					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
West: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_AM Peak - Esc Existing + Prev Devs (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: R304															
Lane 1	1206	1.5	1206	1.5	1111 ¹	1.085	100	135.1	LOS F	115.9	821.3	Full	500	0.0	50.6
Lane 2	251	0.0	251	0.0	173	1.446	100	451.4	LOS F	37.9	265.1	Short	70	0.0	NA
Approach	1457	1.2	1457	1.2		1.446		189.5	LOS F	115.9	821.3				
East: Welgevonden Blvd															
Lane 1	178	0.0	178	0.0	422	0.421	100	53.2	LOS D	8.2	57.7	Short	45	0.0	NA
Lane 2	248	0.0	248	0.0	216 ¹	1.152	100	217.3	LOS F	27.0	189.1	Full	500	0.0	0.0
Approach	426	0.0	426	0.0		1.152		148.8	LOS F	27.0	189.1				
North: R304															
Lane 1	339	0.6	339	0.6	1227	0.276	100	26.0	LOS C	7.3	51.7	Short	100	0.0	NA
Lane 2	1313	2.3	1313	2.3	1102 ¹	1.191	100	220.4	LOS F	156.7	1119.1	Full	500	0.0	80.3
Approach	1652	2.0	1652	2.0		1.191		180.5	LOS F	156.7	1119.1				
All Vehicles	3535	1.4	3535	1.4		1.446		180.4	LOS F	156.7	1119.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	N	E								
Lane 1	1206	-	1206	1.5	1111 ¹	1.085	100	NA	NA	
Lane 2	-	251	251	0.0	173	1.446	100	100.0	1	
Approach	1206	251	1457	1.2		1.446				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	N								
Lane 1	178	-	178	0.0	422	0.421	100	27.7	2	
Lane 2	-	248	248	0.0	216 ¹	1.152	100	NA	NA	

Approach	178	248	426	0.0	1.152				
North: R304									
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.
From N					Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S			veh/h	v/c	%	%	No.
Lane 1	339	-	339	0.6	1227	0.276	100	0.0	2
Lane 2	-	1313	1313	2.3	1102 ¹	1.191	100	NA	NA
Approach	339	1313	1652	2.0	1.191				
Total %HV Deg.Satn (v/c)									
All Vehicles	3535	1.4	1.446						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R304				
Lane 1	0.0	47.4	153.6	NA
Lane 2	0.0	38.6	802.1	NA
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	16.4	273.2	NA
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	105.3	343.8	NA

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_AM Peak - Esc Existing + Prev Devs_Miti (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R304															
Lane 1	617	1.5	617	1.5	901	0.685	100	25.6	LOS C	21.2	150.4	Full	500	0.0	0.0
Lane 2	589	1.5	589	1.5	860 ¹	0.685	100	22.8	LOS C	20.2	143.5	Short	200	0.0	NA
Lane 3	251	0.0	251	0.0	362	0.692	100	29.8	LOS C	7.0	48.8	Short	70	0.0	NA
Approach	1457	1.2	1457	1.2		0.692		25.2	LOS C	21.2	150.4				
East: Welgevonden Blvd															
Lane 1	178	0.0	178	0.0	743	0.239	100	24.8	LOS C	5.2	36.2	Short	45	0.0	NA
Lane 2	248	0.0	248	0.0	371	0.669	100	42.9	LOS D	10.5	73.4	Full	500	0.0	0.0
Approach	426	0.0	426	0.0		0.669		35.3	LOS D	10.5	73.4				
North: R304															
Lane 1	339	0.6	339	0.6	863	0.393	100	22.4	LOS C	9.7	68.2	Short	100	0.0	NA
Lane 2	656	2.3	656	2.3	896	0.732	100	20.9	LOS C	23.3	166.6	Short	200	0.0	NA
Lane 3	656	2.3	656	2.3	896	0.732	100	26.9	LOS C	23.3	166.6	Full	500	0.0	0.0
Approach	1652	2.0	1652	2.0		0.732		23.6	LOS C	23.3	166.6				
All Vehicles	3535	1.4	3535	1.4		0.732		25.7	LOS C	23.3	166.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	N	E			Cap. veh/h	v/c	%	%	No.	
Lane 1	617	-	617	1.5	901	0.685	100	NA	NA	
Lane 2	589	-	589	1.5	860 ¹	0.685	100	0.0	1	
Lane 3	-	251	251	0.0	362	0.692	100	0.0	2	
Approach	1206	251	1457	1.2		0.692				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E To Exit:	S	N			Cap. veh/h	v/c	%	%	No.	

Lane 1	178	-	178	0.0	743	0.239	100	0.0	2
Lane 2	-	248	248	0.0	371	0.669	100	NA	NA
Approach	178	248	426	0.0		0.669			
North: R304									
Mov. From N To Exit:	L2	T1	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
	E	S							
Lane 1	339	-	339	0.6	863	0.393	100	0.0	2
Lane 2	-	656	656	2.3	896	0.732	100	0.0	3
Lane 3	-	656	656	2.3	896	0.732	100	NA	NA
Approach	339	1313	1652	2.0		0.732			
Total %HV Deg. Satn (v/c)									
All Vehicles	3535	1.4		0.732					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R304												
Merge Type: Priority												
Exit Short Lane	2	200	0.0	834	842	3.03	2.02	656	897	0.731	1.9	6.0
Merge Lane	1	-	100.0	Merge Lane is not Opposed				834	1800	0.463	0.0	0.0
North Exit: R304												
Merge Type: Priority												
Exit Short Lane	1	200	0.0	838	842	3.02	2.01	617	907	0.681	1.9	5.3
Merge Lane	2	-	100.0	Merge Lane is not Opposed				838	1800	0.465	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: 101v [Int 8: R44 / Fir Street_AMPeak - Esc Existing + Prev Devs - Conversion (Site Folder: 2026 AM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist]		m	%	%
South: R44															
Lane 1	598	3.6	598	3.6	1391	0.430	100	7.1	LOS A	13.3	96.3	Full	490	0.0	0.0
Lane 2	600	4.0	600	4.0	1394	0.430	100	6.6	LOS A	13.4	96.8	Full	490	0.0	0.0
Approach	1198	3.8	1198	3.8		0.430		6.8	LOS A	13.4	96.8				
North: R44															
Lane 1	1212	2.1	1212	2.1	1411	0.859	100	12.2	LOS B	50.2	357.5	Full	1150	0.0	0.0
Lane 2	1027	2.1	1027	2.1	1196 ¹	0.859	100	21.1	LOS C	44.5	317.3	Full	1150	0.0	0.0
Lane 3	58	0.0	58	0.0	243	0.238	100	23.7	LOS C	1.6	11.1	Short	60	0.0	NA
Approach	2297	2.1	2297	2.1		0.859		16.5	LOS B	50.2	357.5				
West: Fir Street															
Lane 1	265	0.8	265	0.8	308	0.862	100	67.1	LOS E	17.0	119.6	Full	260	0.0	0.0
Approach	265	0.8	265	0.8		0.862		67.1	LOS E	17.0	119.6				
All Vehicles	3760	2.5	3760	2.5		0.862		17.0	LOS B	50.2	357.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	N								
Lane 1	56	542	598	3.6	1391	0.430	100	NA	NA	
Lane 2	-	600	600	4.0	1394	0.430	100	NA	NA	
Approach	56	1142	1198	3.8		0.430				
North: R44										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From N					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	1212	-	1212	2.1	1411	0.859	100	NA	NA	
Lane 2	1027	-	1027	2.1	1196 ¹	0.859	100	NA	NA	
Lane 3	-	58	58	0.0	243	0.238	100	0.0	2	

Approach	2239	58	2297	2.1		0.859				
West: Fir Street										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W						Satn	Util.	SL	Ov.	Lane
To Exit:	N	S				veh/h	v/c	%	%	No.
Lane 1	21	244	265	0.8		308	0.862	100	NA	NA
Approach	21	244	265	0.8			0.862			
Total %HV Deg.Satn (v/c)										
All Vehicles	3760	2.5		0.862						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1
- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int1 [Int 1: R44 / Hendriske Road_PM
Peak_NextUpgraded - Esc Existing + Prev Devs (Site Folder:
2026 PM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	402	0.0	402	0.0	1199	0.335	100	7.6	LOS A	2.6	18.2	Short	80	0.0	NA
Lane 2	276	3.7	276	3.7	1181	0.234	35 ⁶	7.8	LOS A	3.0	21.7	Full	500	0.0	0.0
Lane 3	756	3.7	756	3.7	1146 ¹	0.660	100	7.0	LOS A	12.0	86.8	Short	45	0.0	NA
Approach	1435	2.6	1435	2.6		0.660		7.3	LOS A	12.0	86.8				
East: RoadName															
Lane 1	2	0.0	2	0.0	223	0.009	100	26.2	LOS C	0.0	0.3	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.009		26.2	LOS C	0.0	0.3				
North: R44															
Lane 1	351	3.1	351	3.1	1185	0.296	100	4.8	LOS A	4.0	28.8	Full	500	0.0	0.0
Lane 2	225	3.1	225	3.1	1185	0.190	64 ⁶	5.5	LOS A	2.4	17.0	Full	500	0.0	0.0
Lane 3	93	0.0	93	0.0	266	0.348	100	19.2	LOS B	1.8	12.6	Short	80	0.0	NA
Approach	668	2.7	668	2.7		0.348		7.1	LOS A	4.0	28.8				
West: Hendriske Road															
Lane 1	151	0.6	151	0.6	244	0.619	100	30.3	LOS C	3.8	27.0	Short	20	0.0	NA
Lane 2	111	1.0	111	1.0	267	0.416	67 ⁶	29.4	LOS C	2.7	18.8	Full	500	0.0	0.0
Approach	262	0.8	262	0.8		0.619		29.9	LOS C	3.8	27.0				
All Vehicles	2367	2.4	2367	2.4		0.660		9.8	LOS A	12.0	86.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.

Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

⁶ Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)											
South: R44											
Mov.	L2	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			veh/h	v/c	%	%	No.	
Lane 1	402	-	-	402	0.0	1199	0.335	100	0.0	2	
Lane 2	-	276	-	276	3.7	1181	0.234	35 ⁶	NA	NA	
Lane 3	-	755	1	756	3.7	1146 ¹	0.660	100	65.8	2	

Approach	402	1032	1	1435	2.6		0.660			
East: RoadName										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From E						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	S	N				veh/h	v/c	%	%	No.
Lane 1	1	1	2	0.0		223	0.009	100	NA	NA
Approach	1	1	2	0.0			0.009			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	1	350	-	351	3.1	1185	0.296	100	NA	NA
Lane 2	-	225	-	225	3.1	1185	0.190	64 ⁶	NA	NA
Lane 3	-	-	93	93	0.0	266	0.348	100	0.0	2
Approach	1	575	93	668	2.7		0.348			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	S				veh/h	v/c	%	%	No.
Lane 1	56	95	151	0.6		244	0.619	100	32.4	2
Lane 2	-	111	111	1.0		267	0.416	67 ⁶	NA	NA
Approach	56	206	262	0.8			0.619			
Total %HV Deg.Satn (v/c)										
All Vehicles	2367	2.4		0.660						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
- 6 Lane under-utilisation due to downstream effects

Merge Analysis													
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
South Exit: R44													
Merge Type: Priority													
Exit Short Lane	2	120	0.0	446	452	3.04	2.02	336	1312	0.256	0.8	1.1	
Merge Lane	1	-	100.0	Merge Lane is not Opposed				446	1800	0.248	0.0	0.0	
North Exit: R44													
Merge Type: Priority													
Exit Short Lane	1	60	0.0	784	798	3.05	2.03	304	933	0.326	1.8	2.9	
Merge Lane	2	-	100.0	Merge Lane is not Opposed				784	1800	0.436	0.0	0.0	

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				

Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

Site: Int1 [Int 1: R44 / Hendriske Road_PM Peak_Duel- Esc Existing + Prev Devs (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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 Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.
From S To Exit:	W	N	E			Cap. veh/h	v/c	%	%	
Lane 1	402	-	-	402	0.0	1183	0.340	100	0.0	2
Lane 2	-	271	-	271	3.7	1219	0.222	35 ⁶	NA	NA
Lane 3	-	761	1	762	3.7	1217	0.626	100	NA	NA
Approach	402	1032	1	1435	2.6		0.626			
East: RoadName										

Mov. From E To Exit:	L2	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	1	1	2	0.0	192	0.011	100	NA	NA	
Approach	1	1	2	0.0		0.011				
North: R44										
Mov. From N To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	287	-	288	3.1	1223	0.235	100	NA	NA
Lane 2	-	288	-	288	3.1	1223	0.235	100	NA	NA
Lane 3	-	-	93	93	0.0	281	0.330	100	0.0	2
Approach	1	575	93	668	2.7		0.330			
West: Hendriske Road										
Mov. From W To Exit:	L2	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	56	67	122	0.6	210	0.583	100	13.7	2	
Lane 2	-	140	140	1.0	240	0.583	100	NA	NA	
Approach	56	206	262	0.8		0.583				
Total %HV Deg.Satn (v/c)										
All Vehicles	2367	2.4		0.626						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

6 Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Flow Rate pcu/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	790	804	3.05	2.03	299	927	0.322	1.8	2.9
Merge Lane	2	-	100.0	Merge Lane is not Opposed				790	1800	0.439	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
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LANE SUMMARY

 **Site: [Int 2: Hendriske Road / Tolbos Road_PM Peak - Esc Existing + Prev Devs (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist] m		m	%	%
South: Hendriske Road															
Lane 1	97	1.1	97	1.1	567	0.171	100	13.3	LOS B	0.6	4.0	Full	500	0.0	0.0
Approach	97	1.1	97	1.1		0.171		13.3	LOS B	0.6	4.0				
East: Tolbos Road															
Lane 1	55	0.0	55	0.0	497	0.110	100	13.6	LOS B	0.4	2.5	Full	500	0.0	0.0
Approach	55	0.0	55	0.0		0.110		13.6	LOS B	0.4	2.5				
North: Hendriske Road															
Lane 1	251	0.0	251	0.0	597	0.419	100	16.1	LOS C	1.8	12.5	Full	500	0.0	0.0
Approach	251	0.0	251	0.0		0.419		16.1	LOS C	1.8	12.5				
West: Tolbos Road															
Lane 1	1	0.0	1	0.0	1	1.000 ⁴	100	4165.9	LOS F	2.2	15.4	Full	500	0.0	0.0
Approach	1	0.0	1	0.0		1.000		4165.9	LOS F	2.2	15.4				
All Vehicles	403	0.3	403	0.3		1.000		25.9	LOS D	2.2	15.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

⁴ x = 1.00 due to minimum capacity

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	T1	R2	Total	%HV						
From S					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	N	E			veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	88	8	97	1.1	567	0.171	100	NA	NA	
Approach	88	8	97	1.1		0.171				
East: Tolbos Road										
Mov.	L2	R2	Total	%HV						
From E					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	S	N			veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	2	53	55	0.0	497	0.110	100	NA	NA	
Approach	2	53	55	0.0		0.110				
North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV					
From N					Cap.	Deg.	Lane	Prob.	Ov.	

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	81	166	3	251	0.0	597	0.419	100	NA	NA
Approach	81	166	3	251	0.0		0.419			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.
From W To Exit:	N					Cap. veh/h	v/c	%	%	No.
Lane 1	1	1	0.0			1	1.000 ⁴	100	NA	NA
Approach	1	1	0.0				1.000			
Total %HV Deg. Satn (v/c)										
All Vehicles	403	0.3		1.000						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

⁴ x = 1.00 due to minimum capacity

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	NA

LANE SUMMARY

 **Site: [Int 3: Hendriske Road / Williams Road_PM Peak - Esc Existing + Prev Devs (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob. Adj. Block.	
	[Total	HV]	[Total	HV]						[Veh	Dist]			%	%
	veh/h	%	veh/h	%						veh/h	v/c			%	sec
South: Williams Road															
Lane 1	34	0.0	34	0.0	370	0.091	100	16.2	LOS C	0.3	2.1	Full	500	0.0	0.0
Approach	34	0.0	34	0.0		0.091		16.2	LOS C	0.3	2.1				
East: Hendriske Road															
Lane 1	167	0.0	167	0.0	646	0.259	100	13.3	LOS B	0.9	6.4	Full	500	0.0	0.0
Approach	167	0.0	167	0.0		0.259		13.3	LOS B	0.9	6.4				
West: RoadName															
Lane 1	76	2.8	76	2.8	620	0.122	100	12.4	LOS B	0.4	2.8	Full	500	0.0	0.0
Approach	76	2.8	76	2.8		0.122		12.4	LOS B	0.4	2.8				
All Vehicles	277	0.8	277	0.8		0.259		13.4	LOS B	0.9	6.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Williams Road										
Mov.	L2	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From S To Exit:	W	E								
Lane 1	4	29	34	0.0	370	0.091	100	NA	NA	
Approach	4	29	34	0.0		0.091				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From E To Exit:	S	W								
Lane 1	46	121	167	0.0	646	0.259	100	NA	NA	
Approach	46	121	167	0.0		0.259				
West: RoadName										
Mov.	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From W To Exit:	E	S								
Lane 1	69	6	76	2.8	620	0.122	100	NA	NA	
Approach	69	6	76	2.8		0.122				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	277	0.8	0.259

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Williams Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: RoadName				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: 101 [Int 4: Hendriske Road / Rhode Road_PM Peak - Esc Existing + Prev Devs (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%											
South: Rhode Road															
Lane 1	21	0.0	21	0.0	1247	0.017	100	5.9	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	21	0.0	21	0.0		0.017		5.9	LOS A	0.1	0.4				
East: Hendriske Road															
Lane 1	123	0.0	123	0.0	1920	0.064	100	1.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	123	0.0	123	0.0		0.064		1.8	NA	0.0	0.0				
West: Hendriske Road															
Lane 1	66	3.2	66	3.2	1890	0.035	100	0.3	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	66	3.2	66	3.2		0.035		0.3	NA	0.0	0.1				
All Vehicles	211	1.0	211	1.0		0.064		1.7	NA	0.1	0.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Rhode Road										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From S					Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	W	E			veh/h	v/c	%	%	%	No.
Lane 1	8	13	21	0.0	1247	0.017	100	NA	NA	
Approach	8	13	21	0.0		0.017				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.	
From E					Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	S	W			veh/h	v/c	%	%	%	No.
Lane 1	39	84	123	0.0	1920	0.064	100	NA	NA	
Approach	39	84	123	0.0		0.064				
West: Hendriske Road										
Mov.	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W					Cap.	Satn	Util.	SL	Ov.	Lane
To Exit:	E	S			veh/h	v/c	%	%	%	No.

Lane 1	63	3	66	3.2	1890	0.035	100	NA	NA
Approach	63	3	66	3.2		0.035			
Total %HV Deg.Satn (v/c)									
All Vehicles	211	1.0		0.064					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Rhode Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 5: Lang Road / Gabriels Road_PM Peak - Esc Existing + Prev Devs (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Lang Road															
Lane 1	466	0.2	466	0.2	1210	0.385	100	10.5	LOS B	1.4	9.5	Full	500	0.0	0.0
Approach	466	0.2	466	0.2		0.385		10.5	LOS B	1.4	9.5				
East: Gabriels Road															
Lane 1	9	0.0	9	0.0	204	0.046	100	24.5	LOS C	0.2	1.1	Full	500	0.0	0.0
Approach	9	0.0	9	0.0		0.046		24.5	LOS C	0.2	1.1				
North: Lang Road															
Lane 1	277	1.1	277	1.1	1114	0.249	100	10.0	LOS B	0.8	5.3	Full	500	0.0	0.0
Approach	277	1.1	277	1.1		0.249		10.0	LOS B	0.8	5.3				
All Vehicles	753	0.6	753	0.6		0.385		10.5	LOS B	1.4	9.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From S					Cap. veh/h	v/c	%	%		
To Exit:	N	E								
Lane 1	443	23	466	0.2	1210	0.385	100	NA	NA	
Approach	443	23	466	0.2		0.385				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From E					Cap. veh/h	v/c	%	%		
To Exit:	S	N								
Lane 1	8	1	9	0.0	204	0.046	100	NA	NA	
Approach	8	1	9	0.0		0.046				
North: Lang Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From N					Cap. veh/h	v/c	%	%		
To Exit:	E	S								
Lane 1	2	275	277	1.1	1114	0.249	100	NA	NA	
Approach	2	275	277	1.1		0.249				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	753	0.6	0.385

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 6: Welgevonden Blvd / Lang Road_PM Peak - Esc Existing + Prev Devs (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Lang Road															
Lane 1	338	0.0	338	0.0	1317	0.257	100	8.4	LOS A	1.2	8.7	Full	500	0.0	0.0
Approach	338	0.0	338	0.0		0.257		8.4	LOS A	1.2	8.7				
East: Welgevonden Blvd															
Lane 1	80	0.0	80	0.0	1936	0.041	100	0.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	80	0.0	80	0.0		0.041		0.8	NA	0.0	0.0				
West: Welgevonden Blvd															
Lane 1	292	0.0	292	0.0	1738	0.168	100	4.1	LOS A	0.9	6.0	Full	500	0.0	0.0
Approach	292	0.0	292	0.0		0.168		4.1	NA	0.9	6.0				
All Vehicles	709	0.0	709	0.0		0.257		5.8	NA	1.2	8.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	E								
Lane 1	325	13	338	0.0	1317	0.257	100	NA	NA	
Approach	325	13	338	0.0		0.257				
East: Welgevonden Blvd										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	12	68	80	0.0	1936	0.041	100	NA	NA	
Approach	12	68	80	0.0		0.041				
West: Welgevonden Blvd										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From W					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								

Lane 1	88	203	292	0.0	1738	0.168	100	NA	NA
Approach	88	203	292	0.0		0.168			
Total %HV Deg.Satn (v/c)									
All Vehicles	709	0.0		0.257					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
West: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_PM Peak - Esc Existing + Prev Devs (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%	veh/h						m		m		
South: R304															
Lane 1	1461	2.7	1461	2.7	1272 ¹	1.149	100	185.6	LOS F	181.9	1302.3	Full	500	0.0	95.3
Lane 2	218	0.0	218	0.0	148	1.476	100	498.8	LOS F	35.8	250.7	Short	70	0.0	NA
Approach	1679	2.3	1679	2.3		1.476		226.3	LOS F	181.9	1302.3				
East: Welgevonden Blvd															
Lane 1	177	0.0	177	0.0	298 ¹	0.593	100	77.8	LOS E	12.0	84.2	Short	45	0.0	NA
Lane 2	181	0.0	181	0.0	164 ¹	1.105	100	202.5	LOS F	21.0	147.1	Full	500	0.0	0.0
Approach	358	0.0	358	0.0		1.105		140.9	LOS F	21.0	147.1				
North: R304															
Lane 1	211	0.0	211	0.0	1387	0.152	100	20.3	LOS C	4.3	29.8	Short	100	0.0	NA
Lane 2	1206	0.5	1206	0.5	1295 ¹	0.932	100	34.7	LOS C	79.4	558.2	Full	500	0.0	15.0
Approach	1417	0.4	1417	0.4		0.932		32.6	LOS C	79.4	558.2				
All Vehicles	3454	1.3	3454	1.3		1.476		138.0	LOS F	181.9	1302.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	N	E								
Lane 1	1461	-	1461	2.7	1272 ¹	1.149	100	NA	NA	
Lane 2	-	218	218	0.0	148	1.476	100	100.0	1	
Approach	1461	218	1679	2.3		1.476				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	N								
Lane 1	177	-	177	0.0	298 ¹	0.593	100	63.0	2	
Lane 2	-	181	181	0.0	164 ¹	1.105	100	NA	NA	

Approach	177	181	358	0.0		1.105				
North: R304										
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.	
From N						Satn	Util.	SL Ov.	Lane	
To Exit:	E	S				veh/h	%	%	No.	
Lane 1	211	-	211	0.0		1387	0.152	100	0.0	2
Lane 2	-	1206	1206	0.5		1295 ¹	0.932	100	NA	NA
Approach	211	1206	1417	0.4			0.932			
Total %HV Deg.Satn (v/c)										
All Vehicles	3454	1.3		1.476						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R304				
Lane 1	0.0	94.7	268.2	NA
Lane 2	0.0	35.1	856.9	NA
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	8.6	188.1	NA
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_PM Peak - Esc Existing + Prev Devs_Miti (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: R304															
Lane 1	756	2.7	756	2.7	1001	0.756	100	30.1	LOS C	26.1	187.1	Full	500	0.0	0.0
Lane 2	705	2.7	705	2.7	933 ¹	0.756	100	24.1	LOS C	24.4	175.0	Short	200	0.0	NA
Lane 3	218	0.0	218	0.0	300	0.726	100	28.9	LOS C	5.9	41.0	Short	70	0.0	NA
Approach	1679	2.3	1679	2.3		0.756		27.4	LOS C	26.1	187.1				
East: Welgevonden Blvd															
Lane 1	177	0.0	177	0.0	640	0.276	100	28.6	LOS C	5.6	39.5	Short	45	0.0	NA
Lane 2	181	0.0	181	0.0	371	0.487	100	40.8	LOS D	7.2	50.6	Full	500	0.0	0.0
Approach	358	0.0	358	0.0		0.487		34.8	LOS C	7.2	50.6				
North: R304															
Lane 1	211	0.0	211	0.0	970	0.217	100	17.9	LOS B	4.9	34.5	Short	100	0.0	NA
Lane 2	603	0.5	603	0.5	1015	0.594	100	15.9	LOS B	18.3	128.3	Short	200	0.0	NA
Lane 3	603	0.5	603	0.5	1015	0.594	100	20.2	LOS C	18.3	128.3	Full	500	0.0	0.0
Approach	1417	0.4	1417	0.4		0.594		18.0	LOS B	18.3	128.3				
All Vehicles	3454	1.3	3454	1.3		0.756		24.3	LOS C	26.1	187.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From S To Exit:	N	E			Cap. veh/h	v/c	%	%		
Lane 1	756	-	756	2.7	1001	0.756	100	NA	NA	
Lane 2	705	-	705	2.7	933 ¹	0.756	100	0.0	1	
Lane 3	-	218	218	0.0	300	0.726	100	0.0	2	
Approach	1461	218	1679	2.3		0.756				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From E To Exit:	S	N			Cap. veh/h	v/c	%	%		

Lane 1	177	-	177	0.0	640	0.276	100	0.0	2
Lane 2	-	181	181	0.0	371	0.487	100	NA	NA
Approach	177	181	358	0.0	0.487				
North: R304									
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.
From N					Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S			veh/h	v/c	%	%	No.
Lane 1	211	-	211	0.0	970	0.217	100	0.0	2
Lane 2	-	603	603	0.5	1015	0.594	100	0.0	3
Lane 3	-	603	603	0.5	1015	0.594	100	NA	NA
Approach	211	1206	1417	0.4	0.594				
Total %HV Deg. Satn (v/c)									
All Vehicles	3454	1.3	0.756						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R304												
Merge Type: Priority												
Exit Short Lane	2	200	0.0	780	782	3.01	2.01	603	982	0.614	1.7	4.2
Merge Lane	1	-	100.0	Merge Lane is not Opposed				780	1800	0.433	0.0	0.0
North Exit: R304												
Merge Type: Priority												
Exit Short Lane	1	200	0.0	886	895	3.04	2.03	756	837	0.904	2.2	11.9
Merge Lane	2	-	100.0	Merge Lane is not Opposed				886	1800	0.492	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: 101v [Int 8: R44 / Fir Street_PMPeak - Esc Existing + Prev Devs - Conversion (Site Folder: 2026 PM Peak - Esc Existing + Prev Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	HV %	[Total veh/h]	HV %	veh/h	v/c	%	sec		[Veh]	Dist] m		m	%	%
South: R44															
Lane 1	920	2.9	920	2.9	1515	0.607	100	4.9	LOS A	15.5	111.0	Full	490	0.0	0.0
Lane 2	926	3.6	926	3.6	1524	0.607	100	3.7	LOS A	15.6	112.4	Full	490	0.0	0.0
Approach	1845	3.3	1845	3.3		0.607		4.3	LOS A	15.6	112.4				
North: R44															
Lane 1	699	4.1	699	4.1	1519	0.460	100	3.0	LOS A	9.6	69.3	Full	1150	0.0	0.0
Lane 2	699	4.1	699	4.1	1519	0.460	100	3.0	LOS A	9.6	69.3	Full	1150	0.0	0.0
Lane 3	19	5.6	19	5.6	125	0.151	100	14.5	LOS B	0.4	2.9	Short	60	0.0	NA
Approach	1417	4.2	1417	4.2		0.460		3.2	LOS A	9.6	69.3				
West: Fir Street															
Lane 1	72	0.0	72	0.0	124	0.578	100	53.3	LOS D	3.3	23.2	Full	260	0.0	0.0
Approach	72	0.0	72	0.0		0.578		53.3	LOS D	3.3	23.2				
All Vehicles	3334	3.6	3334	3.6		0.607		4.9	LOS A	15.6	112.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From S To Exit:	W	N			veh/h	v/c	%	%		
Lane 1	202	718	920	2.9	1515	0.607	100	NA	NA	
Lane 2	-	926	926	3.6	1524	0.607	100	NA	NA	
Approach	202	1643	1845	3.3		0.607				
North: R44										
Mov.	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From N To Exit:	S	W			veh/h	v/c	%	%		
Lane 1	699	-	699	4.1	1519	0.460	100	NA	NA	
Lane 2	699	-	699	4.1	1519	0.460	100	NA	NA	
Lane 3	-	19	19	5.6	125	0.151	100	0.0	2	
Approach	1398	19	1417	4.2		0.460				

West: Fir Street									
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	19	53	72	0.0	124	0.578	100	NA	NA
Approach	19	53	72	0.0		0.578			
Total %HV Deg.Satn (v/c)									
All Vehicles	3334	3.6		0.607					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int1 [Int 1: R44 / Hendriske Road_AM Peak_Duel - Esc Existing + All Devs (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	109	0.0	109	0.0	1543	0.071	100	6.3	LOS A	0.4	2.8	Short	80	0.0	NA
Lane 2	193	1.3	193	1.3	608	0.317	35 ⁶	21.3	LOS C	5.1	36.0	Full	500	0.0	0.0
Lane 3	538	1.3	538	1.3	602	0.894	100	36.4	LOS D	22.1	156.6	Full	500	0.0	0.0
Approach	840	1.1	840	1.1		0.894		29.0	LOS C	22.1	156.6				
East: RoadName															
Lane 1	2	0.0	2	0.0	779	0.003	100	14.8	LOS B	0.0	0.2	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.003		14.8	LOS B	0.0	0.2				
North: R44															
Lane 1	559	1.0	559	1.0	609	0.918	100	40.5	LOS D	24.4	172.2	Full	500	0.0	0.0
Lane 2	559	1.0	559	1.0	609	0.918	100	40.5	LOS D	24.4	172.2	Full	500	0.0	0.0
Lane 3	36	0.0	36	0.0	116	0.309	100	42.9	LOS D	1.3	9.0	Short	80	0.0	NA
Approach	1154	1.0	1154	1.0		0.918		40.6	LOS D	24.4	172.2				
West: Hendriske Road															
Lane 1	558	0.0	558	0.0	463 ¹	1.206	100	241.9	LOS F	60.8	425.4	Short	20	0.0	NA
Lane 2	555	0.0	555	0.0	460 ¹	1.206	100	241.9	LOS F	60.4	423.0	Full	500	0.0	0.0
Approach	1113	0.0	1113	0.0		1.206		241.9	LOS F	60.8	425.4				
All Vehicles	3108	0.7	3108	0.7		1.206		109.5	LOS F	60.8	425.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.

Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

⁶ Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)											
South: R44											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			Cap. veh/h	v/c	%	%	No.	
Lane 1	109	-	-	109	0.0	1543	0.071	100	0.0	2	
Lane 2	-	193	-	193	1.3	608	0.317	35 ⁶	NA	NA	
Lane 3	-	537	1	538	1.3	602	0.894	100	NA	NA	

Approach	109	729	1	840	1.1		0.894			
East: RoadName										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From E						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	S	N				veh/h	v/c	%	%	No.
Lane 1	1	1	2	0.0		779	0.003	100	NA	NA
Approach	1	1	2	0.0			0.003			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	1	558	-	559	1.0	609	0.918	100	NA	NA
Lane 2	-	559	-	559	1.0	609	0.918	100	NA	NA
Lane 3	-	-	36	36	0.0	116	0.309	100	0.0	2
Approach	1	1117	36	1154	1.0		0.918			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	S				veh/h	v/c	%	%	No.
Lane 1	57	501	558	0.0		463 ¹	1.206	100	100.0	2
Lane 2	-	555	555	0.0		460 ¹	1.206	100	NA	NA
Approach	57	1056	1113	0.0			1.206			
Total %HV Deg.Satn (v/c)										
All Vehicles	3108	0.7		1.206						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.
- 6 Lane under-utilisation due to downstream effects

Merge Analysis													
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
North Exit: R44 Merge Type: Priority													
Exit Short Lane	1	60	0.0	562	565	3.02	2.01	216	1206	0.179	1.0	1.4	
Merge Lane	2	-	100.0	Merge Lane is not Opposed				562	1800	0.312	0.0	0.0	

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	47.6	370.3	NA
Lane 2	0.0	47.3	370.3	NA

LANE SUMMARY

**Site: Int1 [Int 1: R44 / Hendriske Road_AM Peak_Duel+TurnExt
- Esc Existing + All Devs (Site Folder: 2026 AM Peak - Esc
Existing + All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %						[Veh	Dist] m				
South: R44															
Lane 1	109	0.0	109	0.0	1409	0.078	100	6.6	LOS A	0.4	2.8	Short	80	0.0	NA
Lane 2	192	1.3	192	1.3	696	0.276	35 ⁶	13.9	LOS B	3.4	24.1	Full	500	0.0	0.0
Lane 3	538	1.3	538	1.3	692	0.778	100	18.7	LOS B	13.3	94.3	Full	500	0.0	0.0
Approach	840	1.1	840	1.1		0.778		16.0	LOS B	13.3	94.3				
East: RoadName															
Lane 1	2	0.0	2	0.0	624	0.003	100	15.2	LOS B	0.0	0.2	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.003		15.2	LOS B	0.0	0.2				
North: R44															
Lane 1	559	1.0	559	1.0	697	0.802	100	19.8	LOS B	14.3	101.1	Full	500	0.0	0.0
Lane 2	559	1.0	559	1.0	697	0.802	100	19.8	LOS B	14.3	101.1	Full	500	0.0	0.0
Lane 3	36	0.0	36	0.0	190	0.189	100	28.7	LOS C	0.9	6.0	Short	80	0.0	NA
Approach	1154	1.0	1154	1.0		0.802		20.0	LOS C	14.3	101.1				
West: Hendriske Road															
Lane 1	557	0.0	557	0.0	630	0.884	100	32.5	LOS C	17.4	121.7	Short	80	0.0	NA
Lane 2	555	0.0	555	0.0	628	0.884	100	32.4	LOS C	17.3	121.4	Full	500	0.0	0.0
Approach	1113	0.0	1113	0.0		0.884		32.5	LOS C	17.4	121.7				
All Vehicles	3108	0.7	3108	0.7		0.884		23.4	LOS C	17.4	121.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival values used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

6 Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)										
South: R44										
Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	109	-	-	109	0.0	1409	0.078	100	0.0	2
Lane 2	-	192	-	192	1.3	696	0.276	35 ⁶	NA	NA
Lane 3	-	537	1	538	1.3	692	0.778	100	NA	NA
Approach	109	729	1	840	1.1	0.778				
East: RoadName										

Mov. From E To Exit:	L2 S	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	1	1	2	0.0	624	0.003	100	NA	NA	
Approach	1	1	2	0.0		0.003				
North: R44										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	558	-	559	1.0	697	0.802	100	NA	NA
Lane 2	-	559	-	559	1.0	697	0.802	100	NA	NA
Lane 3	-	-	36	36	0.0	190	0.189	100	0.0	2
Approach	1	1117	36	1154	1.0		0.802			
West: Hendriske Road										
Mov. From W To Exit:	L2 N	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	57	500	557	0.0	630	0.884	100	43.4	2	
Lane 2	-	555	555	0.0	628	0.884	100	NA	NA	
Approach	57	1056	1113	0.0		0.884				
Total %HV Deg.Satn (v/c)										
All Vehicles	3108	0.7		0.884						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

6 Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Flow Rate pcu/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	567	570	3.02	2.01	220	1200	0.184	1.0	1.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				567	1800	0.315	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
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LANE SUMMARY

 **Site: [Int 2: Hendriske Road / Tolbos Road_AM Peak - Esc Existing + All Devs (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue	Back Of Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	m		m	%	%
South: Hendriske Road															
Lane 1	260	0.0	260	0.0	757	0.343	100	12.9	LOS B	1.3	9.0	Full	500	0.0	0.0
Approach	260	0.0	260	0.0		0.343		12.9	LOS B	1.3	9.0				
East: Tolbos Road															
Lane 1	107	0.0	107	0.0	609	0.176	100	12.7	LOS B	0.6	4.1	Full	500	0.0	0.0
Approach	107	0.0	107	0.0		0.176		12.7	LOS B	0.6	4.1				
North: Hendriske Road															
Lane 1	138	0.8	138	0.8	641	0.215	100	13.0	LOS B	0.7	5.1	Full	500	0.0	0.0
Approach	138	0.8	138	0.8		0.215		13.0	LOS B	0.7	5.1				
West: Tolbos Road															
Lane 1	77	0.0	77	0.0	152	0.505	100	51.5	LOS F	2.4	17.0	Full	500	0.0	0.0
Approach	77	0.0	77	0.0		0.505		51.5	LOS F	2.4	17.0				
All Vehicles	582	0.2	582	0.2		0.505		18.0	LOS C	2.4	17.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)											
South: Hendriske Road											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			Cap. veh/h	v/c	%	%	No.	
Lane 1	5	253	2	260	0.0	757	0.343	100	NA	NA	
Approach	5	253	2	260	0.0		0.343				
East: Tolbos Road											
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane		
From E To Exit:	S	N			Cap. veh/h	v/c	%	%	%	No.	
Lane 1	13	95	107	0.0	609	0.176	100	NA	NA		
Approach	13	95	107	0.0		0.176					
North: Hendriske Road											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From N To Exit:	E	S	W			Cap. veh/h	v/c	%	%	No.	

Lane 1	46	85	6	138	0.8	641	0.215	100	NA	NA
Approach	46	85	6	138	0.8		0.215			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.
From W To Exit:	N					Cap. veh/h	v/c	%	%	
Lane 1	77	77	0.0			152	0.505	100	NA	NA
Approach	77	77	0.0				0.505			
Total %HV Deg.Satn (v/c)										
All Vehicles	582	0.2		0.505						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: v [Int 2: Hendriske Road / Tolbos Road_AM Peak - Esc Existing + All Devs - Conversion (2) (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Hendriske Road															
Lane 1	260	0.0	260	0.0	1944	0.134	100	0.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	260	0.0	260	0.0		0.134		0.2	NA	0.0	0.1				
East: Tolbos Road															
Lane 1	107	0.0	107	0.0	747	0.144	100	8.0	LOS A	0.5	3.6	Full	500	0.0	0.0
Approach	107	0.0	107	0.0		0.144		8.0	LOS A	0.5	3.6				
North: Hendriske Road															
Lane 1	138	0.8	138	0.8	1875	0.074	100	2.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	138	0.8	138	0.8		0.074		2.2	NA	0.1	0.5				
West: Tolbos Road															
Lane 1	77	0.0	77	0.0	1307	0.059	100	6.4	LOS A	0.2	1.6	Full	500	0.0	0.0
Approach	77	0.0	77	0.0		0.059		6.4	LOS A	0.2	1.6				
All Vehicles	582	0.2	582	0.2		0.144		2.9	NA	0.5	3.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)											
South: Hendriske Road											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S						Cap. veh/h	v/c	%	%	No.	
To Exit:	W	N	E								
Lane 1	5	253	2	260	0.0	1944	0.134	100	NA	NA	
Approach	5	253	2	260	0.0		0.134				
East: Tolbos Road											
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane		
From E						Cap. veh/h	v/c	%	%	No.	
To Exit:	S	N									
Lane 1	13	95	107	0.0		747	0.144	100	NA	NA	
Approach	13	95	107	0.0			0.144				

North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	46	85	6	138	0.8	1875	0.074	100	NA	NA
Approach	46	85	6	138	0.8		0.074			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	77	77	0.0			1307	0.059	100	NA	NA
Approach	77	77	0.0				0.059			
Total %HV Deg.Satn (v/c)										
All Vehicles	582	0.2		0.144						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial	Residual	Time for	Duration
	Queued	Queued	Residual	of
	Demand	Demand	Demand	Oversatn
	veh	veh	to Clear	sec
			sec	
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: v [Int 2: Hendriske Road / Tolbos Road_AM Peak - Esc Existing + All Devs - Conversion (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Hendriske Road															
Lane 1	260	0.0	260	0.0	1944	0.134	100	0.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	260	0.0	260	0.0		0.134		0.2	NA	0.0	0.1				
East: Tolbos Road															
Lane 1	107	0.0	107	0.0	649	0.165	100	10.7	LOS B	0.6	4.2	Full	500	0.0	0.0
Approach	107	0.0	107	0.0		0.165		10.7	LOS B	0.6	4.2				
North: Hendriske Road															
Lane 1	138	0.8	138	0.8	1875	0.074	100	2.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	138	0.8	138	0.8		0.074		2.2	NA	0.1	0.5				
West: Tolbos Road															
Lane 1	77	0.0	77	0.0	1118	0.069	100	9.1	LOS A	0.3	1.9	Full	500	0.0	0.0
Approach	77	0.0	77	0.0		0.069		9.1	LOS A	0.3	1.9				
All Vehicles	582	0.2	582	0.2		0.165		3.8	NA	0.6	4.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane No.
From S						Cap. veh/h	v/c	%	%	
To Exit:	W	N	E							
Lane 1	5	253	2	260	0.0	1944	0.134	100	NA	NA
Approach	5	253	2	260	0.0		0.134			
East: Tolbos Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane No.	
From E						Cap. veh/h	v/c	%	%	
To Exit:	S	N								
Lane 1	13	95	107	0.0		649	0.165	100	NA	NA
Approach	13	95	107	0.0			0.165			

North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	46	85	6	138	0.8	1875	0.074	100	NA	NA
Approach	46	85	6	138	0.8		0.074			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	77	77	0.0			1118	0.069	100	NA	NA
Approach	77	77	0.0				0.069			
Total %HV Deg.Satn (v/c)										
All Vehicles	582	0.2		0.165						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane	Opposing Flow Rate % veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 3: Hendriske Road / Williams Road_AM Peak - Esc Existing + All Devs (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Williams Road															
Lane 1	58	1.8	58	1.8	383	0.151	100	16.6	LOS C	0.5	3.7	Full	500	0.0	0.0
Approach	58	1.8	58	1.8		0.151		16.6	LOS C	0.5	3.7				
East: Hendriske Road															
Lane 1	98	1.1	98	1.1	525	0.186	100	14.2	LOS B	0.6	4.5	Full	500	0.0	0.0
Approach	98	1.1	98	1.1		0.186		14.2	LOS B	0.6	4.5				
West: RoadName															
Lane 1	214	0.0	214	0.0	696	0.307	100	13.1	LOS B	1.1	7.9	Full	500	0.0	0.0
Approach	214	0.0	214	0.0		0.307		13.1	LOS B	1.1	7.9				
All Vehicles	369	0.6	369	0.6		0.307		14.0	LOS B	1.1	7.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Williams Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From S					Cap. veh/h	v/c	%	%		
To Exit:	W	E								
Lane 1	6	52	58	1.8	383	0.151	100	NA	NA	
Approach	6	52	58	1.8		0.151				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From E					Cap. veh/h	v/c	%	%		
To Exit:	S	W								
Lane 1	34	64	98	1.1	525	0.186	100	NA	NA	
Approach	34	64	98	1.1		0.186				
West: RoadName										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From W					Cap. veh/h	v/c	%	%		
To Exit:	E	S								
Lane 1	209	4	214	0.0	696	0.307	100	NA	NA	
Approach	209	4	214	0.0		0.307				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	369	0.6	0.307

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Williams Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: RoadName				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: 101 [Int 4: Hendriske Road / Rhode Road_AM Peak - Esc Existing + All Devs (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue	Dist]	Lane Config	Lane Length	Cap. Prob. Adj. Block.	
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	m		m	%	%
South: Rhode Road															
Lane 1	22	0.0	22	0.0	1097	0.020	100	6.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	22	0.0	22	0.0		0.020		6.2	LOS A	0.1	0.5				
East: Hendriske Road															
Lane 1	66	0.0	66	0.0	1896	0.035	100	2.0	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	66	0.0	66	0.0		0.035		2.0	NA	0.0	0.2				
North: RoadName															
Lane 1	49	0.0	49	0.0	1197	0.041	100	6.1	LOS A	0.2	1.1	Full	500	0.0	0.0
Approach	49	0.0	49	0.0		0.041		6.1	LOS A	0.2	1.1				
West: Hendriske Road															
Lane 1	163	0.0	163	0.0	1931	0.085	100	0.8	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	163	0.0	163	0.0		0.085		0.8	NA	0.0	0.2				
All Vehicles	301	0.0	301	0.0		0.085		2.3	NA	0.2	1.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Rhode Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	E								
Lane 1	9	13	22	0.0	1097	0.020	100	NA	NA	
Approach	9	13	22	0.0		0.020				
East: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV	Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W	N							
Lane 1	20	43	3	66	0.0	1896	0.035	100	NA	NA
Approach	20	43	3	66	0.0		0.035			

North: RoadName										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From N						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	E	W					v/c	%	%	No.
Lane 1	32	18	49	0.0		1197	0.041	100	NA	NA
Approach	32	18	49	0.0			0.041			
West: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	E	S			veh/h	v/c	%	%	No.
Lane 1	21	139	3	163	0.0	1931	0.085	100	NA	NA
Approach	21	139	3	163	0.0		0.085			
Total %HV Deg.Satn (v/c)										
All Vehicles	301	0.0		0.085						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit	Short	Percent	Opposing	Critical	Follow-up	Lane	Capacity	Deg.	Min.	Merge	
	Lane	Lane	Opng in	Flow Rate	Gap	Headway	Flow		Satn	Delay	Delay	
	Number	Length	Lane	% veh/h	pcu/h	sec	sec veh/h	veh/h	v/c	sec	sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial	Residual	Time for	Duration
	Queued	Queued	Residual	of
	Demand	Demand	Demand	Oversatn
	veh	veh	to Clear	sec
			sec	
South: Rhode Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
North: RoadName				
Lane 1	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 5: Lang Road / Gabriels Road_AM Peak - Esc Existing + All Devs (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob.	
	[Total	HV]	[Total	HV]											
	veh/h	%	veh/h	%						veh/h	v/c			%	sec
South: Lang Road															
Lane 1	337	0.0	337	0.0	806	0.418	100	13.3	LOS B	1.7	11.9	Full	500	0.0	0.0
Approach	337	0.0	337	0.0		0.418		13.3	LOS B	1.7	11.9				
East: Gabriels Road															
Lane 1	78	0.0	78	0.0	270	0.289	100	24.3	LOS C	1.1	7.9	Full	500	0.0	0.0
Approach	78	0.0	78	0.0		0.289		24.3	LOS C	1.1	7.9				
North: Lang Road															
Lane 1	880	0.5	880	0.5	912	0.965	100	53.2	LOS F	20.1	141.5	Full	500	0.0	0.0
Approach	880	0.5	880	0.5		0.965		53.2	LOS F	20.1	141.5				
All Vehicles	1295	0.3	1295	0.3		0.965		41.1	LOS E	20.1	141.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Ov.	Ov. Lane No.
From S To Exit:	N	E								
Lane 1	328	8	337	0.0	806	0.418	100	NA	NA	
Approach	328	8	337	0.0		0.418				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Ov.	Ov. Lane No.
From E To Exit:	S	N								
Lane 1	34	44	78	0.0	270	0.289	100	NA	NA	
Approach	34	44	78	0.0		0.289				
North: Lang Road										
Mov.	L2	T1	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Ov.	Ov. Lane No.
From N To Exit:	E	S								
Lane 1	48	832	880	0.5	912	0.965	100	NA	NA	
Approach	48	832	880	0.5		0.965				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1295	0.3	0.965

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: v [Int 5: Lang Road / Gabriels Road_AM Peak - Esc Existing + All Devs - Conversion (2) (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Lang Road															
Lane 1	337	0.0	337	0.0	1845	0.183	100	0.6	LOS A	0.2	1.2	Full	500	0.0	0.0
Approach	337	0.0	337	0.0		0.183		0.6	NA	0.2	1.2				
East: Gabriels Road															
Lane 1	78	0.0	78	0.0	281	0.277	100	20.9	LOS C	0.9	6.6	Full	500	0.0	0.0
Approach	78	0.0	78	0.0		0.277		20.9	LOS C	0.9	6.6				
North: Lang Road															
Lane 1	880	0.5	880	0.5	1939	0.454	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	880	0.5	880	0.5		0.454		0.5	NA	0.0	0.0				
All Vehicles	1295	0.3	1295	0.3		0.454		1.7	NA	0.9	6.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From S					Cap. veh/h	v/c	%	%		
To Exit:	N	E								
Lane 1	328	8	337	0.0	1845	0.183	100	NA	NA	
Approach	328	8	337	0.0		0.183				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From E					Cap. veh/h	v/c	%	%		
To Exit:	S	N								
Lane 1	34	44	78	0.0	281	0.277	100	NA	NA	
Approach	34	44	78	0.0		0.277				
North: Lang Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From N					Cap. veh/h	v/c	%	%		
To Exit:	E	S								

Lane 1	48	832	880	0.5	1939	0.454	100	NA	NA
Approach	48	832	880	0.5		0.454			
Total %HV Deg.Satn (v/c)									
All Vehicles	1295	0.3		0.454					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▽ Site: v [Int 5: Lang Road / Gabriels Road_AM Peak - Esc Existing + All Devs - Conversion (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%											
South: Lang Road															
Lane 1	337	0.0	337	0.0	1845	0.183	100	0.6	LOS A	0.2	1.2	Full	500	0.0	0.0
Approach	337	0.0	337	0.0		0.183		0.6	NA	0.2	1.2				
East: Gabriels Road															
Lane 1	78	0.0	78	0.0	376	0.207	100	14.3	LOS B	0.7	4.7	Full	500	0.0	0.0
Approach	78	0.0	78	0.0		0.207		14.3	LOS B	0.7	4.7				
North: Lang Road															
Lane 1	880	0.5	880	0.5	1939	0.454	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	880	0.5	880	0.5		0.454		0.5	NA	0.0	0.0				
All Vehicles	1295	0.3	1295	0.3		0.454		1.3	NA	0.7	4.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov.
From S					Cap.	v/c	%	%	Lane	No.
To Exit:	N	E			veh/h					
Lane 1	328	8	337	0.0	1845	0.183	100	NA	NA	
Approach	328	8	337	0.0		0.183				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov.
From E					Cap.	v/c	%	%	Lane	No.
To Exit:	S	N			veh/h					
Lane 1	34	44	78	0.0	376	0.207	100	NA	NA	
Approach	34	44	78	0.0		0.207				
North: Lang Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov.
From N					Cap.	v/c	%	%	Lane	No.
To Exit:	E	S			veh/h					

Lane 1	48	832	880	0.5	1939	0.454	100	NA	NA
Approach	48	832	880	0.5		0.454			
Total %HV Deg.Satn (v/c)									
All Vehicles	1295	0.3		0.454					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 6: Welgevonden Blvd / Lang Road_AM Peak - Esc Existing + All Devs (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	HV %	[Total veh/h]	HV %	veh/h	v/c	%	sec		[Veh]	Dist] m		m	%	%
South: Lang Road															
Lane 1	244	0.9	244	0.9	1173	0.208	100	8.9	LOS A	0.9	6.5	Full	500	0.0	0.0
Approach	244	0.9	244	0.9		0.208		8.9	LOS A	0.9	6.5				
East: Welgevonden Blvd															
Lane 1	121	0.0	121	0.0	1938	0.062	100	0.7	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	121	0.0	121	0.0		0.062		0.7	NA	0.0	0.0				
West: Welgevonden Blvd															
Lane 1	704	1.0	704	1.0	1622	0.434	100	5.7	LOS A	2.9	20.4	Full	500	0.0	0.0
Approach	704	1.0	704	1.0		0.434		5.7	NA	2.9	20.4				
All Vehicles	1069	0.9	1069	0.9		0.434		5.9	NA	2.9	20.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From S					Cap. veh/h	v/c	%	%		
To Exit:	W	E								
Lane 1	237	7	244	0.9	1173	0.208	100	NA	NA	
Approach	237	7	244	0.9		0.208				
East: Welgevonden Blvd										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From E					Cap. veh/h	v/c	%	%		
To Exit:	S	W								
Lane 1	15	106	121	0.0	1938	0.062	100	NA	NA	
Approach	15	106	121	0.0		0.062				
West: Welgevonden Blvd										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov. Lane No.
From W					Cap. veh/h	v/c	%	%		
To Exit:	E	S								

Lane 1	42	662	704	1.0	1622	0.434	100	NA	NA
Approach	42	662	704	1.0		0.434			
Total %HV Deg.Satn (v/c)									
All Vehicles	1069	0.9		0.434					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
West: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_AM Peak - Esc Existing + All Devs_Miti (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R304															
Lane 1	618	1.5	618	1.5	901	0.685	100	25.7	LOS C	21.2	150.6	Full	500	0.0	0.0
Lane 2	589	1.5	589	1.5	859 ¹	0.685	100	22.9	LOS C	20.2	143.6	Short	200	0.0	NA
Lane 3	264	0.0	264	0.0	361	0.732	100	32.7	LOS C	7.6	53.4	Short	70	0.0	NA
Approach	1471	1.2	1471	1.2		0.732		25.8	LOS C	21.2	150.6				
East: Welgevonden Blvd															
Lane 1	203	0.0	203	0.0	743	0.273	100	25.1	LOS C	6.0	42.0	Short	45	0.0	NA
Lane 2	258	0.0	258	0.0	371	0.694	100	43.5	LOS D	11.0	77.2	Full	500	0.0	0.0
Approach	461	0.0	461	0.0		0.694		35.4	LOS D	11.0	77.2				
North: R304															
Lane 1	366	0.6	366	0.6	863	0.424	100	22.7	LOS C	10.7	75.0	Short	100	0.0	NA
Lane 2	656	2.3	656	2.3	896	0.732	100	20.9	LOS C	23.3	166.6	Short	200	0.0	NA
Lane 3	656	2.3	656	2.3	896	0.732	100	27.5	LOS C	23.3	166.6	Full	500	0.0	0.0
Approach	1679	1.9	1679	1.9		0.732		23.9	LOS C	23.3	166.6				
All Vehicles	3611	1.4	3611	1.4		0.732		26.1	LOS C	23.3	166.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From S To Exit:	N	E			Cap. veh/h	v/c	%	%		
Lane 1	618	-	618	1.5	901	0.685	100	NA	NA	
Lane 2	589	-	589	1.5	859 ¹	0.685	100	0.0	1	
Lane 3	-	264	264	0.0	361	0.732	100	0.0	2	
Approach	1206	264	1471	1.2		0.732				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From E To Exit:	S	N			Cap. veh/h	v/c	%	%		

Lane 1	203	-	203	0.0	743	0.273	100	0.0	2
Lane 2	-	258	258	0.0	371	0.694	100	NA	NA
Approach	203	258	461	0.0	0.694				
North: R304									
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.
From N					Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S			veh/h	v/c	%	%	No.
Lane 1	366	-	366	0.6	863	0.424	100	0.0	2
Lane 2	-	656	656	2.3	896	0.732	100	0.0	3
Lane 3	-	656	656	2.3	896	0.732	100	NA	NA
Approach	366	1313	1679	1.9	0.732				
Total %HV Deg. Satn (v/c)									
All Vehicles	3611	1.4		0.732					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1
- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.

Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R304												
Merge Type: Priority												
Exit Short Lane	2	200	0.0	859	867	3.03	2.02	656	870	0.754	2.1	6.5
Merge Lane	1	-	100.0	Merge Lane is not Opposed				859	1800	0.477	0.0	0.0
North Exit: R304												
Merge Type: Priority												
Exit Short Lane	1	200	0.0	847	851	3.02	2.01	618	897	0.689	2.0	5.5
Merge Lane	2	-	100.0	Merge Lane is not Opposed				847	1800	0.470	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: 101v [Int 8: R44 / Fir Street_AMPeak - Esc Existing + All Devs - Conversion (Site Folder: 2026 AM Peak - Esc Existing + All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist m]		m	%	%
South: R44															
Lane 1	598	3.6	598	3.6	1391	0.430	100	7.1	LOS A	13.3	96.3	Full	490	0.0	0.0
Lane 2	600	4.0	600	4.0	1394	0.430	100	6.6	LOS A	13.4	96.8	Full	490	0.0	0.0
Approach	1198	3.8	1198	3.8		0.430		6.8	LOS A	13.4	96.8				
North: R44															
Lane 1	1212	2.1	1212	2.1	1411	0.859	100	12.2	LOS B	50.2	357.5	Full	1150	0.0	0.0
Lane 2	1027	2.1	1027	2.1	1196 ¹	0.859	100	21.1	LOS C	44.5	317.3	Full	1150	0.0	0.0
Lane 3	58	0.0	58	0.0	243	0.238	100	23.7	LOS C	1.6	11.1	Short	60	0.0	NA
Approach	2297	2.1	2297	2.1		0.859		16.5	LOS B	50.2	357.5				
West: Fir Street															
Lane 1	265	0.8	265	0.8	308	0.862	100	67.1	LOS E	17.0	119.6	Full	260	0.0	0.0
Approach	265	0.8	265	0.8		0.862		67.1	LOS E	17.0	119.6				
All Vehicles	3760	2.5	3760	2.5		0.862		17.0	LOS B	50.2	357.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	N								
Lane 1	56	542	598	3.6	1391	0.430	100	NA	NA	
Lane 2	-	600	600	4.0	1394	0.430	100	NA	NA	
Approach	56	1142	1198	3.8		0.430				
North: R44										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From N					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	1212	-	1212	2.1	1411	0.859	100	NA	NA	
Lane 2	1027	-	1027	2.1	1196 ¹	0.859	100	NA	NA	
Lane 3	-	58	58	0.0	243	0.238	100	0.0	2	

Approach	2239	58	2297	2.1		0.859				
West: Fir Street										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W						Satn	Util.	SL	Ov.	Lane
To Exit:	N	S				veh/h	v/c	%	%	No.
Lane 1	21	244	265	0.8		308	0.862	100	NA	NA
Approach	21	244	265	0.8			0.862			
Total %HV Deg.Satn (v/c)										
All Vehicles	3760	2.5		0.862						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1
- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	0.0	0.0	0.0

Site: Int1 [Int 1: R44 / Hendriske Road_PM Peak_Duel - Esc Existing + All Devs (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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 Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.
From S To Exit:	W	N	E			Cap. veh/h	v/c	%	%	
Lane 1	483	-	-	483	0.0	1146	0.422	100	0.0	2
Lane 2	-	271	-	271	3.7	1219	0.222	35 ⁶	NA	NA
Lane 3	-	761	1	762	3.7	1217	0.626	100	NA	NA
Approach	483	1032	1	1516	2.5		0.626			
East: RoadName										

Mov. From E To Exit:	L2	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	1	1	2	0.0	188	0.011	100	NA	NA	
Approach	1	1	2	0.0		0.011				
North: R44										
Mov. From N To Exit:	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	287	-	288	3.1	1223	0.235	100	NA	NA
Lane 2	-	288	-	288	3.1	1223	0.235	100	NA	NA
Lane 3	-	-	112	112	0.0	281	0.397	100	0.0	2
Approach	1	575	112	687	2.6		0.397			
West: Hendriske Road										
Mov. From W To Exit:	L2	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	63	73	136	0.5	210	0.648	100	25.3	2	
Lane 2	-	155	155	0.9	240	0.648	100	NA	NA	
Approach	63	228	292	0.7		0.648				
Total %HV Deg.Satn (v/c)										
All Vehicles	2497	2.3		0.648						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

6 Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Flow Rate pcu/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	794	808	3.05	2.03	302	924	0.327	1.8	3.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				794	1800	0.441	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
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Project: C:\Users\Armandt.VanStraten\Zutari\1001918 - Cloeteville - Documents\05 Deliver\510 Reports\2. Status Quo Analysis\Status Quo_Transport\Sidra Analysis\1001918-Cloeteville.sip9

LANE SUMMARY

**Site: Int1 [Int 1: R44 / Hendriske Road_PM Peak_Duel+TurnExt
- Esc Existing + All Devs (Site Folder: 2026 PM Peak - Esc
Existing+ All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob.	
	[Total veh/h	HV] %	[Total veh/h	HV] %						[Veh	Dist] m			Adj.	Block.
					veh/h	v/c	%	sec					m	%	%
South: R44															
Lane 1	483	0.0	483	0.0	1146	0.422	100	8.0	LOS A	3.7	25.8	Short	80	0.0	NA
Lane 2	271	3.7	271	3.7	1219	0.222	35 ⁶	7.0	LOS A	2.8	20.1	Full	500	0.0	0.0
Lane 3	762	3.7	762	3.7	1217	0.626	100	5.9	LOS A	11.3	81.6	Full	500	0.0	0.0
Approach	1516	2.5	1516	2.5		0.626		6.8	LOS A	11.3	81.6				
East: RoadName															
Lane 1	2	0.0	2	0.0	188	0.011	100	27.4	LOS C	0.0	0.3	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.011		27.4	LOS C	0.0	0.3				
North: R44															
Lane 1	288	3.1	288	3.1	1223	0.235	100	4.1	LOS A	3.0	21.5	Full	500	0.0	0.0
Lane 2	288	3.1	288	3.1	1223	0.235	100	4.1	LOS A	3.0	21.5	Full	500	0.0	0.0
Lane 3	112	0.0	112	0.0	281	0.397	100	18.1	LOS B	2.1	14.8	Short	80	0.0	NA
Approach	687	2.6	687	2.6		0.397		6.4	LOS A	3.0	21.5				
West: Hendriske Road															
Lane 1	136	0.5	136	0.5	210	0.648	100	31.8	LOS C	3.6	25.0	Short	80	0.0	NA
Lane 2	155	0.9	155	0.9	240	0.648	100	30.8	LOS C	4.0	28.3	Full	500	0.0	0.0
Approach	292	0.7	292	0.7		0.648		31.2	LOS C	4.0	28.3				
All Vehicles	2497	2.3	2497	2.3		0.648		9.5	LOS A	11.3	81.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

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.

6 Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)										
South: R44										
Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	483	-	-	483	0.0	1146	0.422	100	0.0	2
Lane 2	-	271	-	271	3.7	1219	0.222	35 ⁶	NA	NA
Lane 3	-	761	1	762	3.7	1217	0.626	100	NA	NA
Approach	483	1032	1	1516	2.5	0.626				
East: RoadName										

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From E To Exit:	S	N				Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	1	1	2	0.0		188	0.011	100	NA	NA
Approach	1	1	2	0.0			0.011			
North: R44										
Mov.	L2	T1	R2	Total	%HV	Deg.	Lane	Prob.	Ov.	
From N To Exit:	E	S	W			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	1	287	-	288	3.1	1223	0.235	100	NA	NA
Lane 2	-	288	-	288	3.1	1223	0.235	100	NA	NA
Lane 3	-	-	112	112	0.0	281	0.397	100	0.0	2
Approach	1	575	112	687	2.6		0.397			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W To Exit:	N	S				Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	63	73	136	0.5		210	0.648	100	0.0	2
Lane 2	-	155	155	0.9		240	0.648	100	NA	NA
Approach	63	228	292	0.7			0.648			
Total %HV Deg.Satn (v/c)										
All Vehicles	2497	2.3		0.648						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

6 Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Flow Rate pcu/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	794	808	3.05	2.03	302	924	0.327	1.8	3.0
Merge Lane	2	-	100.0	Merge Lane is not Opposed				794	1800	0.441	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
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Project: C:\Users\Armandt.VanStraten\Zutari\1001918 - Cloetesville - Documents\05 Deliver\510 Reports\2. Status Quo Analysis\Status Quo_Transport\Sidra Analysis\1001918-Cloetesville.sip9

LANE SUMMARY

 **Site: [Int 2: Hendriske Road / Tolbos Road_PM Peak - Esc Existing + All Devs (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist] m		m	%	%
South: Hendriske Road															
Lane 1	112	0.9	112	0.9	620	0.180	100	12.8	LOS B	0.6	4.2	Full	500	0.0	0.0
Approach	112	0.9	112	0.9		0.180		12.8	LOS B	0.6	4.2				
East: Tolbos Road															
Lane 1	55	0.0	55	0.0	436	0.126	100	14.9	LOS B	0.4	2.9	Full	500	0.0	0.0
Approach	55	0.0	55	0.0		0.126		14.9	LOS B	0.4	2.9				
North: Hendriske Road															
Lane 1	351	0.0	351	0.0	734	0.477	100	15.0	LOS C	2.1	15.0	Full	500	0.0	0.0
Approach	351	0.0	351	0.0		0.477		15.0	LOS C	2.1	15.0				
West: Tolbos Road															
Lane 1	16	0.0	16	0.0	16	1.000 ⁴	100	587.1	LOS F	4.4	31.0	Full	500	0.0	0.0
Approach	16	0.0	16	0.0		1.000		587.1	LOS F	4.4	31.0				
All Vehicles	533	0.2	533	0.2		1.000		31.5	LOS D	4.4	31.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

⁴ x = 1.00 due to minimum capacity

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	T1	R2	Total	%HV						
From S					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	N	E			veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	103	8	112	0.9	620	0.180	100	NA	NA	
Approach	103	8	112	0.9		0.180				
East: Tolbos Road										
Mov.	L2	R2	Total	%HV						
From E					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	S	N			veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	2	53	55	0.0	436	0.126	100	NA	NA	
Approach	2	53	55	0.0		0.126				
North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV					
From N					Cap.	Deg.	Lane	Prob.	Ov.	

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	81	216	54	351	0.0	734	0.477	100	NA	NA
Approach	81	216	54	351	0.0		0.477			
West: Tolbos Road										
Mov.	L2	Total	%HV			Cap.	Deg.	Lane	Prob.	Ov.
From W						Satn		Util.	SL	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	16	16	0.0			16	1.000 ⁴	100	NA	NA
Approach	16	16	0.0				1.000			
Total %HV Deg.Satn (v/c)										
All Vehicles	533	0.2		1.000						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

⁴ x = 1.00 due to minimum capacity

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	NA

LANE SUMMARY

 **Site: v [Int 2: Hendriske Road / Tolbos Road_PM Peak - Esc Existing + All Devs - Conversion (2) (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Hendriske Road															
Lane 1	112	0.9	112	0.9	1872	0.060	100	0.6	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	112	0.9	112	0.9		0.060		0.6	NA	0.1	0.5				
East: Tolbos Road															
Lane 1	55	0.0	55	0.0	620	0.088	100	10.6	LOS B	0.3	2.1	Full	500	0.0	0.0
Approach	55	0.0	55	0.0		0.088		10.6	LOS B	0.3	2.1				
North: Hendriske Road															
Lane 1	351	0.0	351	0.0	1867	0.188	100	2.3	LOS A	0.5	3.2	Full	500	0.0	0.0
Approach	351	0.0	351	0.0		0.188		2.3	NA	0.5	3.2				
West: Tolbos Road															
Lane 1	16	0.0	16	0.0	1306	0.012	100	8.4	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	16	0.0	16	0.0		0.012		8.4	LOS A	0.0	0.3				
All Vehicles	533	0.2	533	0.2		0.188		3.0	NA	0.5	3.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	N	E								
Lane 1	103	8	112	0.9	1872	0.060	100	NA	NA	
Approach	103	8	112	0.9		0.060				
East: Tolbos Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	N								
Lane 1	2	53	55	0.0	620	0.088	100	NA	NA	
Approach	2	53	55	0.0		0.088				

North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	81	216	54	351	0.0	1867	0.188	100	NA	NA
Approach	81	216	54	351	0.0		0.188			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	16	16	0.0			1306	0.012	100	NA	NA
Approach	16	16	0.0				0.012			
Total %HV Deg.Satn (v/c)										
All Vehicles	533	0.2		0.188						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h		Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial	Residual	Time for	Duration
	Queued	Queued	Residual	of
	Demand	Demand	Demand	Oversatn
	veh	veh	to Clear	sec
			sec	
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: v [Int 2: Hendriske Road / Tolbos Road_PM Peak - Esc Existing + All Devs - Conversion (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Hendriske Road															
Lane 1	112	0.9	112	0.9	1872	0.060	100	0.6	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	112	0.9	112	0.9		0.060		0.6	NA	0.1	0.5				
East: Tolbos Road															
Lane 1	55	0.0	55	0.0	714	0.077	100	7.9	LOS A	0.3	1.8	Full	500	0.0	0.0
Approach	55	0.0	55	0.0		0.077		7.9	LOS A	0.3	1.8				
North: Hendriske Road															
Lane 1	351	0.0	351	0.0	1867	0.188	100	2.3	LOS A	0.5	3.2	Full	500	0.0	0.0
Approach	351	0.0	351	0.0		0.188		2.3	NA	0.5	3.2				
West: Tolbos Road															
Lane 1	16	0.0	16	0.0	1500	0.011	100	5.8	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	16	0.0	16	0.0		0.011		5.8	LOS A	0.0	0.3				
All Vehicles	533	0.2	533	0.2		0.188		2.6	NA	0.5	3.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	N	E								
Lane 1	103	8	112	0.9	1872	0.060	100	NA	NA	
Approach	103	8	112	0.9		0.060				
East: Tolbos Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	N								
Lane 1	2	53	55	0.0	714	0.077	100	NA	NA	
Approach	2	53	55	0.0		0.077				

North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	81	216	54	351	0.0	1867	0.188	100	NA	NA
Approach	81	216	54	351	0.0		0.188			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	16	16	0.0			1500	0.011	100	NA	NA
Approach	16	16	0.0				0.011			
Total %HV Deg.Satn (v/c)										
All Vehicles	533	0.2		0.188						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 3: Hendriske Road / Williams Road_PM Peak - Esc Existing + All Devs (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Williams Road															
Lane 1	34	0.0	34	0.0	337	0.100	100	17.4	LOS C	0.3	2.3	Full	500	0.0	0.0
Approach	34	0.0	34	0.0		0.100		17.4	LOS C	0.3	2.3				
East: Hendriske Road															
Lane 1	217	0.0	217	0.0	676	0.321	100	13.6	LOS B	1.2	8.4	Full	500	0.0	0.0
Approach	217	0.0	217	0.0		0.321		13.6	LOS B	1.2	8.4				
West: RoadName															
Lane 1	91	2.3	91	2.3	622	0.146	100	12.5	LOS B	0.5	3.3	Full	500	0.0	0.0
Approach	91	2.3	91	2.3		0.146		12.5	LOS B	0.5	3.3				
All Vehicles	341	0.6	341	0.6		0.321		13.7	LOS B	1.2	8.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Williams Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	E								
Lane 1	4	29	34	0.0	337	0.100	100	NA	NA	
Approach	4	29	34	0.0		0.100				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	46	171	217	0.0	676	0.321	100	NA	NA	
Approach	46	171	217	0.0		0.321				
West: RoadName										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From W					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								
Lane 1	84	6	91	2.3	622	0.146	100	NA	NA	
Approach	84	6	91	2.3		0.146				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	341	0.6	0.321

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Williams Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: RoadName				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: 101 [Int 4: Hendriske Road / Rhode Road_PM Peak - Esc Existing + All Devs (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue	Dist]	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	m		m	%	%
South: Rhode Road															
Lane 1	21	0.0	21	0.0	1091	0.019	100	6.1	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	21	0.0	21	0.0		0.019		6.1	LOS A	0.1	0.5				
East: Hendriske Road															
Lane 1	148	0.0	148	0.0	1863	0.080	100	2.5	LOS A	0.2	1.4	Full	500	0.0	0.0
Approach	148	0.0	148	0.0		0.080		2.5	NA	0.2	1.4				
North: RoadName															
Lane 1	24	0.0	24	0.0	1053	0.023	100	6.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	24	0.0	24	0.0		0.023		6.2	LOS A	0.1	0.5				
West: Hendriske Road															
Lane 1	92	2.3	92	2.3	1881	0.049	100	1.7	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	92	2.3	92	2.3		0.049		1.7	NA	0.0	0.2				
All Vehicles	285	0.7	285	0.7		0.080		2.8	NA	0.2	1.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Rhode Road										
Mov.	L2	R2	Total	%HV		Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane No.
From S To Exit:	W	E				veh/h	v/c	%	%	
Lane 1	8	13	21	0.0		1091	0.019	100	NA	NA
Approach	8	13	21	0.0			0.019			
East: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Cap.	Deg. Satn	Lane Util.	Prob. SL
From E To Exit:	S	W	N			veh/h	v/c	%	%	Ov. Lane No.
Lane 1	39	84	25	148	0.0	1863	0.080	100	NA	NA
Approach	39	84	25	148	0.0		0.080			

North: RoadName										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From N						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	E	W					v/c	%	%	No.
Lane 1	7	17	24	0.0		1053	0.023	100	NA	NA
Approach	7	17	24	0.0			0.023			
West: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	E	S			veh/h	v/c	%	%	No.
Lane 1	25	63	3	92	2.3	1881	0.049	100	NA	NA
Approach	25	63	3	92	2.3		0.049			
Total %HV Deg.Satn (v/c)										
All Vehicles	285	0.7		0.080						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis										
	Exit Lane Number	Short Lane Length	Percent Opng in Lane	Opposing Flow Rate	Critical Gap	Follow-up Headway	Lane Capacity	Deg. Satn	Min. Delay	Merge Delay
		m	% veh/h	pcu/h	sec	sec	veh/h	veh/h	v/c	sec
There are no Exit Short Lanes for Merge Analysis at this Site.										

Variable Demand Analysis				
	Initial	Residual	Time for	Duration
	Queued	Queued	Residual	of
	Demand	Demand	Demand	Oversatn
	veh	veh	to Clear	
			sec	sec
South: Rhode Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
North: RoadName				
Lane 1	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 5: Lang Road / Gabriels Road_PM Peak - Esc Existing + All Devs (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Lang Road															
Lane 1	466	0.2	466	0.2	779	0.599	100	17.0	LOS C	3.3	22.9	Full	500	0.0	0.0
Approach	466	0.2	466	0.2		0.599		17.0	LOS C	3.3	22.9				
East: Gabriels Road															
Lane 1	43	0.0	43	0.0	262	0.165	100	21.9	LOS C	0.6	4.1	Full	500	0.0	0.0
Approach	43	0.0	43	0.0		0.165		21.9	LOS C	0.6	4.1				
North: Lang Road															
Lane 1	326	1.0	326	1.0	680	0.480	100	15.8	LOS C	2.2	15.4	Full	500	0.0	0.0
Approach	326	1.0	326	1.0		0.480		15.8	LOS C	2.2	15.4				
All Vehicles	836	0.5	836	0.5		0.599		16.8	LOS C	3.3	22.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	N	E								
Lane 1	443	23	466	0.2	779	0.599	100	NA	NA	
Approach	443	23	466	0.2		0.599				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	N								
Lane 1	8	35	43	0.0	262	0.165	100	NA	NA	
Approach	8	35	43	0.0		0.165				
North: Lang Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From N					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								
Lane 1	52	275	326	1.0	680	0.480	100	NA	NA	
Approach	52	275	326	1.0		0.480				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	836	0.5	0.599

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 6: Welgevonden Blvd / Lang Road_PM Peak - Esc Existing + All Devs (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist] m		m	%	%
South: Lang Road															
Lane 1	372	0.0	372	0.0	1315	0.283	100	8.4	LOS A	1.4	9.9	Full	500	0.0	0.0
Approach	372	0.0	372	0.0		0.283		8.4	LOS A	1.4	9.9				
East: Welgevonden Blvd															
Lane 1	80	0.0	80	0.0	1936	0.041	100	0.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	80	0.0	80	0.0		0.041		0.8	NA	0.0	0.0				
West: Welgevonden Blvd															
Lane 1	352	0.0	352	0.0	1733	0.203	100	4.2	LOS A	1.1	7.6	Full	500	0.0	0.0
Approach	352	0.0	352	0.0		0.203		4.2	NA	1.1	7.6				
All Vehicles	803	0.0	803	0.0		0.283		5.8	NA	1.4	9.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	W	E								
Lane 1	359	13	372	0.0	1315	0.283	100	NA	NA	
Approach	359	13	372	0.0		0.283				
East: Welgevonden Blvd										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	W								
Lane 1	12	68	80	0.0	1936	0.041	100	NA	NA	
Approach	12	68	80	0.0		0.041				
West: Welgevonden Blvd										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From W					Cap. veh/h	v/c	%	%	No.	
To Exit:	E	S								

Lane 1	99	253	352	0.0	1733	0.203	100	NA	NA
Approach	99	253	352	0.0		0.203			
Total %HV Deg.Satn (v/c)									
All Vehicles	803	0.0		0.283					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
West: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_PM Peak - Esc Existing + All Devs_Miti (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: R304															
Lane 1	760	2.7	760	2.7	980	0.776	100	34.4	LOS C	27.4	196.4	Full	500	0.0	0.0
Lane 2	701	2.7	701	2.7	904 ¹	0.776	100	26.3	LOS C	25.6	183.2	Short	200	0.0	NA
Lane 3	240	0.0	240	0.0	313	0.767	100	32.4	LOS C	7.4	51.9	Short	70	0.0	NA
Approach	1701	2.3	1701	2.3		0.776		30.8	LOS C	27.4	196.4				
East: Welgevonden Blvd															
Lane 1	188	0.0	188	0.0	660	0.285	100	28.0	LOS C	5.9	41.6	Short	45	0.0	NA
Lane 2	203	0.0	203	0.0	371	0.547	100	41.3	LOS D	8.2	57.6	Full	500	0.0	0.0
Approach	392	0.0	392	0.0		0.547		34.9	LOS C	8.2	57.6				
North: R304															
Lane 1	238	0.0	238	0.0	949	0.251	100	18.7	LOS B	5.8	40.6	Short	100	0.0	NA
Lane 2	608	0.5	608	0.5	993	0.613	100	16.8	LOS B	18.9	133.1	Short	200	0.0	NA
Lane 3	608	0.5	608	0.5	993	0.613	100	21.3	LOS C	18.9	133.1	Full	500	0.0	0.0
Approach	1455	0.4	1455	0.4		0.613		19.0	LOS B	18.9	133.1				
All Vehicles	3547	1.3	3547	1.3		0.776		26.4	LOS C	27.4	196.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					veh/h	v/c	%	%	No.	
To Exit:	N	E								
Lane 1	760	-	760	2.7	980	0.776	100	NA	NA	
Lane 2	701	-	701	2.7	904 ¹	0.776	100	0.0	1	
Lane 3	-	240	240	0.0	313	0.767	100	0.0	2	
Approach	1461	240	1701	2.3		0.776				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					veh/h	v/c	%	%	No.	
To Exit:	S	N								

Lane 1	188	-	188	0.0	660	0.285	100	0.0	2
Lane 2	-	203	203	0.0	371	0.547	100	NA	NA
Approach	188	203	392	0.0	0.547				
North: R304									
Mov. From N To Exit:	L2	T1	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
	E	S							
Lane 1	238	-	238	0.0	949	0.251	100	0.0	2
Lane 2	-	608	608	0.5	993	0.613	100	0.0	3
Lane 3	-	608	608	0.5	993	0.613	100	NA	NA
Approach	238	1217	1455	0.4	0.613				
Total %HV Deg. Satn (v/c)									
All Vehicles	3547	1.3		0.776					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1
- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R304												
Merge Type: Priority												
Exit Short Lane	2	200	0.0	797	798	3.01	2.01	608	964	0.631	1.7	4.5
Merge Lane	1	-	100.0	Merge Lane is not Opposed				797	1800	0.443	0.0	0.0
North Exit: R304												
Merge Type: Priority												
Exit Short Lane	1	200	0.0	904	914	3.04	2.03	760	817	0.930	2.3	14.6
Merge Lane	2	-	100.0	Merge Lane is not Opposed				904	1800	0.502	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: 101v [Int 8: R44 / Fir Street_PMPeak - Esc Existing + All Devs - Conversion (Site Folder: 2026 PM Peak - Esc Existing+ All Devs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	920	2.9	920	2.9	1515	0.607	100	4.9	LOS A	15.5	111.0	Full	490	0.0	0.0
Lane 2	926	3.6	926	3.6	1524	0.607	100	3.7	LOS A	15.6	112.4	Full	490	0.0	0.0
Approach	1845	3.3	1845	3.3		0.607		4.3	LOS A	15.6	112.4				
North: R44															
Lane 1	699	4.1	699	4.1	1519	0.460	100	3.0	LOS A	9.6	69.3	Full	1150	0.0	0.0
Lane 2	699	4.1	699	4.1	1519	0.460	100	3.0	LOS A	9.6	69.3	Full	1150	0.0	0.0
Lane 3	19	5.6	19	5.6	125	0.151	100	14.5	LOS B	0.4	2.9	Short	60	0.0	NA
Approach	1417	4.2	1417	4.2		0.460		3.2	LOS A	9.6	69.3				
West: Fir Street															
Lane 1	72	0.0	72	0.0	124	0.578	100	53.3	LOS D	3.3	23.2	Full	260	0.0	0.0
Approach	72	0.0	72	0.0		0.578		53.3	LOS D	3.3	23.2				
All Vehicles	3334	3.6	3334	3.6		0.607		4.9	LOS A	15.6	112.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: R44										
Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	202	718	920	2.9	1515	0.607	100	NA	NA	
Lane 2	-	926	926	3.6	1524	0.607	100	NA	NA	
Approach	202	1643	1845	3.3		0.607				
North: R44										
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	699	-	699	4.1	1519	0.460	100	NA	NA	
Lane 2	699	-	699	4.1	1519	0.460	100	NA	NA	
Lane 3	-	19	19	5.6	125	0.151	100	0.0	2	
Approach	1398	19	1417	4.2		0.460				

West: Fir Street									
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	19	53	72	0.0	124	0.578	100	NA	NA
Approach	19	53	72	0.0		0.578			
Total %HV Deg.Satn (v/c)									
All Vehicles	3334	3.6		0.607					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: Int1 [Int 1: R44 / Hendriske Road_AM Peak_Duel+TurnExt - Esc Existing + All Devs + 5 yrs (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob.	
	[Total veh/h	HV] %	[Total veh/h	HV] %						[Veh	Dist] m			Adj. Block.	
South: R44															
Lane 1	120	0.0	120	0.0	1507	0.080	100	6.3	LOS A	0.4	3.1	Short	80	0.0	NA
Lane 2	211	1.4	211	1.4	745	0.283	35 ⁶	17.7	LOS B	5.0	35.5	Full	500	0.0	0.0
Lane 3	591	1.4	591	1.4	739	0.799	100	24.3	LOS C	19.9	140.9	Full	500	0.0	0.0
Approach	922	1.3	922	1.3		0.799		20.4	LOS C	19.9	140.9				
East: RoadName															
Lane 1	2	0.0	2	0.0	679	0.003	100	17.7	LOS B	0.0	0.3	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.003		17.7	LOS B	0.0	0.3				
North: R44															
Lane 1	609	1.0	609	1.0	747	0.816	100	25.3	LOS C	21.0	148.5	Full	500	0.0	0.0
Lane 2	609	1.0	609	1.0	747	0.816	100	25.3	LOS C	21.0	148.5	Full	500	0.0	0.0
Lane 3	39	0.0	39	0.0	151	0.257	100	38.5	LOS D	1.3	9.2	Short	80	0.0	NA
Approach	1258	1.0	1258	1.0		0.816		25.7	LOS C	21.0	148.5				
West: Hendriske Road															
Lane 1	610	0.0	610	0.0	679	0.898	100	40.0	LOS D	25.8	180.5	Short	80	0.0	NA
Lane 2	604	0.0	604	0.0	672	0.898	100	40.0	LOS D	25.6	179.0	Full	500	0.0	0.0
Approach	1214	0.0	1214	0.0		0.898		40.0	LOS D	25.8	180.5				
All Vehicles	3396	0.7	3396	0.7		0.898		29.4	LOS C	25.8	180.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival values used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

6 Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)										
South: R44										
Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	120	-	-	120	0.0	1507	0.080	100	0.0	2
Lane 2	-	211	-	211	1.4	745	0.283	35 ⁶	NA	NA
Lane 3	-	590	1	591	1.4	739	0.799	100	NA	NA
Approach	120	801	1	922	1.3	0.799				
East: RoadName										

Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From E To Exit:	S	N				Cap.	Satn	Util.	SL	Lane
						veh/h	v/c	%	%	No.
Lane 1	1	1	2	0.0		679	0.003	100	NA	NA
Approach	1	1	2	0.0			0.003			
North: R44										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N To Exit:	E	S	W			Cap.	Satn	Util.	SL	Lane
						veh/h	v/c	%	%	No.
Lane 1	1	608	-	609	1.0	747	0.816	100	NA	NA
Lane 2	-	609	-	609	1.0	747	0.816	100	NA	NA
Lane 3	-	-	39	39	0.0	151	0.257	100	0.0	2
Approach	1	1218	39	1258	1.0		0.816			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV			Deg.	Lane	Prob.	Ov.
From W To Exit:	N	S				Cap.	Satn	Util.	SL	Lane
						veh/h	v/c	%	%	No.
Lane 1	61	549	610	0.0		679	0.898	100	81.0	2
Lane 2	-	604	604	0.0		672	0.898	100	NA	NA
Approach	61	1153	1214	0.0			0.898			
Total %HV Deg.Satn (v/c)										
All Vehicles	3396	0.7		0.898						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

6 Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	621	626	3.02	2.01	242	1140	0.212	1.2	1.6
Merge Lane	2	-	100.0	Merge Lane is not Opposed			621	1800	0.345	0.0	0.0	

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
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LANE SUMMARY

 **Site: [Int 2: Hendriske Road / Tolbos Road_AM Peak - Esc Existing + All Devs + 5yrs (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue	Back Of Queue Dist	Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist] m		m	%	%
South: Hendriske Road															
Lane 1	280	0.0	280	0.0	752	0.373	100	13.3	LOS B	1.5	10.2	Full	500	0.0	0.0
Approach	280	0.0	280	0.0		0.373		13.3	LOS B	1.5	10.2				
East: Tolbos Road															
Lane 1	118	0.0	118	0.0	609	0.194	100	12.8	LOS B	0.6	4.5	Full	500	0.0	0.0
Approach	118	0.0	118	0.0		0.194		12.8	LOS B	0.6	4.5				
North: Hendriske Road															
Lane 1	152	0.7	152	0.7	635	0.239	100	13.2	LOS B	0.8	5.8	Full	500	0.0	0.0
Approach	152	0.7	152	0.7		0.239		13.2	LOS B	0.8	5.8				
West: Tolbos Road															
Lane 1	78	0.0	78	0.0	148	0.527	100	54.7	LOS F	2.6	18.2	Full	500	0.0	0.0
Approach	78	0.0	78	0.0		0.527		54.7	LOS F	2.6	18.2				
All Vehicles	627	0.2	627	0.2		0.527		18.3	LOS C	2.6	18.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

Approach Lane Flows (veh/h)											
South: Hendriske Road											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	W	N	E			Cap. veh/h	v/c	%	%	No.	
Lane 1	6	272	2	280	0.0	752	0.373	100	NA	NA	
Approach	6	272	2	280	0.0		0.373				
East: Tolbos Road											
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane		
From E To Exit:	S	N			Cap. veh/h	v/c	%	%	%	No.	
Lane 1	14	104	118	0.0	609	0.194	100	NA	NA		
Approach	14	104	118	0.0		0.194					
North: Hendriske Road											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From N To Exit:	E	S	W			Cap. veh/h	v/c	%	%	No.	

Lane 1	52	94	6	152	0.7	635	0.239	100	NA	NA
Approach	52	94	6	152	0.7		0.239			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.
From W To Exit:	N					Cap. veh/h	v/c	%	%	
Lane 1	78	78	0.0			148	0.527	100	NA	NA
Approach	78	78	0.0				0.527			
Total %HV Deg.Satn (v/c)										
All Vehicles	627	0.2		0.527						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▽ Site: v [Int 2: Hendriske Road / Tolbos Road_AM Peak - Esc Existing + All Devs + 5yrs - Conversion (2) (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	HV %	[Total veh/h]	HV %	veh/h	v/c	%	sec		[Veh]	Dist] m		m	%	%
South: Hendriske Road															
Lane 1	280	0.0	280	0.0	1944	0.144	100	0.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	280	0.0	280	0.0		0.144		0.2	NA	0.0	0.1				
East: Tolbos Road															
Lane 1	118	0.0	118	0.0	720	0.164	100	8.2	LOS A	0.6	4.1	Full	500	0.0	0.0
Approach	118	0.0	118	0.0		0.164		8.2	LOS A	0.6	4.1				
North: Hendriske Road															
Lane 1	152	0.7	152	0.7	1876	0.081	100	2.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	152	0.7	152	0.7		0.081		2.2	NA	0.1	0.5				
West: Tolbos Road															
Lane 1	78	0.0	78	0.0	1283	0.061	100	6.4	LOS A	0.2	1.7	Full	500	0.0	0.0
Approach	78	0.0	78	0.0		0.061		6.4	LOS A	0.2	1.7				
All Vehicles	627	0.2	627	0.2		0.164		3.0	NA	0.6	4.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane No.
From S						Cap. veh/h	v/c	%	%	
To Exit:	W	N	E							
Lane 1	6	272	2	280	0.0	1944	0.144	100	NA	NA
Approach	6	272	2	280	0.0		0.144			
East: Tolbos Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane No.	
From E						Cap. veh/h	v/c	%	%	
To Exit:	S	N								
Lane 1	14	104	118	0.0		720	0.164	100	NA	NA
Approach	14	104	118	0.0			0.164			

North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	52	94	6	152	0.7	1876	0.081	100	NA	NA
Approach	52	94	6	152	0.7		0.081			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	78	78	0.0			1283	0.061	100	NA	NA
Approach	78	78	0.0				0.061			
Total %HV Deg.Satn (v/c)										
All Vehicles	627	0.2		0.164						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: v [Int 2: Hendriske Road / Tolbos Road_AM Peak - Esc Existing + All Devs + 5yrs - Conversion (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue	Dist	Lane Config	Lane Length	Cap. Prob. Adj.	Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	m		m	%	%
South: Hendriske Road															
Lane 1	280	0.0	280	0.0	1944	0.144	100	0.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	280	0.0	280	0.0		0.144		0.2	NA	0.0	0.1				
East: Tolbos Road															
Lane 1	118	0.0	118	0.0	623	0.189	100	11.0	LOS B	0.7	4.8	Full	500	0.0	0.0
Approach	118	0.0	118	0.0		0.189		11.0	LOS B	0.7	4.8				
North: Hendriske Road															
Lane 1	152	0.7	152	0.7	1876	0.081	100	2.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	152	0.7	152	0.7		0.081		2.2	NA	0.1	0.5				
West: Tolbos Road															
Lane 1	78	0.0	78	0.0	1095	0.071	100	9.2	LOS A	0.3	2.0	Full	500	0.0	0.0
Approach	78	0.0	78	0.0		0.071		9.2	LOS A	0.3	2.0				
All Vehicles	627	0.2	627	0.2		0.189		3.8	NA	0.7	4.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)											
South: Hendriske Road											
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S						Cap. veh/h	v/c	%	%	No.	
To Exit:	W	N	E								
Lane 1	6	272	2	280	0.0	1944	0.144	100	NA	NA	
Approach	6	272	2	280	0.0		0.144				
East: Tolbos Road											
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane		
From E						Cap. veh/h	v/c	%	%	No.	
To Exit:	S	N									
Lane 1	14	104	118	0.0		623	0.189	100	NA	NA	
Approach	14	104	118	0.0			0.189				

North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	52	94	6	152	0.7	1876	0.081	100	NA	NA
Approach	52	94	6	152	0.7		0.081			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	78	78	0.0			1095	0.071	100	NA	NA
Approach	78	78	0.0				0.071			
Total %HV Deg.Satn (v/c)										
All Vehicles	627	0.2		0.189						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 3: Hendriske Road / Williams Road_AM Peak - Esc Existing + All Devs + 5yrs (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Williams Road															
Lane 1	63	1.7	63	1.7	385	0.164	100	16.8	LOS C	0.6	4.0	Full	500	0.0	0.0
Approach	63	1.7	63	1.7		0.164		16.8	LOS C	0.6	4.0				
East: Hendriske Road															
Lane 1	107	1.0	107	1.0	529	0.203	100	14.3	LOS B	0.7	4.9	Full	500	0.0	0.0
Approach	107	1.0	107	1.0		0.203		14.3	LOS B	0.7	4.9				
West: RoadName															
Lane 1	229	0.0	229	0.0	700	0.328	100	13.3	LOS B	1.2	8.6	Full	500	0.0	0.0
Approach	229	0.0	229	0.0		0.328		13.3	LOS B	1.2	8.6				
All Vehicles	400	0.5	400	0.5		0.328		14.1	LOS B	1.2	8.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Williams Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	E								
Lane 1	7	56	63	1.7	385	0.164	100	NA	NA	
Approach	7	56	63	1.7		0.164				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	38	69	107	1.0	529	0.203	100	NA	NA	
Approach	38	69	107	1.0		0.203				
West: RoadName										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From W					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								
Lane 1	224	5	229	0.0	700	0.328	100	NA	NA	
Approach	224	5	229	0.0		0.328				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	400	0.5	0.328

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis										
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.										

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Williams Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: RoadName				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: 101 [Int 4: Hendriske Road / Rhode Road_AM Peak - Esc
Existing + All Devs + 5yrs (Site Folder: 2031 AM Peak - Esc
Existing + All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Rhode Road															
Lane 1	24	0.0	24	0.0	1081	0.022	100	6.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	24	0.0	24	0.0		0.022		6.2	LOS A	0.1	0.5				
East: Hendriske Road															
Lane 1	74	0.0	74	0.0	1897	0.039	100	2.0	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	74	0.0	74	0.0		0.039		2.0	NA	0.0	0.2				
North: RoadName															
Lane 1	49	0.0	49	0.0	1175	0.042	100	6.2	LOS A	0.2	1.1	Full	500	0.0	0.0
Approach	49	0.0	49	0.0		0.042		6.2	LOS A	0.2	1.1				
West: Hendriske Road															
Lane 1	179	0.0	179	0.0	1930	0.093	100	0.8	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	179	0.0	179	0.0		0.093		0.8	NA	0.0	0.3				
All Vehicles	326	0.0	326	0.0		0.093		2.3	NA	0.2	1.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Rhode Road										
Mov.	L2	R2	Total	%HV			Deg. Satn	Lane Util.	Prob. SL	Ov. Lane No.
From S						Cap. veh/h	v/c	%	%	
To Exit:	W	E								
Lane 1	11	14	24	0.0		1081	0.022	100	NA	NA
Approach	11	14	24	0.0			0.022			
East: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane No.
From E						Cap. veh/h	v/c	%	%	
To Exit:	S	W	N							
Lane 1	22	48	3	74	0.0	1897	0.039	100	NA	NA
Approach	22	48	3	74	0.0		0.039			

North: RoadName										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From N						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	E	W					v/c	%	%	No.
Lane 1	32	18	49	0.0		1175	0.042	100	NA	NA
Approach	32	18	49	0.0			0.042			
West: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	E	S			veh/h	v/c	%	%	No.
Lane 1	21	154	4	179	0.0	1930	0.093	100	NA	NA
Approach	21	154	4	179	0.0		0.093			
Total %HV Deg.Satn (v/c)										
All Vehicles	326	0.0		0.093						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit	Short	Percent	Opposing	Critical	Follow-up	Lane	Capacity	Deg.	Min.	Merge	
	Lane	Lane	Opng in	Flow Rate	Gap	Headway	Flow		Satn	Delay	Delay	
	Number	Length	Lane	% veh/h	pcu/h	sec	sec veh/h	veh/h	v/c	sec	sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial	Residual	Time for	Duration
	Queued	Queued	Residual	of
	Demand	Demand	Demand	Oversatn
	veh	veh	to Clear	sec
			sec	
South: Rhode Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
North: RoadName				
Lane 1	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 5: Lang Road / Gabriels Road_AM Peak - Esc Existing + All Devs + 5yrs (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Lang Road															
Lane 1	382	0.0	382	0.0	822	0.465	100	13.8	LOS B	2.0	14.1	Full	500	0.0	0.0
Approach	382	0.0	382	0.0		0.465		13.8	LOS B	2.0	14.1				
East: Gabriels Road															
Lane 1	83	0.0	83	0.0	266	0.312	100	25.2	LOS D	1.2	8.7	Full	500	0.0	0.0
Approach	83	0.0	83	0.0		0.312		25.2	LOS D	1.2	8.7				
North: Lang Road															
Lane 1	986	0.5	986	0.5	928	1.062	100	102.0	LOS F	41.7	293.3	Full	500	0.0	0.0
Approach	986	0.5	986	0.5		1.062		102.0	LOS F	41.7	293.3				
All Vehicles	1452	0.4	1452	0.4		1.062		74.4	LOS F	41.7	293.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	N	E								
Lane 1	374	8	382	0.0	822	0.465	100	NA	NA	
Approach	374	8	382	0.0		0.465				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	N								
Lane 1	38	45	83	0.0	266	0.312	100	NA	NA	
Approach	38	45	83	0.0		0.312				
North: Lang Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From N					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								
Lane 1	49	937	986	0.5	928	1.062	100	NA	NA	
Approach	49	937	986	0.5		1.062				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1452	0.4	1.062

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis										
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.										

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	29.0	112.5	NA

LANE SUMMARY

 **Site: v [Int 5: Lang Road / Gabriels Road_AM Peak - Esc Existing + All Devs + 5yrs - Conversion (2) (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Lang Road															
Lane 1	382	0.0	382	0.0	1827	0.209	100	0.7	LOS A	0.2	1.6	Full	500	0.0	0.0
Approach	382	0.0	382	0.0		0.209		0.7	NA	0.2	1.6				
East: Gabriels Road															
Lane 1	83	0.0	83	0.0	209	0.399	100	28.0	LOS D	1.4	9.6	Full	500	0.0	0.0
Approach	83	0.0	83	0.0		0.399		28.0	LOS D	1.4	9.6				
North: Lang Road															
Lane 1	986	0.5	986	0.5	1938	0.509	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	986	0.5	986	0.5		0.509		0.5	NA	0.0	0.0				
All Vehicles	1452	0.4	1452	0.4		0.509		2.1	NA	1.4	9.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	N	E								
Lane 1	374	8	382	0.0	1827	0.209	100	NA	NA	
Approach	374	8	382	0.0		0.209				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	N								
Lane 1	38	45	83	0.0	209	0.399	100	NA	NA	
Approach	38	45	83	0.0		0.399				
North: Lang Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From N					Cap. veh/h	v/c	%	%	No.	
To Exit:	E	S								

Lane 1	49	937	986	0.5	1938	0.509	100	NA	NA
Approach	49	937	986	0.5		0.509			
Total %HV Deg.Satn (v/c)									
All Vehicles	1452	0.4		0.509					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▽ Site: v [Int 5: Lang Road / Gabriels Road_AM Peak - Esc Existing + All Devs + 5yrs - Conversion (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	HV %	[Total veh/h]	HV %	veh/h	v/c	%	sec		[Veh]	[Dist] m		m	%	%
South: Lang Road															
Lane 1	382	0.0	382	0.0	1827	0.209	100	0.7	LOS A	0.2	1.6	Full	500	0.0	0.0
Approach	382	0.0	382	0.0		0.209		0.7	NA	0.2	1.6				
East: Gabriels Road															
Lane 1	83	0.0	83	0.0	291	0.286	100	18.4	LOS C	1.0	6.7	Full	500	0.0	0.0
Approach	83	0.0	83	0.0		0.286		18.4	LOS C	1.0	6.7				
North: Lang Road															
Lane 1	986	0.5	986	0.5	1938	0.509	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	986	0.5	986	0.5		0.509		0.5	NA	0.0	0.0				
All Vehicles	1452	0.4	1452	0.4		0.509		1.6	NA	1.0	6.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov.
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	N	E								
Lane 1	374	8	382	0.0	1827	0.209	100	NA	NA	
Approach	374	8	382	0.0		0.209				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov.
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	N								
Lane 1	38	45	83	0.0	291	0.286	100	NA	NA	
Approach	38	45	83	0.0		0.286				
North: Lang Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	Ov.
From N					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								

Lane 1	49	937	986	0.5	1938	0.509	100	NA	NA
Approach	49	937	986	0.5		0.509			
Total %HV Deg.Satn (v/c)									
All Vehicles	1452	0.4		0.509					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 6: Welgevonden Blvd / Lang Road_AM Peak - Esc Existing + All Devs + 5yrs (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Lang Road															
Lane 1	279	0.8	279	0.8	1128	0.247	100	9.1	LOS A	1.1	7.9	Full	500	0.0	0.0
Approach	279	0.8	279	0.8		0.247		9.1	LOS A	1.1	7.9				
East: Welgevonden Blvd															
Lane 1	136	0.0	136	0.0	1938	0.070	100	0.7	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	136	0.0	136	0.0		0.070		0.7	NA	0.0	0.0				
West: Welgevonden Blvd															
Lane 1	797	1.1	797	1.1	1601	0.498	100	5.9	LOS A	3.5	25.1	Full	500	0.0	0.0
Approach	797	1.1	797	1.1		0.498		5.9	NA	3.5	25.1				
All Vehicles	1212	0.9	1212	0.9		0.498		6.1	NA	3.5	25.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	W	E								
Lane 1	271	8	279	0.8	1128	0.247	100	NA	NA	
Approach	271	8	279	0.8		0.247				
East: Welgevonden Blvd										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	W								
Lane 1	17	119	136	0.0	1938	0.070	100	NA	NA	
Approach	17	119	136	0.0		0.070				
West: Welgevonden Blvd										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From W					Cap. veh/h	v/c	%	%	No.	
To Exit:	E	S								

Lane 1	46	751	797	1.1	1601	0.498	100	NA	NA
Approach	46	751	797	1.1		0.498			
Total %HV Deg.Satn (v/c)									
All Vehicles	1212	0.9		0.498					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
West: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_AM Peak - Esc Existing + All Devs + 5 yrs_Miti (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: R304															
Lane 1	783	1.6	783	1.6	922	0.849	100	79.7	LOS E	33.7	239.1	Full	500	0.0	0.0
Lane 2	696	1.6	696	1.6	819 ¹	0.849	100	35.8	LOS D	30.5	216.1	Short	200	0.0	NA
Lane 3	316	0.0	316	0.0	320	0.986	100	83.6	LOS F	16.9	118.2	Short	70	0.0	NA
Approach	1795	1.3	1795	1.3		0.986		63.4	LOS E	33.7	239.1				
East: Welgevonden Blvd															
Lane 1	231	0.0	231	0.0	722	0.319	100	26.9	LOS C	7.1	49.4	Short	45	0.0	NA
Lane 2	279	0.0	279	0.0	359 ¹	0.776	100	47.0	LOS D	12.6	88.3	Full	500	0.0	0.0
Approach	509	0.0	509	0.0		0.776		37.9	LOS D	12.6	88.3				
North: R304															
Lane 1	400	0.5	400	0.5	884	0.452	100	24.9	LOS C	11.7	82.0	Short	100	0.0	NA
Lane 2	745	2.5	745	2.5	836 ¹	0.891	100	37.2	LOS D	36.1	258.4	Short	200	0.0	NA
Lane 3	817	2.5	817	2.5	917	0.891	100	137.3	LOS F	39.0	279.1	Full	500	0.0	0.0
Approach	1962	2.1	1962	2.1		0.891		76.4	LOS E	39.0	279.1				
All Vehicles	4266	1.5	4266	1.5		0.986		66.3	LOS E	39.0	279.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From S To Exit:	N	E			Cap. veh/h	v/c	%	%		
Lane 1	783	-	783	1.6	922	0.849	100	NA	NA	
Lane 2	696	-	696	1.6	819 ¹	0.849	100	12.0	1	
Lane 3	-	316	316	0.0	320	0.986	100	53.2	2	
Approach	1479	316	1795	1.3		0.986				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From E To Exit:	S	N			Cap. veh/h	v/c	%	%		

Lane 1	231	-	231	0.0	722	0.319	100	13.5	2
Lane 2	-	279	279	0.0	359 ¹	0.776	100	NA	NA
Approach	231	279	509	0.0		0.776			
North: R304									
Mov. From N To Exit:	L2	T1	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
	E	S							
Lane 1	400	-	400	0.5	884	0.452	100	0.0	2
Lane 2	-	745	745	2.5	836 ¹	0.891	100	28.3	3
Lane 3	-	817	817	2.5	917	0.891	100	NA	NA
Approach	400	1562	1962	2.1		0.891			
Total %HV Deg. Satn (v/c)									
All Vehicles	4266	1.5		0.986					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R304												
Merge Type: Priority												
Exit Short Lane	2	200	0.0	976	985	3.04	2.02	817	743	1.100	2.7	103.8
Merge Lane	1	-	100.0	Merge Lane is not Opposed				976	1800	0.542	0.0	0.0
North Exit: R304												
Merge Type: Priority												
Exit Short Lane	1	200	0.0	975	980	3.02	2.02	783	758	1.033	2.6	51.9
Merge Lane	2	-	100.0	Merge Lane is not Opposed				975	1800	0.541	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: 101v [Int 8: R44 / Fir Street_AMPeak - Esc Existing + All Devs + 5 yrs - Conversion (Site Folder: 2031 AM Peak - Esc Existing + All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	658	3.6	658	3.6	1391	0.473	100	7.4	LOS A	15.4	111.1	Full	490	0.0	0.0
Lane 2	660	3.9	660	3.9	1394	0.473	100	6.9	LOS A	15.4	111.6	Full	490	0.0	0.0
Approach	1318	3.8	1318	3.8		0.473		7.1	LOS A	15.4	111.6				
North: R44															
Lane 1	1361	2.1	1361	2.1	1411	0.965	100	37.9	LOS D	90.9	648.0	Full	1150	0.0	0.0
Lane 2	1096	2.1	1096	2.1	1136 ¹	0.965	100	53.8	LOS D	77.4	551.7	Full	1150	0.0	0.0
Lane 3	64	0.0	64	0.0	204	0.315	100	28.6	LOS C	2.0	13.9	Short	60	0.0	NA
Approach	2521	2.0	2521	2.0		0.965		44.6	LOS D	90.9	648.0				
West: Fir Street															
Lane 1	293	0.7	293	0.7	308	0.950	100	82.8	LOS F	21.4	150.6	Full	260	0.0	0.0
Approach	293	0.7	293	0.7		0.950		82.8	LOS F	21.4	150.6				
All Vehicles	4132	2.5	4132	2.5		0.965		35.3	LOS D	90.9	648.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R44										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S To Exit:	W	N			Cap. veh/h	v/c	%	%	Lane No.	
Lane 1	62	596	658	3.6	1391	0.473	100	NA	NA	
Lane 2	-	660	660	3.9	1394	0.473	100	NA	NA	
Approach	62	1256	1318	3.8		0.473				
North: R44										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From N To Exit:	S	W			Cap. veh/h	v/c	%	%	Lane No.	
Lane 1	1361	-	1361	2.1	1411	0.965	100	NA	NA	
Lane 2	1096	-	1096	2.1	1136 ¹	0.965	100	NA	NA	
Lane 3	-	64	64	0.0	204	0.315	100	0.0	2	

Approach	2457	64	2521	2.0		0.965				
West: Fir Street										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.	
From W To Exit:	N	S			Cap. veh/h	v/c	%	%		
Lane 1	23	269	293	0.7	308	0.950	100	NA	NA	
Approach	23	269	293	0.7		0.950				
Total %HV Deg. Satn (v/c)										
All Vehicles	4132	2.5		0.965						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- 1
- Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec		
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

**Site: Int1 [Int 1: R44 / Hendriske Road_PM Peak_Duel+TurnExt
- Esc Existing + All Devs + 5 yrs (Site Folder: 2031 PM Peak -
Esc Existing+ All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob.	
	[Total veh/h	HV] %	[Total veh/h	HV] %						[Veh	Dist] m			Adj. Block.	
South: R44															
Lane 1	525	0.0	525	0.0	1117	0.470	100	8.5	LOS A	4.5	31.7	Short	80	0.0	NA
Lane 2	295	3.7	295	3.7	1219	0.242	35 ⁶	7.8	LOS A	3.1	22.2	Full	500	0.0	0.0
Lane 3	830	3.6	830	3.6	1217	0.682	100	6.3	LOS A	13.1	94.6	Full	500	0.0	0.0
Approach	1651	2.5	1651	2.5		0.682		7.3	LOS A	13.1	94.6				
East: RoadName															
Lane 1	2	0.0	2	0.0	186	0.011	100	27.4	LOS C	0.0	0.3	Full	500	0.0	0.0
Approach	2	0.0	2	0.0		0.011		27.4	LOS C	0.0	0.3				
North: R44															
Lane 1	315	3.2	315	3.2	1223	0.257	100	4.2	LOS A	3.3	23.9	Full	500	0.0	0.0
Lane 2	315	3.2	315	3.2	1223	0.257	100	4.2	LOS A	3.3	23.9	Full	500	0.0	0.0
Lane 3	120	0.0	120	0.0	249	0.482	100	19.5	LOS B	2.4	17.1	Short	80	0.0	NA
Approach	749	2.7	749	2.7		0.482		6.6	LOS A	3.3	23.9				
West: Hendriske Road															
Lane 1	148	0.5	148	0.5	210	0.707	100	32.7	LOS C	4.0	27.9	Short	80	0.0	NA
Lane 2	169	0.8	169	0.8	240	0.707	100	31.5	LOS C	4.5	31.6	Full	500	0.0	0.0
Approach	318	0.7	318	0.7		0.707		32.1	LOS C	4.5	31.6				
All Vehicles	2720	2.3	2720	2.3		0.707		10.0	LOS B	13.1	94.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

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.

6 Lane under-utilisation due to downstream effects

Approach Lane Flows (veh/h)										
South: R44										
Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	525	-	-	525	0.0	1117	0.470	100	0.0	2
Lane 2	-	295	-	295	3.7	1219	0.242	35 ⁶	NA	NA
Lane 3	-	829	1	830	3.6	1217	0.682	100	NA	NA
Approach	525	1124	1	1651	2.5	0.682				
East: RoadName										

Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From E To Exit:	S	N				veh/h	Satn v/c	Util.	SL	Lane No.
Lane 1	1	1	2	0.0		186	0.011	100	NA	NA
Approach	1	1	2	0.0			0.011			
North: R44										
Mov.	L2	T1	R2	Total	%HV	Cap.	Deg.	Lane	Prob.	Ov.
From N To Exit:	E	S	W			veh/h	Satn v/c	Util.	SL	Lane No.
Lane 1	1	314	-	315	3.2	1223	0.257	100	NA	NA
Lane 2	-	315	-	315	3.2	1223	0.257	100	NA	NA
Lane 3	-	-	120	120	0.0	249	0.482	100	0.0	2
Approach	1	628	120	749	2.7		0.482			
West: Hendriske Road										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From W To Exit:	N	S				veh/h	Satn v/c	Util.	SL	Lane No.
Lane 1	68	80	148	0.5		210	0.707	100	0.0	2
Lane 2	-	169	169	0.8		240	0.707	100	NA	NA
Approach	68	249	318	0.7			0.707			
Total %HV Deg.Satn (v/c)										
All Vehicles	2720	2.3		0.707						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

6 Lane under-utilisation due to downstream effects

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Flow Rate pcu/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
North Exit: R44 Merge Type: Priority												
Exit Short Lane	1	60	0.0	865	880	3.05	2.03	329	847	0.389	2.1	3.7
Merge Lane	2	-	100.0	Merge Lane is not Opposed				865	1800	0.480	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: RoadName				
Lane 1	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
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LANE SUMMARY

 **Site: [Int 2: Hendriske Road / Tolbos Road_PM Peak - Esc Existing + All Devs + 5yrs (Site Folder: 2031 PM Peak - Esc Existing+ All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist] m		m	%	%
South: Hendriske Road															
Lane 1	121	0.9	121	0.9	614	0.197	100	13.0	LOS B	0.7	4.7	Full	500	0.0	0.0
Approach	121	0.9	121	0.9		0.197		13.0	LOS B	0.7	4.7				
East: Tolbos Road															
Lane 1	60	0.0	60	0.0	440	0.136	100	14.9	LOS B	0.5	3.2	Full	500	0.0	0.0
Approach	60	0.0	60	0.0		0.136		14.9	LOS B	0.5	3.2				
North: Hendriske Road															
Lane 1	377	0.0	377	0.0	725	0.520	100	15.9	LOS C	2.5	17.4	Full	500	0.0	0.0
Approach	377	0.0	377	0.0		0.520		15.9	LOS C	2.5	17.4				
West: Tolbos Road															
Lane 1	16	0.0	16	0.0	16	1.000 ⁴	100	587.1	LOS F	4.4	31.0	Full	500	0.0	0.0
Approach	16	0.0	16	0.0		1.000		587.1	LOS F	4.4	31.0				
All Vehicles	574	0.2	574	0.2		1.000		30.9	LOS D	4.4	31.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

⁴ x = 1.00 due to minimum capacity

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	T1	R2	Total	%HV						
From S					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	N	E			veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	113	8	121	0.9	614	0.197	100	NA	NA	
Approach	113	8	121	0.9		0.197				
East: Tolbos Road										
Mov.	L2	R2	Total	%HV						
From E					Cap.	Deg.	Lane	Prob.	Ov.	
To Exit:	S	N			veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.	
Lane 1	2	58	60	0.0	440	0.136	100	NA	NA	
Approach	2	58	60	0.0		0.136				
North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV					
From N					Cap.	Deg.	Lane	Prob.	Ov.	

To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	89	233	55	377	0.0	725	0.520	100	NA	NA
Approach	89	233	55	377	0.0		0.520			
West: Tolbos Road										
Mov.	L2	Total	%HV			Cap.	Deg.	Lane	Prob.	Ov.
From W						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	N						v/c	%	%	No.
Lane 1	16	16	0.0			16	1.000 ⁴	100	NA	NA
Approach	16	16	0.0				1.000			
Total %HV Deg.Satn (v/c)										
All Vehicles	574	0.2		1.000						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

⁴ x = 1.00 due to minimum capacity

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	NA

LANE SUMMARY

▽ Site: v [Int 2: Hendriske Road / Tolbos Road_PM Peak - Esc Existing + All Devs + 5yrs - Conversion (2) (Site Folder: 2031 PM Peak - Esc Existing+ All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue	Dist	Lane Config	Lane Length	Cap. Prob. Adj.	Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	m		m	%	%
South: Hendriske Road															
Lane 1	121	0.9	121	0.9	1873	0.065	100	0.6	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	121	0.9	121	0.9		0.065		0.6	NA	0.1	0.5				
East: Tolbos Road															
Lane 1	60	0.0	60	0.0	686	0.088	100	8.2	LOS A	0.3	2.0	Full	500	0.0	0.0
Approach	60	0.0	60	0.0		0.088		8.2	LOS A	0.3	2.0				
North: Hendriske Road															
Lane 1	377	0.0	377	0.0	1867	0.202	100	2.3	LOS A	0.5	3.4	Full	500	0.0	0.0
Approach	377	0.0	377	0.0		0.202		2.3	NA	0.5	3.4				
West: Tolbos Road															
Lane 1	16	0.0	16	0.0	1488	0.011	100	5.8	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	16	0.0	16	0.0		0.011		5.8	LOS A	0.0	0.3				
All Vehicles	574	0.2	574	0.2		0.202		2.6	NA	0.5	3.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	N	E								
Lane 1	113	8	121	0.9	1873	0.065	100	NA	NA	
Approach	113	8	121	0.9		0.065				
East: Tolbos Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	N								
Lane 1	2	58	60	0.0	686	0.088	100	NA	NA	
Approach	2	58	60	0.0		0.088				

North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	89	233	55	377	0.0	1867	0.202	100	NA	NA
Approach	89	233	55	377	0.0		0.202			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	16	16	0.0			1488	0.011	100	NA	NA
Approach	16	16	0.0				0.011			
Total %HV Deg.Satn (v/c)										
All Vehicles	574	0.2		0.202						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit	Short	Percent	Opposing	Critical	Follow-up	Lane	Capacity	Deg.	Min.	Merge	
	Lane	Lane	Opng in	Flow Rate	Gap	Headway	Flow		Satn	Delay	Delay	
	Number	Length	Lane	% veh/h	pcu/h	sec	sec veh/h	veh/h	v/c	sec	sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial	Residual	Time for	Duration
	Queued	Queued	Residual	of
	Demand	Demand	Demand	Oversatn
	veh	veh	to Clear	sec
			sec	
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: v [Int 2: Hendriske Road / Tolbos Road_PM Peak - Esc Existing + All Devs + 5yrs - Conversion (Site Folder: 2031 PM Peak - Esc Existing+ All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	HV %	[Total veh/h]	HV %	veh/h	v/c	%	sec		[Veh]	Dist] m		m	%	%
South: Hendriske Road															
Lane 1	121	0.9	121	0.9	1873	0.065	100	0.6	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	121	0.9	121	0.9		0.065		0.6	NA	0.1	0.5				
East: Tolbos Road															
Lane 1	60	0.0	60	0.0	593	0.101	100	11.0	LOS B	0.3	2.4	Full	500	0.0	0.0
Approach	60	0.0	60	0.0		0.101		11.0	LOS B	0.3	2.4				
North: Hendriske Road															
Lane 1	377	0.0	377	0.0	1867	0.202	100	2.3	LOS A	0.5	3.4	Full	500	0.0	0.0
Approach	377	0.0	377	0.0		0.202		2.3	NA	0.5	3.4				
West: Tolbos Road															
Lane 1	16	0.0	16	0.0	1294	0.012	100	8.4	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	16	0.0	16	0.0		0.012		8.4	LOS A	0.0	0.3				
All Vehicles	574	0.2	574	0.2		0.202		3.0	NA	0.5	3.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Hendriske Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S					Cap. veh/h	v/c	%	%	No.	
To Exit:	N	E								
Lane 1	113	8	121	0.9	1873	0.065	100	NA	NA	
Approach	113	8	121	0.9		0.065				
East: Tolbos Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E					Cap. veh/h	v/c	%	%	No.	
To Exit:	S	N								
Lane 1	2	58	60	0.0	593	0.101	100	NA	NA	
Approach	2	58	60	0.0		0.101				

North: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From N						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S	W			veh/h	v/c	%	%	No.
Lane 1	89	233	55	377	0.0	1867	0.202	100	NA	NA
Approach	89	233	55	377	0.0		0.202			
West: Tolbos Road										
Mov.	L2	Total	%HV				Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N					veh/h	v/c	%	%	No.
Lane 1	16	16	0.0			1294	0.012	100	NA	NA
Approach	16	16	0.0				0.012			
Total %HV Deg.Satn (v/c)										
All Vehicles	574	0.2		0.202						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis										
	Exit Lane Number	Short Lane Length	Percent Opng in Lane	Opposing Flow Rate	Critical Gap	Follow-up Headway	Lane Capacity	Deg. Satn	Min. Delay	Merge Delay
		m	% veh/h	pcu/h	sec	sec	veh/h	veh/h	v/c	sec
There are no Exit Short Lanes for Merge Analysis at this Site.										

Variable Demand Analysis				
	Initial	Residual	Time for	Duration
	Queued	Queued	Residual	of
	Demand	Demand	Demand	Oversatn
	veh	veh	to Clear	sec
			sec	
South: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
East: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0
North: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: Tolbos Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 3: Hendriske Road / Williams Road_PM Peak - Esc Existing + All Devs + 5yrs (Site Folder: 2031 PM Peak - Esc Existing+ All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%											
South: Williams Road															
Lane 1	38	0.0	38	0.0	341	0.111	100	17.4	LOS C	0.4	2.6	Full	500	0.0	0.0
Approach	38	0.0	38	0.0		0.111		17.4	LOS C	0.4	2.6				
East: Hendriske Road															
Lane 1	235	0.0	235	0.0	679	0.346	100	13.8	LOS B	1.3	9.3	Full	500	0.0	0.0
Approach	235	0.0	235	0.0		0.346		13.8	LOS B	1.3	9.3				
West: RoadName															
Lane 1	99	2.1	99	2.1	630	0.157	100	12.5	LOS B	0.5	3.6	Full	500	0.0	0.0
Approach	99	2.1	99	2.1		0.157		12.5	LOS B	0.5	3.6				
All Vehicles	372	0.6	372	0.6		0.346		13.8	LOS B	1.3	9.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
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.

Approach Lane Flows (veh/h)										
South: Williams Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	E								
Lane 1	5	33	38	0.0	341	0.111	100	NA	NA	
Approach	5	33	38	0.0		0.111				
East: Hendriske Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	52	183	235	0.0	679	0.346	100	NA	NA	
Approach	52	183	235	0.0		0.346				
West: RoadName										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From W					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								
Lane 1	92	7	99	2.1	630	0.157	100	NA	NA	
Approach	92	7	99	2.1		0.157				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	372	0.6	0.346

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Williams Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
West: RoadName				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

▼ Site: 101 [Int 4: Hendriske Road / Rhode Road_PM Peak - Esc
Existing + All Devs + 5yrs (Site Folder: 2031 PM Peak - Esc
Existing+ All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Rhode Road															
Lane 1	22	0.0	22	0.0	1064	0.021	100	6.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	22	0.0	22	0.0		0.021		6.2	LOS A	0.1	0.5				
East: Hendriske Road															
Lane 1	161	0.0	161	0.0	1865	0.086	100	2.5	LOS A	0.2	1.4	Full	500	0.0	0.0
Approach	161	0.0	161	0.0		0.086		2.5	NA	0.2	1.4				
North: RoadName															
Lane 1	24	0.0	24	0.0	1037	0.023	100	6.2	LOS A	0.1	0.6	Full	500	0.0	0.0
Approach	24	0.0	24	0.0		0.023		6.2	LOS A	0.1	0.6				
West: Hendriske Road															
Lane 1	100	2.1	100	2.1	1881	0.053	100	1.7	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	100	2.1	100	2.1		0.053		1.7	NA	0.0	0.3				
All Vehicles	307	0.7	307	0.7		0.086		2.8	NA	0.2	1.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
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.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
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.

Approach Lane Flows (veh/h)										
South: Rhode Road										
Mov.	L2	R2	Total	%HV			Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.
From S						Cap. veh/h	v/c	%	%	
To Exit:	W	E								
Lane 1	8	14	22	0.0		1064	0.021	100	NA	NA
Approach	8	14	22	0.0			0.021			
East: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL Ov.	Ov. Lane No.
From E						Cap. veh/h	v/c	%	%	
To Exit:	S	W	N							
Lane 1	43	93	25	161	0.0	1865	0.086	100	NA	NA
Approach	43	93	25	161	0.0		0.086			

North: RoadName										
Mov.	L2	R2	Total	%HV		Cap.	Deg.	Lane	Prob.	Ov.
From N						veh/h	Satn	Util.	SL Ov.	Lane
To Exit:	E	W					v/c	%	%	No.
Lane 1	7	17	24	0.0		1037	0.023	100	NA	NA
Approach	7	17	24	0.0			0.023			
West: Hendriske Road										
Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From W						Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	N	E	S			veh/h	v/c	%	%	No.
Lane 1	25	71	4	100	2.1	1881	0.053	100	NA	NA
Approach	25	71	4	100	2.1		0.053			
Total %HV Deg.Satn (v/c)										
All Vehicles	307	0.7		0.086						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit	Short	Percent	Opposing	Critical	Follow-up	Lane	Capacity	Deg.	Min.	Merge	
	Lane	Lane	Opng in	Flow Rate	Gap	Headway	Flow		Satn	Delay	Delay	
	Number	Length	Lane	% veh/h	pcu/h	sec	sec veh/h	veh/h	v/c	sec	sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial	Residual	Time for	Duration
	Queued	Queued	Residual	of
	Demand	Demand	Demand	Oversatn
	veh	veh	to Clear	
			sec	sec
South: Rhode Road				
Lane 1	0.0	0.0	0.0	0.0
East: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0
North: RoadName				
Lane 1	0.0	0.0	0.0	0.0
West: Hendriske Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 5: Lang Road / Gabriels Road_PM Peak - Esc Existing + All Devs + 5yrs (Site Folder: 2031 PM Peak - Esc Existing+ All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (All-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Lang Road															
Lane 1	534	0.2	534	0.2	782	0.683	100	19.7	LOS C	4.4	31.1	Full	500	0.0	0.0
Approach	534	0.2	534	0.2		0.683		19.7	LOS C	4.4	31.1				
East: Gabriels Road															
Lane 1	43	0.0	43	0.0	254	0.170	100	22.6	LOS C	0.6	4.3	Full	500	0.0	0.0
Approach	43	0.0	43	0.0		0.170		22.6	LOS C	0.6	4.3				
North: Lang Road															
Lane 1	367	1.1	367	1.1	684	0.537	100	17.0	LOS C	2.7	18.8	Full	500	0.0	0.0
Approach	367	1.1	367	1.1		0.537		17.0	LOS C	2.7	18.8				
All Vehicles	944	0.6	944	0.6		0.683		18.8	LOS C	4.4	31.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	N	E								
Lane 1	508	25	534	0.2	782	0.683	100	NA	NA	
Approach	508	25	534	0.2		0.683				
East: Gabriels Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	N								
Lane 1	8	35	43	0.0	254	0.170	100	NA	NA	
Approach	8	35	43	0.0		0.170				
North: Lang Road										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From N					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								
Lane 1	52	316	367	1.1	684	0.537	100	NA	NA	
Approach	52	316	367	1.1		0.537				

	Total	%HV	Deg.Satn (v/c)
All Vehicles	944	0.6	0.683

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Capacity Flow Rate veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Gabriels Road				
Lane 1	0.0	0.0	0.0	0.0
North: Lang Road				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 **Site: [Int 6: Welgevonden Blvd / Lang Road_PM Peak - Esc Existing + All Devs + 5yrs (Site Folder: 2031 PM Peak - Esc Existing+ All Devs + 5 yrs)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Stop (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: Lang Road															
Lane 1	426	0.0	426	0.0	1303	0.327	100	8.5	LOS A	1.7	12.0	Full	500	0.0	0.0
Approach	426	0.0	426	0.0		0.327		8.5	LOS A	1.7	12.0				
East: Welgevonden Blvd															
Lane 1	88	0.0	88	0.0	1936	0.046	100	0.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	88	0.0	88	0.0		0.046		0.8	NA	0.0	0.0				
West: Welgevonden Blvd															
Lane 1	394	0.0	394	0.0	1723	0.229	100	4.2	LOS A	1.2	8.7	Full	500	0.0	0.0
Approach	394	0.0	394	0.0		0.229		4.2	NA	1.2	8.7				
All Vehicles	908	0.0	908	0.0		0.327		5.9	NA	1.7	12.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: Lang Road										
Mov.	L2	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From S					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	W	E								
Lane 1	413	14	426	0.0	1303	0.327	100	NA	NA	
Approach	413	14	426	0.0		0.327				
East: Welgevonden Blvd										
Mov.	L2	T1	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From E					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	S	W								
Lane 1	13	76	88	0.0	1936	0.046	100	NA	NA	
Approach	13	76	88	0.0		0.046				
West: Welgevonden Blvd										
Mov.	T1	R2	Total	%HV		Deg. Satn	Lane Util.	Prob. SL	Ov.	
From W					Cap. veh/h	v/c	%	%	Lane No.	
To Exit:	E	S								

Lane 1	109	284	394	0.0	1723	0.229	100	NA	NA
Approach	109	284	394	0.0		0.229			
Total %HV Deg.Satn (v/c)									
All Vehicles	908	0.0		0.327					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Lang Road				
Lane 1	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
West: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: Int7 [Int 7: R304 / Welgevonden Blvd_PM Peak - Esc
Existing + All Devs + 5 yrs_Miti (Site Folder: 2031 PM Peak - Esc
Existing+ All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]	veh/h	v/c	%	sec		[Veh	Dist]		m	%	%
	veh/h	%	veh/h	%							m				
South: R304															
Lane 1	908	2.7	908	2.7	1045	0.869	100	287.0	LOS F	45.8	328.0	Full	500	0.0	0.0
Lane 2	781	2.7	781	2.7	899 ¹	0.869	100	42.3	LOS D	40.5	290.4	Short	200	0.0	NA
Lane 3	271	0.0	271	0.0	318	0.849	100	64.4	LOS E	12.4	86.8	Short	70	0.0	NA
Approach	1960	2.4	1960	2.4		0.869		158.7	LOS F	45.8	328.0				
East: Welgevonden Blvd															
Lane 1	227	0.0	227	0.0	642	0.354	100	34.4	LOS C	9.1	63.5	Short	45	0.0	NA
Lane 2	220	0.0	220	0.0	321	0.686	100	53.3	LOS D	11.5	80.5	Full	500	0.0	0.0
Approach	447	0.0	447	0.0		0.686		43.7	LOS D	11.5	80.5				
North: R304															
Lane 1	256	0.0	256	0.0	1013	0.253	100	22.2	LOS C	7.1	49.8	Short	100	0.0	NA
Lane 2	738	0.6	738	0.6	996 ¹	0.741	100	23.0	LOS C	29.9	210.2	Short	200	0.0	NA
Lane 3	785	0.6	785	0.6	1059	0.741	100	54.7	LOS D	31.8	223.6	Full	500	0.0	0.0
Approach	1779	0.5	1779	0.5		0.741		36.9	LOS D	31.8	223.6				
All Vehicles	4186	1.3	4186	1.3		0.869		94.6	LOS F	45.8	328.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes.
Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Approach Lane Flows (veh/h)										
South: R304										
Mov.	T1	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From S To Exit:	N	E			veh/h	v/c	%	%	No.	
Lane 1	908	-	908	2.7	1045	0.869	100	NA	NA	
Lane 2	781	-	781	2.7	899 ¹	0.869	100	39.1	1	
Lane 3	-	271	271	0.0	318	0.849	100	24.6	2	
Approach	1689	271	1960	2.4		0.869				
East: Welgevonden Blvd										
Mov.	L2	R2	Total	%HV	Cap.	Deg. Satn	Lane Util.	Prob. SL	Ov. Lane	
From E To Exit:	S	N			veh/h	v/c	%	%	No.	

Lane 1	227	-	227	0.0	642	0.354	100	36.5	2
Lane 2	-	220	220	0.0	321	0.686	100	NA	NA
Approach	227	220	447	0.0		0.686			
North: R304									
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.
From N					Cap.	Satn	Util.	SL Ov.	Lane
To Exit:	E	S			veh/h	v/c	%	%	No.
Lane 1	256	-	256	0.0	1013	0.253	100	0.0	2
Lane 2	-	738	738	0.6	996 ¹	0.741	100	9.5	3
Lane 3	-	785	785	0.6	1059	0.741	100	NA	NA
Approach	256	1523	1779	0.5		0.741			
Total %HV Deg. Satn (v/c)									
All Vehicles	4186	1.3		0.869					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Delay and stops experienced by drivers upstream of short lane entry have been accounted for.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
South Exit: R304												
Merge Type: Priority												
Exit Short Lane	2	200	0.0	966	968	3.01	2.01	785	782	1.004	2.5	34.4
Merge Lane	1	-	100.0	Merge Lane is not Opposed				966	1800	0.536	0.0	0.0
North Exit: R304												
Merge Type: Priority												
Exit Short Lane	1	200	0.0	1001	1012	3.04	2.03	908	711	1.277	2.9	258.4
Merge Lane	2	-	100.0	Merge Lane is not Opposed				1001	1800	0.556	0.0	0.0

Variable Demand Analysis				
	Initial Queued Demand	Residual Queued Demand	Time for Residual Demand to Clear	Duration of Oversatn
	veh	veh	sec	sec
South: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
East: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0

LANE SUMMARY

 Site: 101v [Int 8: R44 / Fir Street_PMPeak - Esc Existing + All Devs + 5 yrs - Conversion (Site Folder: 2031 PM Peak - Esc Existing+ All Devs + 5 yrs)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: R44															
Lane 1	1009	2.9	1009	2.9	1514	0.666	100	5.3	LOS A	18.7	134.2	Full	490	0.0	0.0
Lane 2	1015	3.6	1015	3.6	1524	0.666	100	4.1	LOS A	18.8	135.8	Full	490	0.0	0.0
Approach	2024	3.3	2024	3.3		0.666		4.7	LOS A	18.8	135.8				
North: R44															
Lane 1	769	4.2	769	4.2	1519	0.506	100	3.2	LOS A	11.2	81.0	Full	1150	0.0	0.0
Lane 2	769	4.2	769	4.2	1519	0.506	100	3.2	LOS A	11.2	81.0	Full	1150	0.0	0.0
Lane 3	19	0.0	19	0.0	113	0.168	100	16.1	LOS B	0.4	3.0	Short	60	0.0	NA
Approach	1557	4.1	1557	4.1		0.506		3.4	LOS A	11.2	81.0				
West: Fir Street															
Lane 1	79	0.0	79	0.0	124	0.638	100	53.9	LOS D	3.7	25.9	Full	260	0.0	0.0
Approach	79	0.0	79	0.0		0.638		53.9	LOS D	3.7	25.9				
All Vehicles	3660	3.6	3660	3.6		0.666		5.2	LOS A	18.8	135.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

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 Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

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.

Approach Lane Flows (veh/h)										
South: R44										
Mov. From S To Exit:	L2 W	T1 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	223	786	1009	2.9	1514	0.666	100	NA	NA	
Lane 2	-	1015	1015	3.6	1524	0.666	100	NA	NA	
Approach	223	1801	2024	3.3		0.666				
North: R44										
Mov. From N To Exit:	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.	
Lane 1	769	-	769	4.2	1519	0.506	100	NA	NA	
Lane 2	769	-	769	4.2	1519	0.506	100	NA	NA	
Lane 3	-	19	19	0.0	113	0.168	100	0.0	2	
Approach	1538	19	1557	4.1		0.506				

West: Fir Street									
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.
From W To Exit:	N	S			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	21	58	79	0.0	124	0.638	100	NA	NA
Approach	21	58	79	0.0		0.638			
Total %HV Deg.Satn (v/c)									
All Vehicles	3660	3.6		0.666					

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis												
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec	
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: R44				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
Lane 3	0.0	0.0	0.0	0.0
West: Fir Street				
Lane 1	0.0	0.0	0.0	0.0



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Our Ref/Ons Verw: Erf 7001 (Cloetesville Housing Project)

Your Ref/U Verw:

6 June 2024

Elzaan Jordaan
Zutari
264 Main Road
Paarl
7646

By e-mail: Elzaan.Jordaan@zutari.com

CAPACITY STATUS OF MUNICIPAL CIVIL ENGINEERING INFRASTRUCTURE TO SERVICE THE PROPOSED DEVELOPMENT ON ERF 7001 (CLOETESVILLE HOUSING – 201 RESIDENTIAL ERVEN)

Your e-mail enquiry dated 6 June 2024, regarding a water and sewer capacity letter required by the Provincial Department of Infrastructure refers.

This letter is based on the following information:

- Subdivision Plan by Zutari 1001918 Number 231130 Rev 1 dated 2023/11/30.
- Engineering Services Report by Zutari dated 2023/11/03 (Rev 0).

The capacity status of the bulk municipal infrastructure required to accommodate this development is as follows:

1. Stellenbosch WWTW (Wastewater Treatment Works)

- 1.1 The proposed development falls within the catchment area of the existing Stellenbosch WWTW (Wastewater Treatment Works). There is sufficient capacity at the WWTW for the proposed development.

2. Water

- 2.2 Cloetesville is currently supplied with water from the existing 2.8 ML Cloetesville Reservoir and 50 kl Cloetesville Tower. There is insufficient capacity in the existing water reticulation system to accommodate the proposed development.

- 2.3 The following bulk network upgrades will be required:

- New 7.0 ML Reservoir top water level at 188.0m and upgrading of existing pumps from the reservoir to the water tower.



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Funding: Only R2.5m ex VAT has been budgeted for this project in the current MTREF (2023/24 - 2025/26), which is insufficient to complete this project. The municipality will have to allocate additional funds to be able to implement this project as the Development can only connect/get subdivision clearance once this project is commissioned.

- Upgrading of existing pumps from the Idas Valley reservoir to Uniepark Reservoir which feeds the existing Cloetesville reservoir.

Funding: Only R8m ex VAT has been budgeted for this project in the current MTREF (2023/24 - 2025/26), which is insufficient to complete this project. The municipality will have to allocate additional funds to be able to implement this project as the Development can only connect/get subdivision clearance once this project is commissioned.

3. Sewer

3.1 The following upgrades must be implemented:

- Upgrading of the bulk sewer line from Kayamandi to Merriman Street. Funding: Only R1m ex VAT has been budgeted for this project in the current MTREF (2023/24 - 2025/26), which is insufficient to complete this project. The municipality will have to allocate additional funds to be able to implement this project as the Development can only connect/get subdivision clearance once this project is commissioned.

Yours faithfully

Shane Chandaka

Director: Infrastructure Services

W:\2.0 DEVELOPMENT\Capacities (Letters, Constraints, Discussions)\Capacity Letters\20240606 Erf 7001 Cloetesville Housing Project\Capacity letter Erf 7001 Cloetesville Housing Project.doc