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NOTICE OF MUNICIPAL PLANNING TRIBUNAL MEETING OF STELLENBOSCH MUNICIPALITY FRIDAY, 2026-04-24 FROM 10:00 - 15:00

VOLUME 2

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APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA: FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

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DIRECTORATE: PLANNING & ECONOMIC DEVELOPMENT
DEVELOPMENT MANAGEMENT: LAND USE MANAGEMENT

PLANNING REPORT ON APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

APPLICATION DETAILS			
Application Reference	LU/18098 – TP917/2024	**Commencement Date**	29 November 2024
Applicant	NKanivo Development Consultants Samuel Chauke	**Last day for comments or additional information**	12 March 2026 Due date: 12 July 2026
Farm nr	81/2 & 81/9 (see **ANNEXURE A** for locality plan)	**Place**	Stellenbosch Division
Zoning	• Farm No. 81/2, Stb - Agriculture and Rural Zone • Farm No. 81/9, Stb – Public Roads and Parking Zone	**Other approvals**	N/A

X	TYPE OF APPLICATION
X	**15(2)(a) rezoning of land***
	15(2)(b) a permanent departure from the development parameters of the zoning scheme
	15(2)(c) a departure granted on a temporary basis to utilise land for a purpose not permitted in terms of the primary rights of the zoning applicable to the land
	15(2)(d) a subdivision of land that is not exempted in terms of section 24, including the registration of a servitude or lease agreement*
	15(2)(e) a consolidation of land that is not exempted in terms of section 24*
	15(2)(f) a removal, suspension or amendment of restrictive conditions in respect of a land unit*

	15(2)(g) a permission required in terms of the zoning scheme
	15(2)(h) an amendment, deletion or imposition of conditions in respect of an existing approval*
	15(2)(i) an extension of the validity period of an approval
	15(2)(j) an approval of an overlay zone as contemplated in the zoning scheme
	15(2)(k) an amendment or cancellation of an approved subdivision plan or part thereof, including a general plan or diagram*
	15(2)(l) a permission required in terms of a condition of approval
	15(2)(m) a determination of a zoning
	15(2)(n) a closure of a public place or part thereof
	15(2)(o) a consent use contemplated in the zoning scheme
	15(2)(p) to disestablish a homeowners' association
	15(2)(q) to rectify a failure by a homeowners' association to meet its obligations in respect of the control over or maintenance of services
	15(2)(r) a permission required for the reconstruction of an existing building that constitutes a non-conforming use that is destroyed or damaged to the extent that it is necessary to demolish a substantial part of the building
	Approval required in terms of relevant policy for street naming and numbering
	Approval required in terms of Council policies or by-laws – Specify:
	Consent / Permission required in terms of a title deed (includes where planning permission is required in terms of the Advertising on Roads and Ribbon Development Act, Act 21 of 1940)

NATURE AND SCOPE OF PROPOSED LAND USE APPLICATION

1. **Purpose**

The purpose of the application is to obtain the necessary land use rights to enable the Municipality to develop a medium- to high-density (i.e. 1 to 4 storey walk-up buildings) sustainable human settlement intended to accommodate social housing.

This phase of the application deals solely with the rezoning of Farm No. 81/2, Stellenbosch Division, to Subdivisional Area in order to establish an overlay zone in accordance with the intended development of the housing project. A subsequent subdivision application will be submitted by another consultant at a later stage. See **ANNEXURE B** for Subdivisional Area Plan.

2. Background and Application detail

The subject property is located between the Kayamandi and Cloetesville settlements. The western boundary of the site is defined by the R304, while the railway line forms the eastern boundary. The Plankenburg River runs along the eastern side of the subject area. The site includes environmentally sensitive features such as a wetland and a section of the Plankenburg River.

To the south, the site includes portions of the Kayamandi Tourism Centre as well as the bridge crossing the railway line. The northern boundary of the application property is delineated by the adjacent Mount Simon residential development.

The property is largely vacant, with certain portions currently utilised for a road, a section of the Kayamandi Tourism Centre, and an overhead bridge.

Over the past decade, Stellenbosch has experienced significant growth, evolving from a historic town into a dynamic urban centre. This expansion has been driven by economic development, tourism, and an increasing demand for housing. The resulting rapid urbanisation has placed considerable pressure on existing infrastructure and housing resources, particularly for lower- and middle-income residents. In this context, the proposed development along the R304 represents a strategic response to the Municipality's critical need for affordable housing.

Farm No. 81/9, Stellenbosch Division encompasses the R304 road. Stellenbosch Municipality future plan includes widening the R304 into a dual carriageway, enhancing traffic flow and reducing congestion. This property is part of this application; however, development will be confined to Farm No. 81/2, Stellenbosch Division.

The proposal entails:

The rezoning of Farm No. 81/2, Stellenbosch Division from **Agriculture and Rural Zone** to **Subdivisional Area** in terms of Section 15(2)(a) of the said Bylaw to allow for the following uses:

*(a) 1 x **Multi-Unit Residential Zone** erf (Portion A), and ±2,47ha in extent, for flats.*

*(b) 1 x **Multi-Unit Residential Zone** erf (Portion B), and ±3,55 ha in extent, for flats.*

*(c) 1 x **Public Road and Parking Zone** erf (Portion C), and ±3,44ha in extent, for public road purposes,*

*(d) 1 x **Public Road and Parking Zone** erf (Portion D), and ±0,63ha in extent, for public road purposes.*

*(e) 1 x **Public Open Space** erf (Portion E), and ±6,55ha in extent, for public open space purposes.*

(f) Farm No. 81/9, Stellenbosch Division, which is 0,83ha in extent for public road purposes.

The application relates solely to the rezoning of the property to a Subdivisional Area in order to facilitate the development of social housing (flats). At the time of submission, no final development proposal had been prepared. It was therefore resolved that the application would be undertaken in a phased manner, comprising firstly, the rezoning of the property; secondly, the subdivision thereof; and thirdly, the submission and approval of a Site Development Plan (SDP).

As part of the motivation, the consultant provided an indicative estimate of the number of residential units they intended to accommodate; however, this was presented for illustrative purposes only and did not constitute a definitive development proposal. The zoning scheme parameters (i.e. building lines, coverage, bulk, height, parking requirements, etc) will ultimately determine the number of flats that can be accommodated on the property. This will be determined in the Site Development Plan stage.

The concept plans indicate the inclusion of a small business component, crèche, and clubhouse, which were not part of the original planning motivation. It should be noted, however, that the Multi-Unit Residential zoning does not permit such uses. Accordingly, should the developer wish to incorporate these elements into the development, a separate and appropriate land use application will be required to obtain the necessary approvals.

3. <u>Summary of applicant's motivation</u>. See **ANNEXURE C** for motivation

a) Rapid urbanization has led to heightened pressure on existing infrastructure and housing resources, particularly for lower- and middle-income residents. As a result, there is a need for the proposed rezoning of the subject properties as it presents a strategic solution to addressing the Municipality's critical need for affordable housing,

b) The Stellenbosch Town Housing Market Study assesses the dynamics of the town's housing market to inform the development of a local inclusionary housing policy. The study was initiated to understand the residential property landscape, supply and affordability gaps. The study reveals a severe housing backlog, with approximately 11,396 households on the municipality's waiting list, many of whom have waited for more than a decade.

c) The shortage of affordable housing does not only affect long-term residents but also university students and employees from lower and middle-income brackets. The demand for affordable housing is exacerbated by high property prices, leaving a large portion of the workforce unable to secure formal housing.

d) The shortage has led to increased informal settlements and high demand in area like Kayamandi and Cloetesville.

e) Drawing on the experience of Kayamandi and Cloetesville, areas that have long faced housing shortages and infrastructure constraints, this development is poised to alleviate some of the existing pressure.

f) The proposed development will have significant economic and social benefits for Stellenbosch. Economically, it will drive local demand for services, retail and amenities, supporting small businesses and creating jobs, leading to a cycle of growth that enhances the town's economic resilience. Socially, the development will promote community cohesion by integrating affordable housing close to the urban core, fostering interaction across socio-economic groups. It will also provide housing stability for lower-income families, supporting the Municipality's goals of social justice and equitable urban development.

g) The proposal is aligned with the Stellenbosch Municipality's Integrated Development Plan (IDP) and Spatial Development Framework (SDF) both of which prioritise high-density, mixed-use developments to cater to the growing population in the Municipality.

h) The subject properties strategic position along the R304 corridor makes it a crucial gateway to opportunity for the people of Stellenbosch and its surrounding settlements.

i) With well-established transport routes nearby, the social housing project will offer its residents affordable, reliable mobility, helping them access employment, education and health care more efficiently.

j) The proposed development will harmonize with the surrounding landscape. It will encourage green building techniques and environmental sustainability, integrating eco-friendly materials and energy-efficient systems that contribute to the long-term sustainability of the area.

k) The aesthetic appeal of the development will extend beyond the buildings themselves to include landscaped public spaces, tree-lined street, and pedestrian walkways that enhance connectivity to neighbouring areas.

l) The Plankenburg River, which flows near the development, will serve as a focal point for beautification efforts, which plans for ecological restoration, public parks, and recreational spaces along its banks. This will not only enhance the quality of life for the residents but also elevate the broader aesthetic appeal of Stellenbosch's urban edge and encourage balance between environmental conservation and development.

m) The subject properties are located within the Adam Tas Corridor. The proposed development will contribute towards attracting investments and businesses, thereby contributing to the economic vitality of Stellenbosch and ensuring that the IDP's economic growth targets are realized.

n) The integration of the Social Housing Programme with broader urban development initiatives, such as the Adam Tas Corridor, is a critical aspect of the IDP.

o) All topographical and physical limitations, servitudes and natural drainage areas guided by professional studies have effectively been accommodated in the plans to ensure the feasibility of the development and to accommodate natural assets sensibly.

ASSESSMENT CHECKLIST			
CONSIDERATION CRITERIA	**YES**	**NO**	**Comments, if any**
Accurate intergovernmental and public participation process followed	x		The applicant has in terms of Section IV of the Stellenbosch Municipality Planning By-Law, advertised the application by sending e-mails to the interested and affected parties as well as external departments. The application was advertised in the Eikestad News and a notice was placed on the Stellenbosch Municipality planning portal. **Fifteen (15) objections** were received. See **ANNEXURE D** for objections and the applicant's comment on the objections received. **<u>The application was circulated to the relevant internal & external departments and the following departments gave comment</u>**:

			1. **The Manager: Electrical Services** supported the proposal subject conditions. See **ANNEXURE E** for memo dated 11 April 2025. 2. The **Department: Community Services (Environmental Planner)** supported the proposal subject to conditions. See **ANNEXURE F** for memo dated 24 April 2025. 3. The **Directorate: Infrastructure Services** supported the proposal subject to conditions. See **ANNEXURE G** for memo dated 12 March 2026. 4. The **Department of Environmental Affairs and Development Planning** gave comment. See **ANNEXURE H** for letter dated 25 April 2025. A Basic Assessment Report was submitted to DEAP, but the EA is still outstanding. See link below for BAR & specialist studies: • https://drive.google.com/drive/folders/1wxro8fzlONbo-POuidcFMG5Ds2FdZl9e?usp=sharing 5. The **Western Cape Department of Agriculture** supported the proposal. See **ANNEXURE I** for letter dated 19 June 2025. 6. The **Department of Agriculture Republic of South Africa** supported the proposal. See **ANNEXURE J** for letter dated 14 November 2025. 7. The **Department: Infrastructure** did not provide comment. An email dated 18 March 2026 from the Department of Infrastructure, indicating that they are currently finalizing their comments and conditions, is attached as part of **ANNEXURE G**. 8. **Heritage Western Cape** did not provide comment.
Conditions imposed by departments	X		The following departments, imposed conditions: 1. The **Manager: Electrical Services** (see **ANNEXURE E**).

			2. The **Department: Community Services** (see **ANNEXURE F**). 3. **Directorate: Infrastructure Services** (see **ANNEXURE G**)
DCs applicable		x	N/A
Objections received	x		See **ANNEXURE D** for objections received.
Proposal complies with applicable laws, policies, guidelines, the IDP and SDP and/or technical requirements in terms of Section 65			**1. <u>Spatial Development Framework</u>** The MSDF does not assign a specific spatial designation to the subject property. However, the site is strategically position within and adjacent to several key spatial-planning categories and investment areas. Specifically: a) it is located along an Activity Route (Bird Steet/R304) to the west; b) it forms part of an established Settlement Centre; c) it is bounded to the east by a railway line that includes a Proposed Light Rail Station; d) it is situated along the Adam Tas Corridor – a catalytic, high-density, mixed use infill development corridor; e) it lies within an existing urban residential neighbourhood with established bulk infrastructure; f) Stellenbosch Town is identified as priority investment area in the Capital Expenditure Framework; g) and it is proximate to Strategic Sites, Catalytic Projects, and Infill Opportunities identified in the municipal Housing Pipeline. The proposal demonstrates strong alignment with the Municipality's spatial vision, particularly in several key areas. It seeks to contain growth within the urban edge, thereby preventing urban sprawl, while directing housing opportunities into already established communities. The development also supports strategic densification and infill initiatives, optimising underutilized urban land and reinforcing the role and function of existing urban nodes.

Furthermore, the proposal directs development toward accessible locations that are well-connected to social, economic, and public transport nodes. It also introduces a variety of housing typologies designed to meet the needs of a diverse demographic, contributing to more inclusive and sustainable urban growth.

2. Stellenbosch Municipality Zoning Scheme Bylaw

The proposed zoning of Multi-Unit Residential allows for the high-density residential development such as flats. The following Zoning Scheme parameters are applicable of flats:

Street b/line	Common b/line	Max Coverage	Max Height	Floor Area
All levels: 4,5m	G/Floor: 4,5m 1st floor: 4,5m 2nd floor: 6m	50%	4 storeys	75%

Since the proposal only deals with the rezoning of the subject properties, the above will only be applicable once the application is at the site development stage.

It is important to note that the proposed zoning does not allow for a business component or a creche. With no final plan yet presented, other intended uses for the property, aside from the flats, remain unclear.

Urban Scenic Overlay Zone

The subject properties fall within the Urban Scenic Route Overlay Zone: Bird Street (R304) – USR4, situated at a

			prominent gateway into Stellenbosch. This overlay restricts development that would detract from scenic quality, disrupt the skyline, or fragment the visual landscape. The scenic character of the area is defined by: • Wide agricultural vistas that serve a visual backdrop to the urban edge. • Strong views towards the Stellenbosch Mountain range and the Pieke. • Treed hillsides that provide contrast and visual interest along the route. • A perceptive sense of openness within an emerging urban environment. To maintain and enhance visual continuity along this important gateway, the development should incorporate: • Heritage-informed urban design, refencing local materials, building typologies and landscape character. • Appropriate articulation, roof forms, materials and building proportions to reduce visual impact. • Passive surveillance and active edges to reinforce safe and vibrant public interfaces. • Public spaces that celebrate local identity, historical and community narratives, creating shared gathering spaces that strengthen place-making. The above must be assessed through a proper visual impact assessment to determine the most appropriate and effective mitigating measures. A visual impact assessment

			was not submitted, but a condition will be imposed in this regard for submission at SDP stage. Agricultural Considerations According to the Stellenbosch Environmental Management Framework (EMF), Farm No. 81/2, Stellenbosch Division is primarily designated for extensive agricultural use, supported by Urban Green Areas associated with the Plankenburg River. However, the property is not under active agricultural production, and the agricultural assessment indicates that the site's soil has low suitability for viable agricultural activities. Conversely, the farm's strategic location within an area designated for settlement expansion, mixed use infill development and restructuring (as identified in the municipal housing pipeline) strengthens its suitability for urban development that meets pressing social and economic needs. In this context, the transformation of the land from low-value agricultural use to a well-located social housing development aligns with broader spatial planning objectives aimed at promoting inclusive, efficient, and consolidated settlements patters. **3. Adam Tas Corridor** Although the subject properties fall just outside the formal Adam Tas Corridor which extends along Baden Powel Drive-Adam Tas Road-R304 they sit adjacent to Precinct 9 (George Blake) and Precinct 10 (Northern Extension): • Precinct 9 – characterised by small workshops, retail, industrial activities, and key transport facilities such as the Long-Distance Minibus Station and Du Toit Station. It is earmarked for high-density, mixed-use development (3-4 storeys). • Precinct 10 – functions as the northern gateway into Stellenbosch, predominantly residential with supporting

			commercial and retail uses. It is envisaged as a low-to-medium density residential area with varied typologies and building heights ranging from 2 to 4 storeys, with the greatest heights along the R304. Located directly between these precincts, the subject properties form a natural transition area that can reinforce the ATC's intensification logic and support mixed-use, affordable housing opportunities in a strategically accessible location. The proposal introduces medium-to-high-density one to four-storey units which remain compatible with the surrounding development pattern. While the development introduces increased densities, it is within an existing settlement footprint, close to community nodes, public transport, work opportunities and promotes compact growth and mixed-use development.

DESIRABILITY CONSIDERATIONS IN TERMS OF SECTION 65 OF THE BYLAW	
Socio-economic impact	The proposed development is expected to enhance living standards through the provision of stable and affordable housing. Such stability is likely to contribute to improved health outcomes and overall well-being among residents. In addition, reduced housing costs will support greater household financial stability, enabling residents to allocate a larger portion of their income toward essential needs such as food, education, and transport, thereby contributing to increased local economic activity. The development will also generate employment opportunities during both the construction and operational phases. Furthermore, it will assist in addressing socio-economic inequality by improving access for lower-income groups to well-located housing and associated opportunities.
Compatibility with surrounding uses	The application property is situated between Mount Simon Residential Estate to the north, the Kayamandi residential neighbourhood to the south, the Coetesville residential neighbourhood to the east, and Newinbosch and Redwood Estate to the west.

	Although the proposed development may comprise four-storey residential units, it is not expected to detract from the character of the surrounding area, as three-storey structures are proposed within Redwood and Newinbosch Estates. The area will therefore consist of a mix of building heights ranging from one to four storeys. Although the proposed development is considered compatible with the surrounding built environment, the height of the buildings (four storeys), particularly along the R304 interface, may result in a notable visual impact. The R304 currently affords views of the mountain range and surrounding landscape, and the introduction of the proposed development may alter or partially obstruct this visual amenity.
Impact on the external engineering services	As per the Capital Expenditure Framework (CEF) Stellenbosch Town is serviced by an established bulk network, including roads, water, sewer, stormwater, and electricity infrastructure which remains in good operational condition. The proposed development will connect directly to these municipal systems and any required upgrades to accommodate additional demand such as increased peak flows, pump-station capacity, stormwater attenuation, or localized electricity upgrades will be implemented in accordance with the Stellenbosch Municipality Engineering Services Department's conditions and recommendation. See **ANNEXURE G** for engineering comments. Also see **ANNEXURE K** for Bulk Services Report and Stormwater Management Report.
Impact on safety, health and wellbeing of the surrounding community	In terms of the Constitution of South Africa, which affirms the right of access to adequate housing, the proposed development is expected to have a positive impact on residents' health and wellbeing. Potential impacts such as dust, noise, and odours are anticipated to be limited to the construction phase. From a safety perspective, well-planned social housing can enhance security through increased residential density, improved passive surveillance, and the formalisation of underutilised land. In terms of health, the provision of adequate shelter and basic services (water, sanitation, and electricity) supports improved living conditions

	and public health outcomes. These benefits are reinforced by access to green spaces, pedestrian infrastructure, and public transport. Regarding wellbeing, the development can promote social inclusion, stability, and access to economic opportunities, particularly when located near employment areas and amenities, while fostering a sense of community. The dwellings in Mount Simon that directly abuts the application property are likely to be impacted in terms of views and privacy. Mitigation measures should be implemented to address and accommodate these impacts.
Impact on heritage	According to the Stellenbosch Heritage Inventory, no formal heritage studies exist for the subject properties, and the surrounding area is already substantially transformed. While the broader landscape exhibits scenic and cultural-historical value, the site holds limited intrinsic heritage or scenic sensitivity and has a development footprint that is already disturbed and fragmented. A field survey was undertaken by Umlando: Archaeological Surveys and Heritage Management on 08 November 2024 (See **ANNEXURE L** for revised Heritage Survey). No archaeological material was observed within the study area. Similarly, the Palaeontological Impact Assessment (PIA) noted that it was highly unlikely that fossiliferous material will be uncovered. If heritage and/or palaeontological material is observed during construction, a Chance Find Protocol must be initiated. There will be no direct impact on heritage resources as no heritage resources do occur within the study area. The study area forms part of a visually sensitive landscape that functions as a key gateway into Stellenbosch. It also falls within a high-heritage-sensitivity context due to its proximity to several heritage resources. In addition, the R304 (Bird Street) is identified as an Urban Scenic Route, requiring careful consideration of visual and aesthetic impacts.
Impact on the biophysical environment	As confirmed as part of the NEMA Applicability Checklist submission, there are no Critical Biodiversity Areas (CBAs) nor Ecological Support Areas (ESAs) on the property. Although the property is mapped as the

	Critically Endangered Swartland Granite Renosterveld (Cape Farm Mapper, 2022), the terrestrial vegetation on the site has been completely transformed from its natural state and no longer represents indigenous vegetation. Instead, the garden facilities on the site contains kikuyu grass and a mixture of exotic and indigenous garden plants. The site includes two freshwater systems; the Plankenburg River and the Klippies River both located along the eastern boundary, as well as a wetland situated northwest of Mount Simon Drive. These watercourses perform essential hydrological and ecological functions and provide ecosystem services and potential recreational value. In the Wetland Assessment it was recommended that the wetland and buffer be marked as a no-go zone during all phases of construction, as most of the impacts are likely to be during this stage. A relevant buffer of 15m was applied to the wetland system. See **ANNEXURE M** for the Wetland Assessment. The MSDF promotes the protection and rehabilitation of such watercourses and requires the maintenance of appropriate buffers to ensure ecological functioning and to enhance public access and continuity. The Plankenburg River, however, is heavily degraded due to upstream pollution and is identified as a high-risk area for human health. As a result, the site requires flood-risk management and stormwater attenuation measures.
Traffic impacts, parking, access and other transport related considerations	Access to Farm No. 81/2, Stellenbosch Division is currently provided via a single entrance off Mount Simon Drive, which connects to Bird Street (R304) and links further west into Kayamandi via Sokuqala Street. Mount Simon Drive is a Class 4 tarred road, accommodating single-lane vehicular movement in each direction. It includes a pedestrian crossing, traffic signals, and partially developed pedestrian walkways at the intersections with both the R304 and Sokuqala Street. Although functional, the existing road and pedestrian infrastructure in this area is incomplete and requires upgrading to support higher pedestrian volumes and future multimodal demand. The dualling of the R304 poses

	a significant risk to pedestrians crossing the road to access the Kayamandi business core, sports field and Kayamandi taxi rank. Public transport in Stellenbosch is primarily provided through informal minibus taxi services, which are the dominant mode for lower-income households. The proposed development is located withIN walking distance of the three key public-transport facilities, namely Kayamandi Taxi Rank; Kayamandi Long-Distance Taxi Rank and Du Toit Train Station. All three modal change facilities are located on the western side of the R304 requiring pedestrians to cross a very busy road without a grade separated crossing. A traffic impact assessment was conducted by Delta Built Environment Consultants (Pty) Ltd to evaluate the impact of the proposed development on the surrounding road network and determine whether it is necessary to implement road and/or intersection improvements. See **ANNEXURE N** for Traffic Impact Assessment. The site will have at least two main gated access points, a north gatehouse and a south gatehouse. The site features an internal road network that connects the residential block and recreational areas. Pedestrian pathways and a designated pedestrian walkway enhance walkability with the development. The proposed development provides 411 parking bays, whereas 1,224 bays are required in terms of the Stellenbosch Municipal Zoning Scheme By-law, resulting in a shortfall of 813 bays. The parking calculation will be addressed at the Site Development Plan (SDP) stage. Public transport in Stellenbosch is primarily provided through informal minibus taxi services which are the dominant mode for lower-income households. The proposed development is located within walking distance of three key public-transport facilities: Kayamandi Taxi Rank; Kayamandi Long-Distance Taxi Rank; and Du Toit Train Station. All three the modal change facilities are located on the western side of the R304 requiring pedestrians to cross a very busy road without a grade separated crossing.

	The analysis of the TIA revealed that the current road network and intersections generally operate at acceptable levels of services (LOS), except for intersections 5,6 and 7, which is performing at an unacceptable LOS. The following mitigation measures are recommended. However, the developer is not responsible for these upgrades, as the intersections are already operated at an unacceptable level of service without the development volumes. • **Intersection 5** mitigation measures: ► The traffic signal is recommended • **Intersection 6** mitigation measures: ► The traffic signal is recommended • **Intersection 7** mitigation measures: ► A revised signal timing plan must be introduced. Modify a through movement land on the southwestern leg to function as a shared through and left-turn land. • It is recommended that the pedestrian sidewalks be extended to seamlessly connect with the existing sidewalks along the R304.
Whether the imposition of conditions can mitigate an adverse impact of the proposed use or development of land	Conditions of approval will be imposed to mitigate the potential adverse impacts of the development.

OBJECTIONS RECEIVED AND CORRESPONDING REPLY BY APPLICANT (SEE ANNEXURE D)	
Make list with statements on responding comments from applicant on inputs/ objections insofar as matters are being addressed.	
Simone Stevenson; Caro Opperman; Anine Lawrence; Leanne Rocher; Christoff Snyman; JC Snyman; Jani Harmse; Elize Van Der Merwe; Chevonne Carstens; Megan Carstens; Jillian Donne Williams; Odelia Snyman; Marie Kruger	
Escalation of Criminal Activities/Potential Crime Spillover/Proximity of High-Crime Areas	
• The existing crime challenges in Cloetesville raise serious concerns about spillover effects. Adding 816 social housing units next to Mount Simon Estate may create opportunities for criminal elements to operate more easily, increasing the risk of burglaries, vandalism, and other disturbances spreading into the neighbourhood. There are already numerous incidents where police response is inadequate and residents are being targeted. • Established security measures and community vigilance are critical to maintaining safety. A dense housing development, with associated socio-economic pressures, could weaken these deterrents and create an environment perceived as more vulnerable to crime. The municipality cannot guarantee residents' safety. • SAPS is already under significant resource strain in addressing crime in Cloetesville. Expanding the population and service area may further reduce response capacity, leading to slower reaction times and less effective policing. • Many residents depend on established security networks and community-led initiatives. A large	• Crime is a complex socio-spatial issue, particularly in areas with informal settlements, youth unemployment, and poor infrastructure. The site near Kayamandi faces crime, social marginalization, and rapid informal growth. Vacant urban-edge land often becomes a hotspot for illegal dumping, land invasion, and gang and drug activity, posing safety risks—especially for women and children traveling long distances for services or transport. The development will implement the Crime Prevention Through Environmental Design (CPTED) principles which aim to reduce crime and improve safety through thoughtful planning. Proposed features include: ► *Natural surveillance – residential units are orientated toward public streets and spaces, allowing passive observation. The "eyes on the street" approach discourages crime and enhances community policing.* ► *Controlled access points – clearly defined entrances and pathways limit unauthorised movement and reduce the likelihood of opportunity crime.*

influx of new residents may undermine these systems. Given existing difficulties in maintaining safety in Cloetesville, this development risks creating further opportunities for criminal activity and increasing residents' vulnerability.	► *Public lighting and visibility – the integration of well-lit pedestrian routes and public spaces makes areas safer at night and reduces fear of crime.* ► *Clear boundaries – fencing has the potential to reduce anti-social behaviour by fostering a sense of ownership.* • Accredited Social Housing Institutions manage these developments as secure, access-controlled estates with on-site caretaking, formal leases, and community oversight.
Irreversible loss of green space/Environmental and Social impacts/Essential Community Green space • The green areas around Mount Simon Estate are vital community assets, providing recreational space, improving air quality, reducing urban heat, and enhancing overall quality of life. The proposed development threatens to replace these spaces with concrete, removing an important element of environmental and psychological well-being. • Green spaces support both mental and physical health by offering areas for exercise, relaxation, and social interaction. The loss will limit outdoor activities and remove a natural buffer against air and noise pollution, negatively impacting residents' health and quality of life. • These areas also play a key role in maintaining local biodiversity. The destruction could disrupt flora and fauna, contributing to environmental decline, poorer air quality, and challenges in water and climate regulation.	• Environmental protection remains a key priority and the development has undergone a formal environmental assessment process in line with the National Environmental Management Act and various departments. The following studies were conducted: *Wetland Assessment; Terrestrial Ecology Compliance Statement; Stormwater Management Plan; Heritage Impact Assessment; Floodline Report; and Geotechnical Investigate Report.* The recommendation of the assessments is as follows: ► *Avoid the most sensitive portions of the site, particularly areas closest to the river and containing intact Renosterveld.* ► *Implementing a biodiversity offset strategy, in line with provincial conservation guidelines, where avoidable impacts occur.*

• Beyond environmental benefits, the green spaces contribute to the aesthetic and cultural identity of Mount Simon Estate. Replacing them with development will diminish the area's character and long-term appeal to residents and potential buyers.	► *Limiting vegetation clearance to only areas needed for housing and services and restoring disturbed areas with appropriate indigenous vegetation.* ► *A minimum 32m buffer will be maintained between the development and the river.* ► *A detailed EMPr will guide construction near watercourses and sensitive areas/plant species to prevent erosion, pollution and eradication.* ► *Sustainable stormwater systems will be implemented to reduce runoff and siltation entering the river.* ► *Open space corridors within the project area will support ecological movement and reduce habitat fragmentation.* • This is not a typical profit-driven development, but a social housing initiative that places strong emphasis on integration, sustainability, and community benefit. The environmental aspects of the development have been carefully considered through formal processes, including environmental screening and specialist studies were required, to ensure that any potential impacts are mitigated. Moreover, social housing developments are planned with long-term sustainability in mind, incorporating green building principles, efficient land use, and accessible open spaces. The intention is not to displace valuable green areas but to develop responsibly within the urban edge, in line with spatial planning frameworks and environmental guidelines.

Broader implications for Community Cohesion and Property Value/Erosion of homeowners investments/Deterioration of neighbourhood reputation. • A large-scale social housing development next to a currently tranquil, well-maintained area may negatively affect the neighbourhood's reputation. Perceptions of increased crime and reduced green space could deter investment and lower property values, as buyers may associate the area with declining living conditions. • Introducing high-density housing into a predominantly owner-occupied estate may create a disconnect in expectations and resources, potentially leading to a fragmented community with reduced cooperation on safety and neighbourhood improvement. • A significant population increase will place additional strain on local services, including police and emergency responders, potentially reducing service quality and responsiveness. • Overall, the combined effects of increased crime risk and loss of green space may diminish quality of life, making the area less attractive for both current residents and prospective homeowners.	• A Bulk Engineering Assessment was undertaken to evaluate the capacity and availability of essential municipal infrastructure required to support the proposed development. This included an analysis of potable water supply, sanitation (wastewater), stormwater management, electricity distribution, and solid waste removal systems. The findings of the assessment confirm the feasibility of servicing the development and identify the infrastructure demands that Stellenbosch Municipality will needs to address to ensure that service provision remains adequate and unconstrained throughout.
Graham Bawden	
Impact on traffic • The R304 corridor is already heavily congested during peak hours, often backing up to the Welgevonden traffic lights. Adding 800 units to	•The TIA prepared comprehensively evaluated the potential impact of the proposed residential

this bottleneck—one of the main access routes into Stellenbosch—will significantly worsen traffic. • Due to limited public transport, most households are likely to have more than one vehicle, meaning 800 units could add around 1,200 cars to the road. This is further compounded by the impact of the Redwood and Newinbosch developments, which will increase traffic volumes even more.	development on the surrounding network. Key findings and recommendations included: ► The development is expected to generate approximately 136 trips during both AM and PM peak hours, which is considered moderate for a residential development of this scale. ► *The intersection of R304 and Mount Simon Drive, currently operating at a poor level of service, will be upgraded to a signalized intersection. This upgrade will significantly improve flow and safety during peak periods, ensuring the road network can accommodate current and future traffic volumes.* ► *Sufficient on-site parking is provided in line with Stellenbosch Municipality zoning requirements, reducing the likelihood of spillover parking into adjacent areas.* • The study proposes access points along Mount Simon Drive to accommodate both light and heavy vehicles, with appropriate pedestrian infrastructure including 2,0m sidewalks and safe crossing points. • The TIA concludes that with the proposed upgrades and access design, the development can be accommodated without causing undue congestion or compromising road safety. • The Kayamandi Taxi Rank, located near the proposed development site, serves as a key public transport hub, providing regular access to the Stellenbosch CBD and surrounding areas. The development's proximity to this facility supports the promotion of public transport use and aligns with

	principles of integrated planning. Social housing in this context is not only about providing accommodation but also serves as a strategic tool to promote well-designed, inclusive urban development and spatial transformation. By situating the project near existing transport infrastructure, the proposal enhances accessibility, reduces dependency on private vehicles and contributes positively to the broader development of the area.
Over densification • This development will over-densify the corridor, with 800 units added alongside Mount Simon, opposite Kayamandi, and near the Newinbosch and Redwood developments. This level of concentration is excessive for an area served by a single main access route into a major city.	• While the scale of the development is substantial, it is deliberately located within a planned growth corridor and will be supported by infrastructure upgrades and responsive design interventions. The amendment of the Site Development Plan will directly address concerns regarding over-densification, ensuring that the final layout aligns with the evolving nature of the area and broader urban planning goals.
Loss of green lungs and open space •The open field next to Mount Simon serves as an important green space and recreational area. It is regularly used for informal soccer, particularly in the evenings, and replacing it with a single formal club will reduce access for social players. • In summer, the shaded areas are popular with picnickers and dog walkers—amenities that will be lost if the development proceeds.	• With regard to the existing open space, the intention is not to eliminate recreational use of the area, but rather to formalize, diversify, and manage it more sustainably. The development will include publicly accessible green space, social amenities, and recreational infrastructure that continues to serve local communities; providing a safe, inclusive environment that supports both housing and quality of life.
Impact on natural environment	

• The environmental impact of this development is being understated. The open area next to Mount Simon supports local wildlife, including mongoose, herons, plovers, as well as birds of prey such as eagles and owls that rely on the tall trees for shelter. • These trees also provide essential shade for residents in summer. Removing them for development would result in a significant loss of habitat and community amenity and should not be supported.	• The environmental sensitivity of the site and its role in supporting local fauna and flora has been carefully assessed as part of the basic assessment report and related environmental investigations in terms of NEMA. The development has been informed by specialist environmental input and steps will be taken to ensure that the design and implementation minimize habitat disruption, retain significant vegetation where possible, and provide structured, ecologically sensitive public spaces. While it is true that some transformation of the land is required, the development seek to balance human settlement needs with environmental stewardship. This will be achieved by: ► *Retaining as much natural vegetation and canopy cover as possible within designated open spaces.* ► *Introducing indigenous landscaping and urban greening initiatives as part of the final design.* ► *Incorporating buffer zones to allow for protection of the water courses and sensitive areas/plant species.* ► *Implementing the EMPr will guide construction near watercourses and sensitive areas/plant species to prevent erosion, pollution and eradication.* While change to the landscape is inevitable, it will be undertaken in a responsible regulated, and environmentally conscious manner.
Crime	

• This development is proposed in an area already affected by crime. Cloetesville experiences gang activity, and residents regularly report hearing gunshots at night. Introducing a large new development without clear, effective safety and policing measures may worsen existing challenges and increase risks for surrounding communities.	• History shows that excluding people from access to well-located housing only deepens inequality, spatial segregation, and social instability. Formal housing promotes: ► *A stronger sense of community ownership.* ► *Reduce informal sprawl into unmanaged land.* ► *Safer, better-managed urban environments.* ► *Improved visibility, service delivery, and law enforcement presence.* Concerns about crime and safety are valid and shared by Urban Planners, the Municipality and the community. However, this proposed development is part of the solution – not the problem. It contributes to long-term urban stability, better housing conditions, and infrastructure improvements, which are essential to reducing unrest and building safer, more integrated communities.
Crime choke point • There have been multiple protests in Kayamandi that have led to closures of the R304, a key route for traffic from Brackenfell and the N1. This corridor is already a major choke point, and further densification will increase pressure on it. • Without proper traffic and contingency planning, additional development may heighten the risk of disruptions, making road closures more impactful and causing wider congestion and instability for commuters.	Already addressed.
Valme Kelfkens	

Wetlands and established trees • Have the required environmental authorizations in terms of NEMA been obtained? EMPr need to be shared with the objector.	• An Environmental Impact Assessment report was repaired as part of the Basic Assessment Report. It is still being reviewed by DEADP. Through careful design, implementation of specialist recommendations, and long-term environmental oversight, the project will limit negative impacts while delivering lasting socio-economic benefits.
• What will be done to improve the local infrastructure and services, specifically the Mount Simon Drive Road, and sewerage. Based on the volume of people there will be substantial increase in traffic, and the road in its current state cannot accommodate such traffic volumes.	• The TIA prepared comprehensively evaluated the potential impact of the proposed residential development on the surrounding road network. The TIA concludes that with the proposed upgrades and access designs, the development can be accommodated without causing undue congestion or compromising road safety. • A Bulk Engineering Services Assessment was undertaken to evaluate the capacity and availability of essential Municipal Infrastructure required to support the proposed development. The findings of the of the assessment confirm the feasibility of servicing the development and identifying the infrastructure demands that Stellenbosch Municipality will need to address to ensure that service provision remains adequate and unconstrained throughout.
• Have other development options as alternatives to the social housing been considered. If so, what options were considered and why were these rejected.	• The proposed development is policy-aligned and will aim to achieve the following: ► *The site is within a restructuring zone, where state-subsidized rental housing is explicitly encouraged.* ► *There is a significant demand for well-located, affordable rental units for working-class residents and students in Stellenbosch.*

	► *Social housing enables higher residential densities in a planned, managed, and regulated environment.* ► *It promotes spatial equity and integration, directly contributing to SPLUMA principles and the Municipality's Human Settlements Strategy.* • Social housing is not government-subsidized ownership housing, nor does it represent temporary or informal shelter. Rather, it is a permanent form of well-located and professionally managed rental accommodation for working individuals and households with low to moderate incomes. Tenants by monthly rentals contribute to the ongoing sustainability and maintenance of the development, and the development as a whole contributes to the Municipal rates base, supporting local services and infrastructure. In this case, development forms part of a broader vision to create a more inclusive, integrated urban environment and plays a key role in transforming historically underutilized land into vibrant, functional neighborhoods.
Stellenbosch Interest Group	
• This stretch of land along the R304 gateway to Stellenbosch is not suitable for the development of eleven bulky four-storey apartment blocks as proposed. The R304 is one of the main access routes to Stellenbosch. From the junction of the Welgevonden Boulevard to the Kayamandi Bridge, it offers uninterrupted views of the rural area against the backdrop of mountains east of the R44. These views have been respected by all existing developments to the east of the road by the application of height restrictions. Visual	None

impact studies were required as a prerequisite for approval of these developments. • The proposed apartment blocks will be in stark contrast to the single storey Mount Simon development immediately to the north of the site. The excessive height and bulk of the blocks a few meters away from the edge of the street will erode the sense of place of the town and visually disrupt the physical beauty of the entrance to the town. • To reduce the visual impact of the bulky structures, the height of the blocks nearest the road should be limited to a maximum of two storeys. Additionally, for the benefit of future apartment residents, a solid wall should be constructed along the western boundary of the development. The wall should be flanked by vegetation -preferably trees – on both sides, similar to the approach of Mount Simon, to help absorb and reduce traffic noise from the adjacent road.	
• The current internal layout does not make optimal use of the available space; for example, the inclusion of passages results in unnecessary wasted space. To improve effective use of space, all unit entrances should open directly into the living area, with access to adjoining rooms provided from this central space.	
• We strongly urge that more space for social housing will be made available on the land adjacent to Kayamandi which was bought by the Municipality from the late Stefan Smit a couple of years ago.	

Assessment of objections

The principal matters highlighted in the submitted objections are summarized below:

i) ***Escalation of Criminal Activities/Potential Crime Spillover/Proximity of High-Crime Areas***

Crime is unfortunately a common occurrence across South Africa and there is a common perception that social housing developments are associated with increased crime. However, evidence suggests that this association is influenced more by social, economic, and design factors than by the housing typology itself. In South Africa, social housing primarily caters to low- to moderate-income households. More specifically:

- *Low-income households: Typically earning between R3,501 and R7,000 per month.*
- *Moderate-income households: Usually earning between R7,001 and R15,000 per month.*

Poorly planned or high-density social housing can contribute to crowding, limited communal spaces, and insufficient natural surveillance, which may create opportunities for petty crime. Conversely, developments designed with principles of passive surveillance, adequate lighting, and well-maintained public spaces can reduce crime risks and enhance safety. These developments are typically managed by government-supported or accredited institutions. It is designed to offer safe, well-located, and regulated housing options for those who might not afford private market housing. Social housing does not inherently lead to increased crime. Appropriate design, management, and the provision of supporting infrastructure are critical to ensuring that these developments contribute positively to community safety and wellbeing.

ii) ***Irreversible loss of green space/Environmental and Social impacts/Essential Community Green space***

Farm No. 81/2, Stellenbosch Division, has been rezoned for Agriculture and Rural purposes and was not intended to serve as public open space for the surrounding areas . In accordance with standard planning practice, each development is designed to provide its own designated green spaces to accommodate the recreational needs of its residents, as is the case with Nuutgevonden Estate. Notwithstanding this, it is acknowledged that residents of the surrounding area currently utilize the property for informal recreational purposes.

The subject portion of land is currently in degraded condition. The proposed development, through careful planning, appropriate siting and scale of the flats, and the rehabilitation of the wetlands and the Plankenburg River, will enhance the visual quality and overall character of the area. All requisite environmental studies have been undertaken to ensure that the natural environment is protected and, where possible, improved.

iii) ***Impact on traffic***

A new development will typically result in an increase in traffic within the surrounding area, as it generates additional vehicle trips. The extent of this impact depends on factors such as the scale and nature of the development, existing road capacity, and background traffic conditions.

A Traffic Impact Assessment (TIA) was conducted by Delta Built Environment Consultants (Pty) Ltd to evaluate the impact of the proposed development on the surrounding road network and determine whether it is necessary to implement road and/or intersection improvements. According to the Stellenbosch Municipality Roads Master Plan 2022 update, traffic modelling result indicate that the R304 (Koelenhof Road) requires upgrading to a dual carriageway between the R44 and Bottelary Road.

The Traffic Impact Assessment (TIA) indicates that the existing road network and associated intersections generally operate at acceptable Levels of Service (LOS), with the exception of Intersections 5, 6, and 7, which currently function at an unacceptable LOS (refer to the Annexure for a copy of the TIA). While the TIA recommends that certain upgrades be implemented, these interventions are not attributable to the proposed development, as the affected intersections already operate at an unacceptable level of service under existing traffic conditions, independent of the development-generated volumes.

iv) **Strain on Services**

A Bulk Engineering Services Assessment was undertaken to evaluate the capacity and availability of essential Municipal Infrastructure required to support the proposed development. The findings of the assessment confirm the feasibility of servicing the development and identifying the infrastructure demands that Stellenbosch Municipality will need to address to ensure that service provision remains adequate and unconstrained throughout.

v) **Over densification**

The subject properties form a natural transition area that can reinforce the ATC's intensification logic and support mixed-use, affordable housing opportunities in a strategically accessible location. The proposal introduces medium-to-high-density one to four-storey units which remain compatible with the surrounding development pattern. While the development introduces increased densities, it is within an existing settlement footprint, close to community nodes, public

transport, work opportunities and promotes compact growth and mixed-use development. The property also forms part of the housing pipe and is identified as a restructuring zone.

It is also important to note that the proposed development is subject to applicable development controls, including building lines, site coverage, height restrictions, and parking requirements, which will ultimately determine the permissible number of units that may be accommodated on the property.

vi) **Impact on natural environment (Wetlands/Established trees)**

The proposed development is positioned just above the 1:100 year floor line and within 32m of a watercourse, risking altering the functioning of the river system and ecological functioning. Approximately 6,51ha of CBA1 vegetation is expected to be cleared for residential development, exacerbating habitat fragmentation within an irreplaceable ecological system. The development therefore triggers an Environmental Impact Assessment (EIA), and all specialist findings and mitigation measures must be rigorously considered to prevent irreversible impacts on ecosystem integrity.

vii) **Other development options**

No other property or site alternatives were considered in this assessment, as the site had already been deemed suitable in terms of spatial planning. It should be noted that the Stellenbosch Municipal Spatial Development Framework supports the development of inclusive infill on vacant public land. The Municipality has identified that Restructuring Zones can help achieve the goal of providing social housing and bringing lower-income residents closer to urban economic opportunities. Therefore, the area proposed for development or rezoning falls within the sites designated for restructuring or rezoning along the R304. This area was also identify in the Housing Pipeline for social housing purposes.

viii) **Visual impact**

A Visual Impact Assessment (VIA) to identify potential impacts on key views and vistas of the town and surrounding mountain ranges will be submitted at SDP stages. Based on the VIA findings, appropriate mitigation measures, design guidelines, and landscaping plans must be prepared and implemented. The development's design guidelines must also comply with the Adam Tas Corridor Urban Design Guidelines, including height controls (1–4 storeys), building massing and articulation, roof forms, and a material and colour palette sensitive to the scenic-route context as it forms part of the bigger ATC vision.

KEY FINDINGS OF PLANNING EVALUATION

After having independently considered and weighted all the relevant information the evaluation of the subject land use and land development application concludes that:

1. The purpose of this application is to secure the necessary land use rights to enable the Municipality to develop a sustainable medium- to high-density human settlement development, consisting of 1- to 4-storey walk-up buildings, intended for social housing. This phase of the application specifically addresses the rezoning of Farm No. 81/2, Stellenbosch Division, to a Subdivisional Area to establish an overlay zone. A separate subdivision application, to be prepared by another consultant, will be submitted at a later stage.

2. The subject property is situated between the Kayamandi and Cloetesville settlements. Its western boundary is defined by the R304, while the railway line forms the eastern boundary, with the Plankenburg River running along this edge. The site also contains environmentally sensitive features, including a wetland area and a portion of the Plankenburg River.

3. The application pertains solely to the rezoning of the property to a Subdivisional Area to facilitate the future development of social housing (flats). At the time of submission, no detailed development proposal had been prepared. It was therefore resolved that the application would be undertaken in a phased approach, comprising: firstly, the rezoning of the property; secondly, the subdivision thereof; and thirdly, the submission and approval of a Site Development Plan (SDP).

4. The concept plans reflect the inclusion of a business component, crèche, and clubhouse, which were not contemplated in the original planning motivation. It should be noted that the Multi-Unit Residential zoning does not permit these uses. Accordingly, should the developer wish to incorporate such elements into the development, a separate and appropriate land use application will be required to obtain the necessary approvals.

5. The proposed development will yield significant economic and social benefits for Stellenbosch. It will stimulate local demand for services and retail, support small businesses, and create employment opportunities, thereby strengthening the local economy. Socially, it will promote community integration by providing affordable housing near the urban core, fostering social cohesion and supporting the Municipality's objectives of social justice and equitable urban development.

6. The proposal aligns with the Stellenbosch Municipality's Integrated Development Plan (IDP) and Spatial Development Framework (SDF), both of which prioritise higher-density, mixed-use development to accommodate the Municipality's growing population.

7. The MSDF does not assign a specific spatial designation to the subject property; however, the site is strategically positioned within and adjacent to several key spatial planning categories and investment areas.

8. The subject property falls within the Urban Scenic Route Overlay Zone: Bird Street (R304) – USR4, located at a prominent gateway into Stellenbosch. This overlay restricts development that may detract from scenic quality, disrupt the skyline, or fragment the visual landscape. The proposal must be assessed through a proper visual impact assessment to determine the most appropriate and effective mitigating measures.

9. According to the Stellenbosch Environmental Management Framework (EMF), Farm No. 81/2, Stellenbosch Division is primarily designated for extensive agricultural use, with Urban Green Areas associated with the Plankenburg River. However, the property is not actively farmed, and the agricultural assessment indicates low soil suitability for viable agricultural production. In contrast, the site's strategic location within a bigger area earmarked for settlement expansion, mixed-use infill, and restructuring (as identified in the municipal housing pipeline) supports its suitability for urban development to address pressing social and economic needs.

10. The subject property lies just outside the formal Adam Tas Corridor, adjacent to Precinct 9 (George Blake) and Precinct 10 (Northern Extension). Positioned between these precincts, the site forms a natural transition area that can reinforce the ATC's intensification strategy and support mixed-use, affordable housing in a strategically accessible location.

11. The proposed development is expected to improve living standards by providing stable, affordable housing, which in turn can enhance residents' health and overall well-being.

12. The development will also generate employment opportunities during both the construction and operational phases.

13. The application property is located between Mount Simon Residential Estate to the north, Kayamandi to the south, Cloetesville to the east, and Newinbosch and Redwood Estate to the west, making it compatible with the surrounding area.

14. The proposed development will connect directly to the municipal services, and any necessary upgrades—such as increased peak flow capacity, pump station enhancements, stormwater attenuation, or localized electricity improvements—will be implemented in accordance with the conditions and recommendations of the Stellenbosch Municipality Engineering Services Department.

15. The development can promote social inclusion, stability, and access to economic opportunities, particularly when located near employment areas and amenities, while fostering a sense of community.

16. According to the Stellenbosch Heritage Inventory, no formal heritage studies exist for the subject properties, and the surrounding area is already substantially transformed.

17. A draft Basic Assessment report was submitted but Environmental Authorisation is still outstanding.

18. A Traffic Impact Assessment (TIA) was conducted by Delta Built Environment Consultants (Pty) Ltd to evaluate the impact of the proposed development on the surrounding road network and determine whether it is necessary to implement road and/or intersection improvements. The TIA recommends that certain upgrades be implemented.

19. The proposed development is located within walking distance of three key public-transport facilities.

20. Fifteen (15) objections were received and have been addressed throughout this report.

21. A Visual Impact Assessment (VIA) to identify potential impacts on key views and vistas of the town and surrounding mountain ranges, needs to be submitted.

22. The subject property features the Plankenburg River running north to south along its eastern boundary. The associated waterbodies, including the river and wetland, have been designated as "no-go" areas. These areas will remain undeveloped and will instead be incorporated into the landscaping of the site.

The subject land use and land development application is, having regard to the conclusions above, viewed as Consistent with the Stellenbosch By-laws and policies and consequently grounds for the support of the subject land use and land development application.

List relevant plan numbers	**Proposed Concept/Phasing Plan for Subdivisional Area Drawing No. 202408-RE.PTN2&9_F.81-REV2, dated 03 February 2026, and drawn by Nkanivo Development Consultants**
List annexures to report	**ANNEXURE A: LOCALITY PLAN** **ANNEXURE B: SUBDIVISIONAL AREA PLAN** **ANNEXURE C: APPLICANT'S MOTIVATION REPORT; POA; TITLE DEED** **ANNEXURE D: OBJECTIONS RECEIVED & COMMENT ON OBJECTIONS**

	ANNEXURE E: COMMENT FROM THE MANAGER: ELECTRICAL SERVICES **ANNEXURE F: DEPARTMENT: COMMUNITY SERVICES (ENVIRONMENTAL PLANNER)** **ANNEXURE G: COMMENT FROM THE DIRECTORATE: INFRASTRUCTURE SERVICES** **ANNEXURE H: COMMENT FROM THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING** **ANNEXURE I: COMMENT FROM WESTERN CAPE DEPARTMENT OF AGRICULTURE** **ANNEXURE J: COMMENT FROM THE DEPARTMENT OF AGRICULTURE REPUBLIC OF SOUTH AFRICA** **ANNEXURE K: BULK SERVICES REPORT AND STORMWATER MANAGEMENT REPORT** **ANNEXURE L: HERITAGE SURVEY OF THE PROPOSED DEVELOPMENT** **ANNEXURE M: WETLAND ASSESSMENT** **ANNEXURE N: TRAFFIC IMPACT ASSESSMENT**

RECOMMENDATION

1. That the application in terms of Section 15(2)(a) of the Stellenbosch Municipality Land Use Planning By-Law, 2024 for a:

   1.1 Rezoning of Farm No. 81/2, Stellenbosch Division from **Agriculture and Rural Zone** to **Subdivisional Area** in terms of the said Bylaw to allow for the following uses:

   (a) *1 x **Multi-Unit Residential Zone** erf (Portion A), and ±2,47ha in extent, for flats.*

   (b) *1 x **Multi-Unit Residential Zone** erf (Portion B), and ±3,55 ha in extent, for flats.*

   (c) *1 x **Public Road and Parking Zone** erf (Portion C), and ±3,44ha in extent, for public road purposes,*

   (d) *1 x **Public Road and Parking Zone** erf (Portion D), and ±0,63ha in extent, for public road purposes.*

*(e) 1 x **Public Open Space** erf (Portion E), and ±6,55ha in extent, for public open space purposes.*

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 proposal under consideration, attached as **ANNEXURE B** 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 development be undertaken in accordance with the subdivisional area plan as referenced **Proposed Concept/Phasing Plan for Subdivisional Area Drawing No. 202408-RE.PTN2&9_F.81-REV3, dated 26 February 2026, and drawn by Nkanivo Development Consultants** and attached as **ANNEXURE B**.

2.3 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.

2.4 A detailed Subdivision Plan, inclusive of street names and numbering, and a phasing plan, as well as a Consolidation Plan for the consolidation of Farm No. 81/9 and Portion C, shall be submitted for approval, and the subdivision plan shall provide for a 5,0m wide sewer line servitude along the western boundary of the site (abutting the R304), to be registered in favour of the Municipality in order to protect the existing bulk sewer line.

2.5 A detailed Site Development Plan as contemplated in terms of Section 16 of the Zoning Scheme Bylaw be submitted to the Municipality and be approved prior to the submission of any building plans, which site development plan satisfactorily addresses, but are not necessarily limited to, all the conditions of this approval, compliance with relevant development parameters of the said Bylaw, any relevant matters relating to Section 16(4) of the said Bylaw. The following matters should also be addressed as part of the site development plan:

2.5.1 *A Landscaping Plan for the development that also includes a replanting plan for the matured pine trees to be removed and those to be planted in accordance with the provisions in the ATC guidelines, be submitted for approval.*

2.5.2 *The development be guided by the findings and recommendations of a visual impact assessment addressing the preservation of key views and vistas, as well as appropriate design and landscaping measures.*

2.5.3 The *design for the development adhere to the Adam Tas Corridor Urban Design Guidelines, considering height controls (1-4 storeys), massing articulation and roof forms, and material and colour palette sensitive to the scenic-route context.*

2.6 The conditions imposed by the **Manager: Electrical Services** as contained in their memo dated 11 April 2025, attached as **ANNEXURE E**, be complied with.

2.7 The conditions imposed by **Department: Community Services (Environmental Planner)** as contained in their memo dated 24 April 2025, attached as **ANNEXURE F**, be complied with.

2.8 The conditions imposed by **Directorate: Infrastructure Services** as contained in their memo dated 12 March 2026, attached as **ANNEXURE G**, be complied with.

2.9 Any conditions stated by the **Department of Infrastructure** (Provincial Roads Engineer) be considered with the subdivision application and be complied with.

2.10 The development must be carried out in accordance with an Environmental Management Plan (EMP), which must be finalised and approved before any building plans are approved. The developer or owner is responsible for remedying, to the satisfaction of the Directorate: Community & Protection Services, any environmental damage resulting from non-compliance with the EMP.

2.11 No development or infrastructure be placed within the 15m watercourse buffer, except where supported by specialist studies and approved by environmental authorities.

2.12 The water quality and risk to potential residents must be confirmed and rehabilitated and integrated as part of the Green-Blue Infrastructure Network as the Plankenburg River is currently severely polluted and regarded as a health risk.

2.13 The land use activities may not create any undue noise or be a nuisance to the neighbourhood and that precautionary measures be taken to avoid environmental noise pollution in terms of the Western Cape Noise Control Regulations, 2013, PN. 200/2013 made in terms of Section 25 of the Environmental Conservation Act, 1989 (Act No 73 of 1989).

2.14 The approval will lapse if not exercised within ten (10) years from date of final notification

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

3.1 The property is located within the approved urban edge, where the MSDF promotes compact settlement, strategic infill, and higher-density residential opportunities along major mobility routes to curb urban sprawl and improve land use efficiently.

3.2 The site is located along Bird Street/R304, an Activity Route with strong vehicular, public transport and NMT connectivity, supporting intensification in proximity to transport corridors.

3.3 The properties are situated between ATC Precincts 9 and 10, both envisaged for high-density, mixed-use intensification, positioning the site within an emerging, well-connected, mixed-use urban district.

3.4 The proposed residential typologies (one to four storeys) are compatible with the adjacent medium- to high- neighbourhoods of Kayamandi, Cloetesville and Mount Simon.

4. Matters to be noted

4.1 The necessary authorization/permission in terms of NEMA need to BE OBTAINED from the **Department of Environmental Affairs and Development Planning.**

ASSESSMENT RECOMMENDATION BY TOWN PLANNER

The proposed land use and land development application has been duly evaluated in terms of process and desirability with the recommendation for consideration.

Name: Louisa Engelbrecht
Capacity: Senior Town Planner
Signature: Engelbrecht
Date: 09/04/2026

REVIEW OF ASSESSMENT AND RECOMMENDATION

The recommendation for decision is hereby submitted for consideration to the authorised decision-maker in accordance with the System of Delegations OR Categorisation Model approved in terms of Section 69 of the said Bylaw vide Item 11.8.1 dated 24 May 2023.

Category / Delegation Item Number: A5

Decision Making Authority: MPT

Rational: Application on initiative of Council or on Council owned land.

Name: Stiaan Carstens
Capacity: SMM
SACPLAN Registration: A/1551
Signature:
Date: 9/4/2026

MPT ADMINISTRATION OF PLANNING APPLICATION ASSESSMENT REPORT

Administrator to Stellenbosch Municipal Planning Tribunal:

It is hereby confirmed that proper notice was served of the Municipal Planning Tribunal meeting at which this land use and land development application will serve for consideration.

The land use and land development application will serve at the scheduled meeting of the Stellenbosch Municipal Planning Tribunal on:

Date: .....

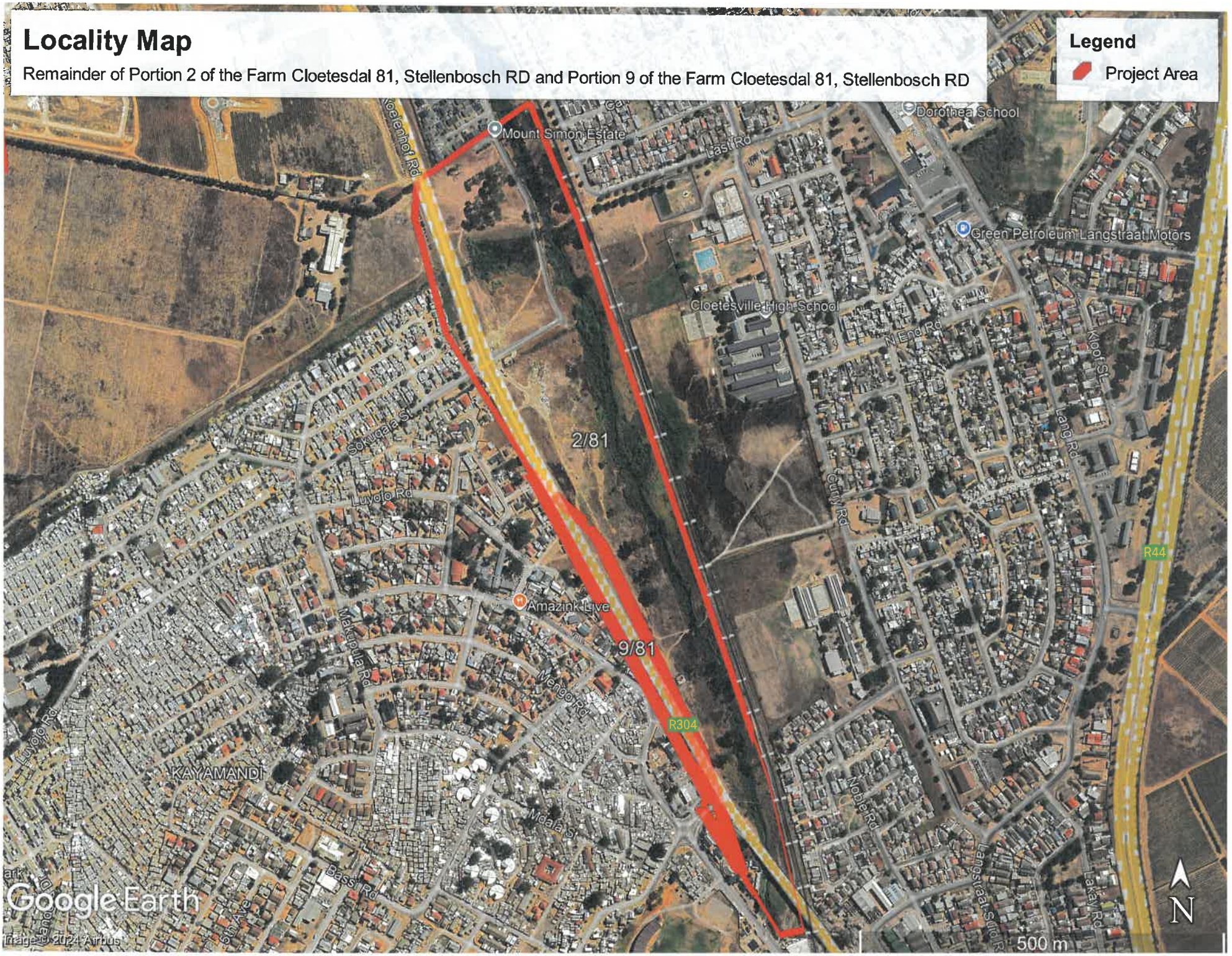
Name: Chrizelle Kriel
Capacity: Manager
Signature:
Date: 09-04-2026

ANNEXURE A

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

LOCALITY PLAN


Locality Map
Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD and Portion 9 of the Farm Cloetesdal 81, Stellenbosch RD
Legend
Project Area
Mount Simon Estate
Dorotheea School
Green Petroleum Langstraat Motors
Cloetesville High School
2/81
9/81
Amazink Live
R304
R44
KAYAMANDI
Google Earth
500 m
N

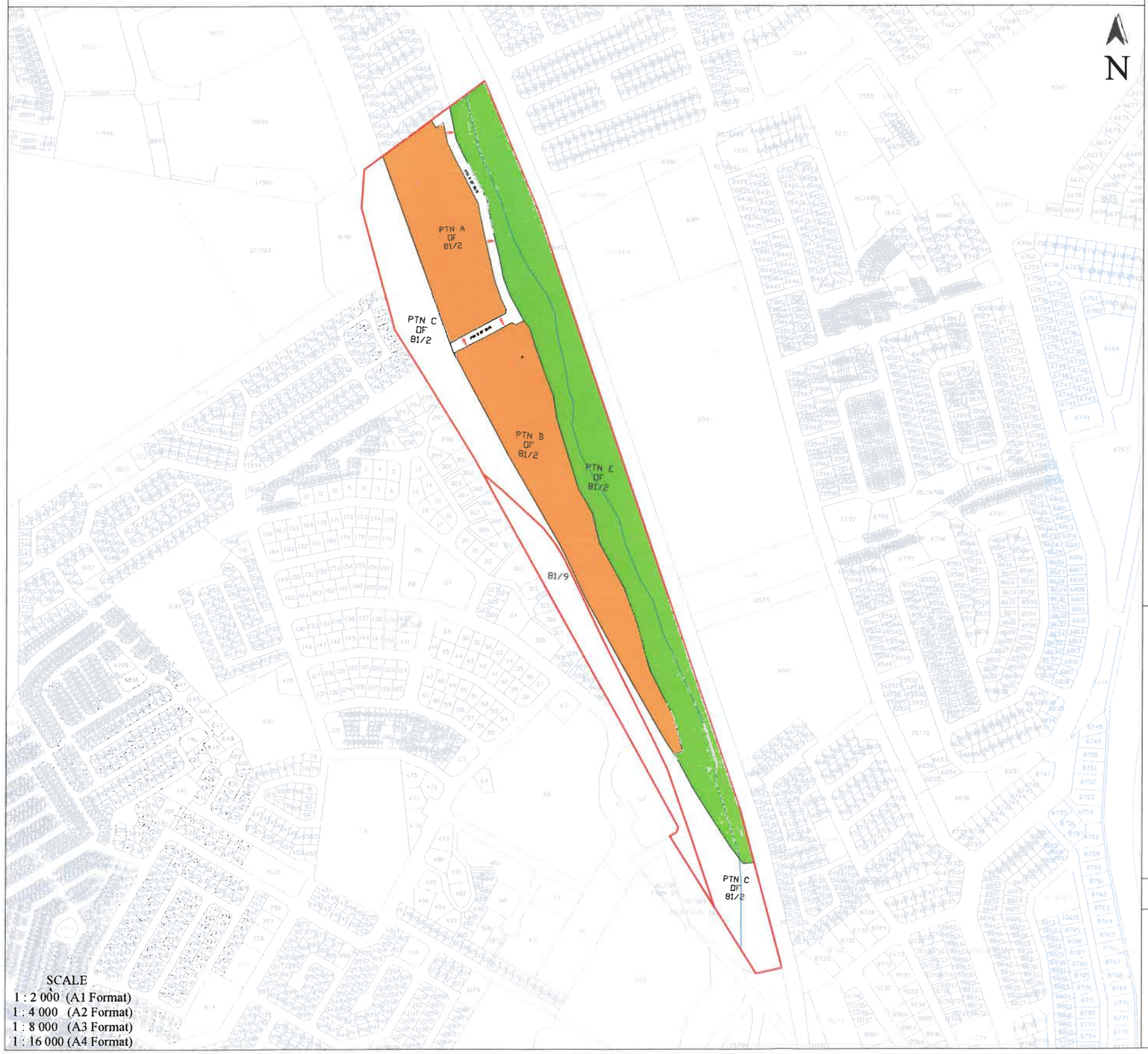
ANNEXURE B

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

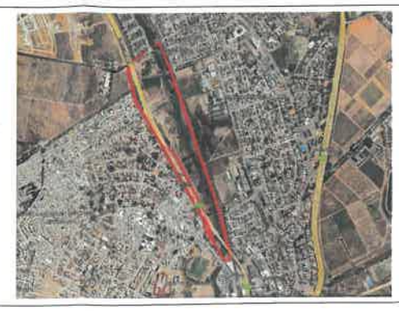
SUBDIVISIONAL AREA PLAN

PROPOSED CONCEPT / PHASING PLAN OF REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL NO. 81



SCALE
1 : 2 000 (A1 Format)
1 : 4 000 (A2 Format)
1 : 8 000 (A3 Format)
1 : 16 000 (A4 Format)

LOCALITY MAP



LEGEND

ZONING (PROPOSED ZONING)	LAND USES	NO. OF ERF	PHASE	NO. OF UNITS	AREA (HA)	AREA (%)	ZONE
MULTI-UNIT RESIDENTIAL	VACANT	PTN A OF 81/2	1	436	2,47	14,14	
MULTI-UNIT RESIDENTIAL	VACANT	PTN B OF 81/2	2	380	3,55	20,32	
PUBLIC ROAD AND PARKING	ROAD	PTN C OF 81/2	-	-	3,44	19,69	
PUBLIC ROAD AND PARKING	ROAD & PARKING	PTN D OF 81/2	-	-	0,63	3,61	
PUBLIC OPEN SPACE	RIVER	PTN E OF 81/2	-	-	6,55	37,49	
PUBLIC ROAD AND PARKING	ROAD	81/9	-	-	0,83	4,75	
			TOTAL	816	17,47 HA	100%	

NOTES:

- Represents the Parent Farm
- Represents the Proposed Portions
- Represents the River

CLIENT: STELLENBOSCH MUNICIPALITY

STELLENBOSCH
STELLENBOSCH • JNIEL • FRANSCHHOEK
MUNISIPALITEIT • UMASIPALA • MUNICIPALITY

CONSULTANTS	NAME	SIGNATURE
NKANIVO DEVELOPMENT CONSULTANTS	SAMUEL CHAUKE	

DESIGNED: OARABILE MODIBE C.Pln C/10028/2024
CHECKED: SAMUEL CHAUKE Pr.Pln A/3130/2022
DRAWING No: 202408-RE PTN2&9 _F.81-REV3
DATE: 26/02/2026

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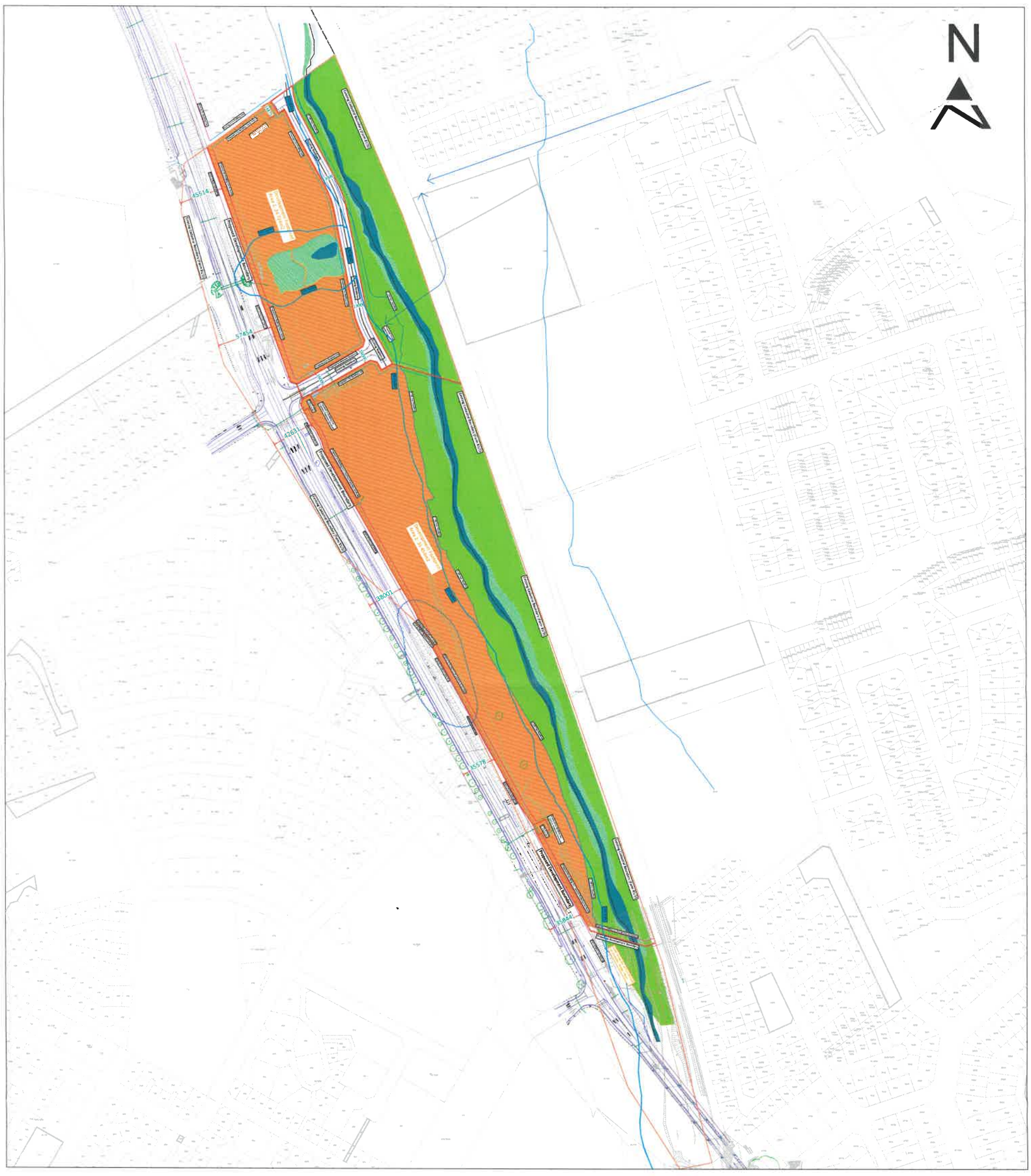
TELL: 012 807 7445
eMail: info@nkanivo.co.za

Nkanivo House
Unit 79, Block 5, Lombardy Business Park
66 Graham Road
Pretoria 0084

PROPOSED ZONING LAYOUT PLAN

STELLENBOSCH MUNICIPALITY ▪ ZONING SCHEME BY-LAW ▪ 2023

SCALE 1:2



CLOETESDAL FARM NO. 81

REMAINIDER OF PORTION 2 & PORTION 9

REFERENCE

Portion Boundary

PROPOSED USE ZONE

MULTI-UNIT RESIDENTIAL ZONE	
PUBLIC OPEN SPACE ZONE	
PUBLIC ROAD & PARKING ZONE	

APPROVED BY (DEPARTMENT)

DATE

STELLENBOSCH MUNICIPALITY

ANNEXURE C

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

APPLICANT'S MOTIVATION; POA & TITLE DEED

Nkanivo
Development Consultants

STELLENBOSCH MUNICIPALITY

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REVISED MOTIVATIONAL MEMORANDUM

THE LAND DEVELOPMENT APPLICATION FOR THE REZONING OF THE REMAINDER OF PORTION 2 OF THE FARM CLOETESDAL 81, STELLENBOSCH RD AND PORTION 9 OF THE FARM CLOETESDAL 81, STELLENBOSCH RD TO SUBDIVISIONAL AREA TO DEVELOP SOCIAL HOUSING IN TERMS OF SECTION 15(2)a OF THE STELLENBOSCH MUNICIPALITY BY-LAW ON MUNICIPAL LAND USE PLANNING, 2023 READ TOGETHER WITH THE RELEVANT PROVISIONS OF THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT, 2013 (ACT NO. 16 OF 2013) AND A PHASING PLAN IN TERMS OF THE SECTION 17(8)c OF THE STELLENBOSCH MUNICIPALITY BY-LAW ON MUNICIPAL LAND USE PLANNING, 2023

FEBRUARY 2026

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Appendix B: Bulk Engineering Services Study
Appendix C: Stormwater Management Plan
Appendix D: Concept/Phasing Plan

1 BACKGROUND

Nkanivo Development Consultants (Pty) Ltd has been appointed by the Stellenbosch Municipality to undertake the project for the rezoning of the Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD and Portion 9 of the Farm Cloetesdal 81, Stellenbosch RD, to Subdivisional Area Overlay Zone in order to enable the development of Social Housing. See the Special Power of Attorney and/or the Project Appointment Letter attached hereto as **Annexure A**.

This application is therefore lodged in terms of Section 15(2)(a) of the Stellenbosch Municipality By-Law on Municipal Land Use Planning, 2023, read together with the applicable provisions of the Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013). Furthermore, in accordance with Section 17(8)(c) of the same By-Law, the proposed development will be implemented in two phases.

In line with Chapter 24 of the Stellenbosch Municipality Zoning Scheme 2023, the land development application with the sole purpose of subdividing the subject properties to create three (3) portions will be submitted to the Municipality upon approval of the rezoning application. The rezoning of the land parcels resulting from the above-mentioned subdivision will be as follows:

- Portion A and Portion B of the Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD to Multi-Unit Residential Zone with the development controls outlined in Figure 1 below.

Building type permitted	Street boundary building lines (m)	Common boundary building lines (m)	Max Coverage	Max Height	Floor area
Group housing; Retirement village	External: 3m Internal: 0m	External: 3m Internal: 0m	50%	2 storeys	n/a
Flats	All levels: 4,5m	Ground floor: 4,5m First floor: 4,5m Second floor: 6m	50%	4 storeys	75%
All other buildings	All levels: 4,5m	Ground floor: 4,6m First floor: 4,5m Second floor: 6m	50%	3 storeys	75%

Figure 1: Development Controls - Multi-Unit Residential Zone (Source: Stellenbosch Zoning Scheme, 2023)

- Portion C and Portion D of the Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD to Public Roads & Parking Zone with the development controls outlined in Figure 2 below.

Primary Uses	Additional Uses (technical approval)	Consent Uses (application required)
• Public parking area • Public road • Utility service • Occasional use (one event/year)	• Rooftop base telecommunication station • Market	• Freestanding base telecommunication station • Occasional use (>one event /year) • Parking garage • Transport purposes (passengers)

Figure 2: Development Controls - Public Roads & Parking Zone (Source: Stellenbosch Zoning Scheme, 2023)

- Portion E of the Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD to Public Open Space with the development controls outlined in Figure 3 below.

Building type	Street boundary building lines (m)	Common boundary building lines (m)	Coverage	Height
All buildings	5m	5m	20% or as restricted in SDP	1 storey

Figure 3: Development Controls – Public Open Space (Source: Stellenbosch Zoning Scheme, 2023)

- Portion 9 of the Farm Cloetesdal 81, Stellenbosch RD will remain as Public Roads & Parking Zone.

The aforementioned town planning procedure was confirmed by the Stellenbosch Municipality during the Pre-Application Consultation meeting that was held on the 05th of September 2024. See the Pre-Application Consultation, Pre-Application Scrutiny, and the Pre-Application Scrutiny feedback letter attached hereto as **Annexure B**.

2 PURPOSE OF THE APPLICATION

The Housing Market Study undertaken by the Western Cape Provincial Government in the year 2021 confirmed that the state housing delivery has not produced sufficient housing units and that the private sector is not building housing units affordable to low- and middle-income households. As a result, there is a significant shortage of adequate, affordable housing in Stellenbosch, which in previous years has resulted in land invasions, a growth in informal settlements, and large numbers of workers and students from the university or private sector having to commute daily to town.

The purpose of this land development application is to obtain land use rights that will enable the Municipality to develop medium-high density (i.e., 1 to 4 storey walk-up buildings), a sustainable human settlement that is intended to accommodate social housing. The proposed development on the subject farm portions is intended to ensure that development along the R304 Road is aligned with the Adam Tas Corridor Initiative and the Stellenbosch Integrated Development Plan (IDP). The proposed development will play a crucial role, taking into consideration the current state of Stellenbosch, where there is an increasing need for affordable housing and community amenities due to population growth and urban expansion.

3 LOCALITY

The project area is situated on the Remainder of Portion 2 of the Farm Cloetesdal 81 Stellenbosch RD (i.e., Farm 81/2) and Portion 9 of the Farm Cloetesdal 81 Stellenbosch RD (i.e., Farm 81/9) in Stellenbosch, Western Cape Province. The subject properties lie between the Khayamandi and Cloetesville settlements. The western boundary of the project area is marked by the R304 Road, while the railway line defines the eastern edge. The Plankenburg River runs along the eastern side of the project area. To the south, it includes parts of the

Khayamandi Tourism Centre and a bridge over the railway line. The northern boundary of the project area is defined by the adjacent Mount Simon residential development as depicted in Figure 4 below.

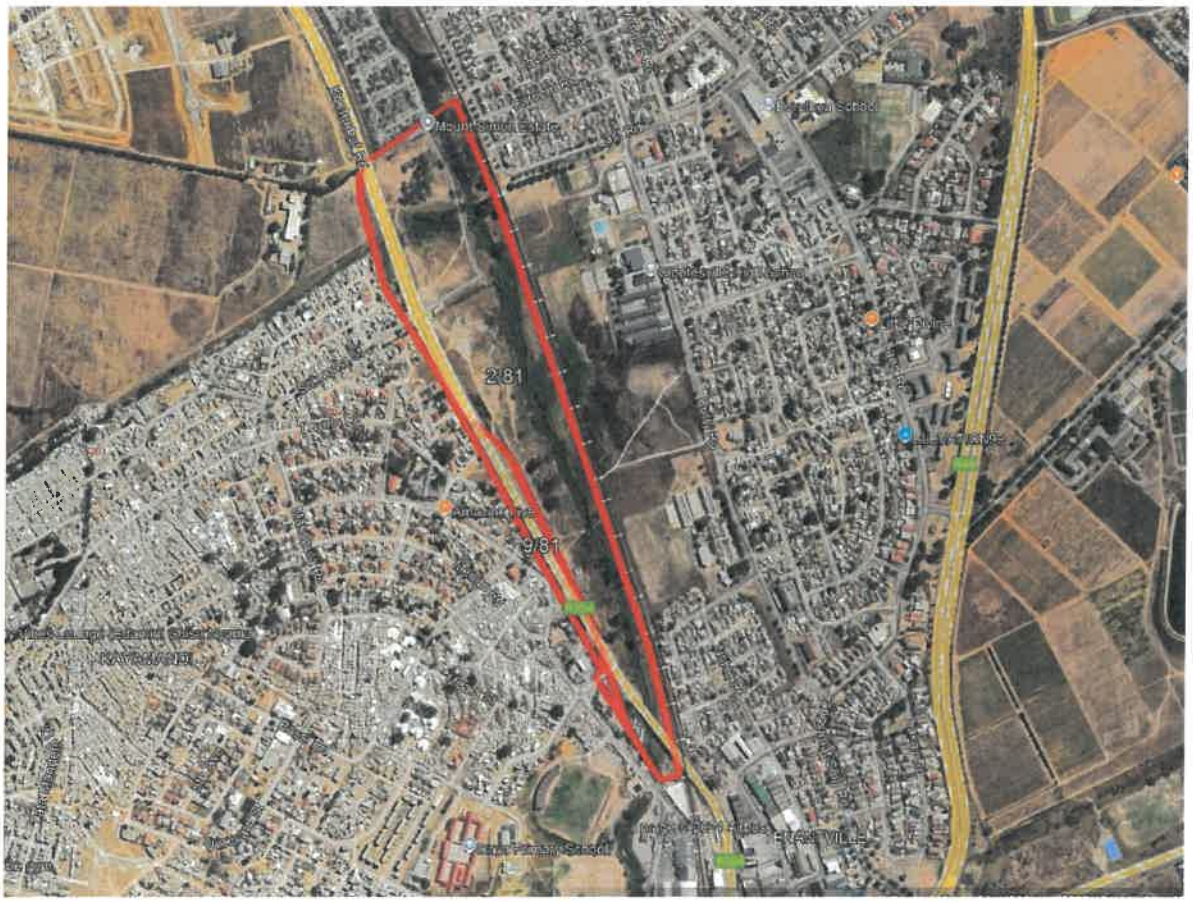


Figure 4: Locality Map

4 PROJECT AREA (SITE) ANALYSIS

4.1 Legal Property Details

4.1.1 Land Ownership and Extent/Size

The project area is situated within two farm portions, namely:

1. **Remainder of Portion 2 of the Farm Cloetesdal 81 Stellenbosch RD**

   According to the Title Deed No.: T12448/1944, the Remainder of Portion 2 of Farm the Cloetesdal 81 Stellenbosch RD is vested under the Stellenbosch Municipality. The Title Deed and Conveyancer's Certificate confirming ownership of the subject property are attached hereto as **Annexure C1** and **D1,** respectively. The subject property measures 12,9068 hectares as per the S.G Diagram attached hereto as **Annexure E1**.

2. **Portion 9 of the Farm Cloetesdal 81 Stellenbosch RD**

According to the Title Deed No.: T2866/1940, Portion 9 of Farm Cloetesdal 81 Stellenbosch RD is vested under the Stellenbosch Municipality. The Title Deed and Conveyancer's Certificate confirming ownership of the subject property are attached hereto as **Annexure C2** and **D2** respectively. The subject property measures 1,5240 hectares as per the S.G Diagram attached hereto as **Annexure E2.**

4.1.2 Title Deed Restrictions

There are no restrictive conditions which encumber the subject properties (i.e., Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD and Portion 9 of the Farm Cloetesdal 81, Stellenbosch RD, Stellenbosch, Western Cape Province), which may affect the establishment of the proposed development.

4.1.3 Land Claims Verification

The letter dated 24th of May 2024 attached hereto as **Annexure F**, from the Office of the Regional Land Claims Commissioner: Western Cape indicates that there are no existing land claims against the Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81, Stellenbosch RD, situated in Stellenbosch, Western Cape Province.

4.1.4 Servitudes and Encumbrances

The subject properties are not affected by any servitudes that hinder the proposed development.

4.2 Area of Jurisdiction

The project area is situated within Stellenbosch, under the jurisdictional area of the Stellenbosch Municipality, in the Western Cape Province.

4.3 Existing Land Uses

The project area is largely vacant, with certain parts currently being utilized to accommodate a road, a portion of the Khayamandi Tourism Centre and an overhead bridge. Figures 5, 6, 7 and 8 below depict some of the existing land uses within the project area. The map depicting the existing land uses is also attached hereto as **Annexure G.**



Figure 5: Vacant Land



Figure 6: Drainage System



Figure 7: Road



Figure 8: Road

4.4 Surrounding Land Uses

The land uses that are in the vicinity of the project area include informal settlements, a tavern, schools, a sports field, a taxi rank, a clinic, and low- to medium-income settlements. The Surrounding Land Use Map is attached hereto as **Annexure H.**

4.5 Current Zoning

The Remainder of Portion 2 of Farm Cloetesdal 81 Stellenbosch RD, is currently zoned "Agriculture and Rural Zone" according to the Stellenbosch Municipality Zoning Scheme 2023.

Portion 9 of Farm Cloetesdal 81 Stellenbosch RD is currently zoned "Public Roads & Parking Zone" according to the Stellenbosch Municipality Zoning Scheme 2023.

The zoning certificates of the subject properties are attached hereto as **Annexure I.**

5 Specialist Studies

5.1 Geotechnical Feasibility Study

The Geotechnical Feasibility Study, complying with the requirements of a Phase 1 near-surface geotechnical investigation as per the National Home Builders Registration Council (NHBRC) Guidelines was undertaken by BVi Consulting Engineers Western Cape (Pty) Ltd. The Geotechnical Feasibility Study is attached hereto as **Annexure J** and the findings can be summarised as follows:

5.1.1 Site Class Designation and Foundation Designs

The Geotechnical Feasibility Study concluded that the project area is divided into three zones as characterized on the table 1 below, in line with the guidelines in Section H of SANS 10400. The table below outlines the identified soil class as well as the associated foundation design for the three identified zones:

ZONE	I	II	III
GEOTECHNICAL CLASS	S/H	P (Fill)	H1
ESTIMATED SOIL MOVEMENT	10mm compression and/or 7,5mm heave	Undetermined	10mm heave
SOIL PROFILE	Up to 500mm fill overlying alluvial silty fine sand and ferruginised alluvium at depth.	More than 1800mm of uncontrolled sandy fill and builders' rubble.	Superficial surface layer of fill overlying alluvium, ferricrete and moderately

			expansive residual shale at depth.
SINGLE-STORY AND DOUBLE-STOREY STRUCTURAL FOUNDATIONS	Normal strip foundations placed on very dense ferruginised alluvium at 700mm depth.	Rapid impact compaction and reinforced concrete rafts designed according to the results of plate load testing. Construct a retaining wall.	Reinforced strip foundations designed to accommodate up to 15mm free heave.
THREE/FOUR STOREY STRUCTURAL FOUNDATIONS	Import G6 gravel to create a level platform and compact to 95% MDD. Conduct plate load tests and found by means of reinforced concrete raft designed according to the results of the plate load tests.	If the stiffness of the soil can accommodate the stresses imposed by a reinforced raft, proceed accordingly. If not, investigate the possibility of founding by means of cased end bearing piles or soil improvement by vibro compaction. The decision of which alternative to follow must be supported by the results of the core drilling.	Import G6 gravel to create a level platform and compact to 95% MDD. Conduct plate load tests and found by means of reinforced concrete raft designed according to the results of the plate load tests.
ASSOCIATED PROBLEMS	None	Presence of possible slope failure. Investigation for the design of MSE wall.	None
DEVELOPMENT POTENTIAL	Favourable. Suitable for low-cost and high-cost development.	Poor. Not suitable for multi-storey low-cost development without expensive geotechnical	Intermediate. Suitable for low-cost and high-cost development, including structural design measures

		remedial measures. Set aside as public open or commercial development.	

Table 1: Three Identified Zones (Source: BVi Consulting Engineers, Western Cape)

The zonation is illustrated on the test pit layout plan in Appendix A of the Geotechnical Feasibility Study and illustrated in Figure 9 below.

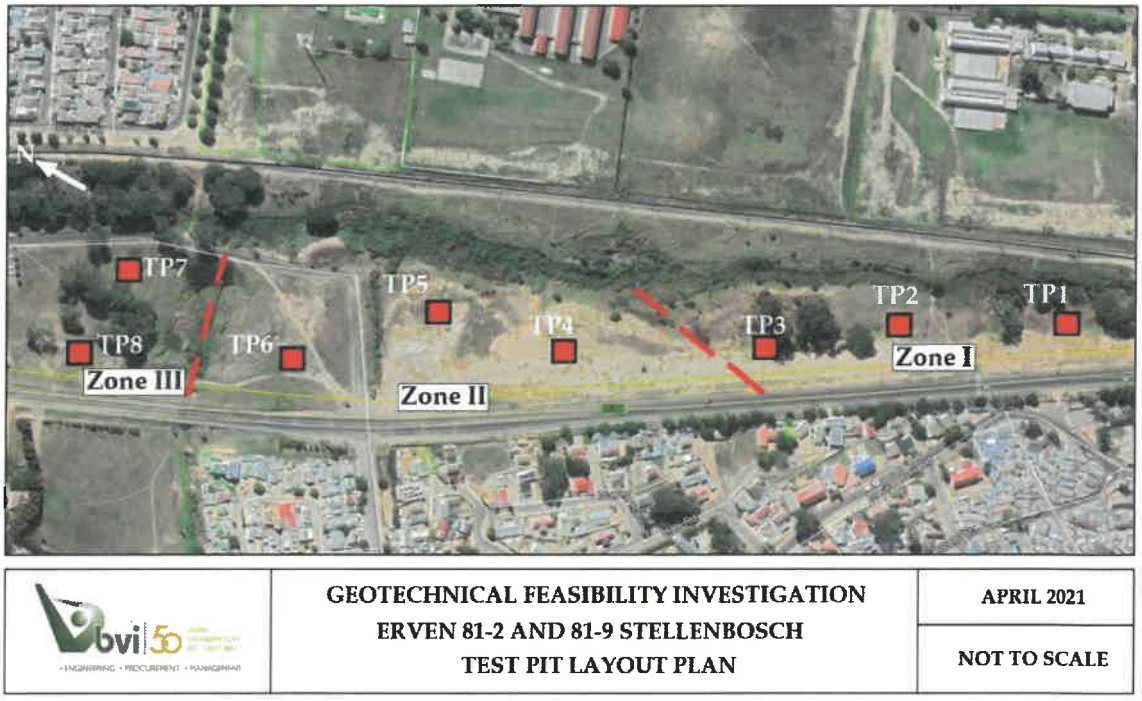


Figure 9: Test Pit Layout Plan (Source: BVi Consulting Engineers Western Cape)

5.2 Traffic Impact Assessment (TIA)

The report of the Traffic Impact Assessment (TIA) conducted by Delta Built Environment Consultants is attached hereto as **Appendix A**. The assessment evaluated the anticipated effects of the development on the surrounding road network and identified measures to improve traffic flow, safety, and overall operational performance within the study area.

The assessment found that most roads and intersections currently operate at acceptable Levels of Service (LOS). However, Intersections 5, 6, and 7 were identified as already operating under unacceptable conditions. Accordingly, mitigation measures were proposed for these locations, although responsibility for their implementation does not lie with the developer, as these intersections are presently functioning at LOS F even without the traffic generated by the proposed development.

The recommended interventions include the installation of traffic signals at Intersections 5 and 6. For Intersection 7, a revised signal timing plan is required, together with the reconfiguration of a through-movement lane on the south-western leg to operate as a shared through-and-left-turn lane. Figure 10 below depicts the identified intersections. In addition, the extension of pedestrian sidewalks is recommended to ensure seamless connectivity with the existing sidewalks along the R304.



Figure 10: Critical Intersections (Source: Delta BEC)

5.3 Bulk Engineering Services Study

Nkanivo Development Consultants appointed CivilConsult Consulting Engineers to conduct the Bulk Engineering Services Study for the proposed development. The revised study is attached hereto as **Appendix B**. The summary of the infrastructure services demands for the proposed development, as per the Bulk Engineering Services Study is outlined below.

5.3.1 Existing Infrastructure

5.3.1.1 Existing Water Infrastructure

The Stellenbosch Municipality confirmed that a 200mm diameter uPVC Class 12 water pipeline runs parallel to the northern and western side of the road that separates the proposed development. This pipeline currently supplies water to the Mount Simon Estate.

5.3.1.2 Existing Sewer Infrastructure

The Municipality confirmed that a 300mm diameter sewer pipeline exists near the proposed development, running partially parallel and within the western boundary of the site.

5.3.2 Proposed Infrastructure

5.3.2.1 Proposed Water Infrastructure

CivilConsult Consulting Engineers recommends that two new 160mm bulk water connections, equipped with water meters and isolation valves, be installed to service the north western and south eastern portions of the proposed development. These connections will tap into the existing 200mm uPVC Class 12 water pipeline, with internal water distribution linked directly to these new bulk connections.

5.3.2.2 Proposed Sewerage Infrastructure

Due to the natural slope of the land, two sewerage pump stations and sumps are proposed within the eastern boundary, located above the 1:100-year flood line of the Plankenburg River. Wastewater from the development would flow through internal sewerage pipes to these pump stations, from which it would be pumped via rising mains into the existing 300mm sewer pipeline.

5.3.3 Estimated Demands

5.3.3.1 Proposed Water Demand

The proposed water demand for the proposed development is illustrated in Figure 11 below.

Portion Number	Land Uses	Proposed Development			
		No. of Units	Area (m^2)	Average Annual Daily Demand (AADD)	Water Demand (kℓ/d)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Multi-Unit Residential	816	43 875	0.25kℓ / unit	204.00
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Roads and Parking	-	49 800	-	-
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Open Space	-	76 100	-	-
The Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	-	8 300	-	-
Total					204.00

Figure 11: Proposed Water Demand (Source: Civil Consult Consulting Engineers)

The proposed water demand is estimated to be 204,00 kl/d based on 816 units that the sites will accommodate.

5.3.3.2 Proposed Sewerage Flow

The proposed sewerage flow for the proposed development is illustrated in Figure 12 below.

Erf Number	Land Uses	Proposed Development			
		No. of Units	Area (m²)	Average Annual Daily Flow (AADF)	Sewerage Flow (kℓ/d)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Multi-Unit Residential	816	43 875	0.25kℓ / unit	204.00
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Roads and Parking	-	49 800	-	-
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Open Space	-	76 100	-	-
The Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	-	8 300	-	-
Total					**204.00**

Figure 12:Proposed Sewerage Flow Demand (Source: Civil Consult Consulting Engineers)

The proposed sewage flow demand is estimated to be 204,00 kl/d based on 816 units that the sites will accommodate

5.3.3.3 Proposed Solid Waste Disposal

The proposed solid waste disposal for the proposed development is illustrated in Figure 13 below.

Erf Number	Land Uses	Proposed Development	
		No. of Units / m²	Volume of Solid Waste (m³/Week)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Multi-Unit Residential	816	122.40
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Roads and Parking	-	-
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Open Space	-	-
The Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	-	-
Total			**122.40**

Figure 13:Proposed Solid Waste (Source: Civil Consult Consulting Engineers)

The proposed solid waste disposal is estimated to be 122,40 m^3/week based on 816 units that the sites will accommodate. The collection of the uncompressed solid waste in the proposed development is recommended to be carried out by the Stellenbosch Municipality or the Municipality will appoint a private company to carry out the service. The residual solid waste will be collected and transported from the site to the solid waste disposal site of the Stellenbosch Municipality, either by the Municipality or the appointed private company.

5.3.3.4 Proposed Electricity Demand

The proposed electricity demand for the proposed development is illustrated in Figure 14.

Zoning	Proposed Development		
	Floor Area (m^2) or No. of Units	VA/m^2 or kVA/unit	kVA
Multi-Unit Residential	816 Units	3.01kVA	2 457.0
Total			**2 457.0**

Figure 14: Proposed Electricity Demand (Source: Civil Consult Consulting Engineers)

The proposed electricity demand is estimated to be 2457,0 kVA for the proposed development. The Bulk Engineering Services Report attached hereto as **Appendix B** provide more details on the findings and recommendations of the Bulk Engineering Services Study.

5.4 Flood-line

The report of the Flood-Line Study conducted by WML Coast Consulting Engineers is attached hereto as **Annexure M.** According to the study, the 1:100 year flood line indicates that the majority of the land west of the Plankenburg River sits above flood levels, making it suitable for residential development. The only flood-affected area is located on the lower ground near the tributary originating from Watergang Dam, located approximately 200 meters south of the Mount Simon residential estate in Khayamandi. Figure 15 below depicts the flood line layout.



Figure 15: 1:100 Year Flood Lines (Source: WML Coast Consulting Engineers)

5.5 Storm Water Management Plan

Nkanivo Development Consultants appointed CivilConsult Consulting Engineers to conduct the Storm Water Management Plan. The findings of the revised Storm Water Management Plan, as contained in the report that is attached hereto as **Appendix C,** are summarized as follows:

5.5.1 Existing Stormwater Infrastructure

There is no municipal stormwater infrastructure present in the area surrounding the proposed development. However, the proposed development is located within the G22G quaternary drainage region of Stellenbosch Municipality, with natural drainage towards the Plankenburg River.

5.5.2 Proposed Stormwater Infrastructure

The Stormwater Management Plan prepared by CivilConsult Consulting Engineers recommends the following:

- Due to the absence of municipal stormwater infrastructure in the immediate vicinity of the proposed development, it is proposed that stormwater generated by the development be discharged directly into the Plankenburg River.
- An internal stormwater drainage network will be established to convey runoff from the development to designated outlet structures along the river.
- Outlet structures will be fitted with gabions and Reno mattresses to mitigate erosion risks at the discharge points.

- Outlet structures will be positioned above the 1:100-year flood line of the Plankenburg River.
- The internal stormwater system will be designed for a 1:25-year flood return period. A runoff coefficient of 0.497 (49.7%) will be applied for the proposed development.

5.6 Environmental Impact Assessment

The National Environmental Management Act (NEMA) inquiry attached hereto as **Annexure O**, detailing the site's physical conditions, including an environmental screening report attached as **Annexure P**, was submitted to the Western Cape Department of Agriculture and Rural Development (i.e., competent authority). The inquiry was intended to check with the competent authority if the proposed development triggers the listed activities and to acquire guidance on the procedure to obtain environmental authorization from the competent authority. The response from the competent authority attached hereto as **Annexure Q**, confirms that the proposed development triggers listed activities, it falls under Activity 12, Activity 19, and Activity 27 of Listing Notice 1, as well as Activity 12 of Listing Notice 3, according to the Environmental Impact Assessment Regulations 2014, published under NEMA, 1998 (Act No. 1998, as amended). As a result, an Environmental Authorization from the competent authority was legally required. Leago Environmental Solutions has been appointed by Nkanivo Development Consultants to conduct the Environmental Impact Assessment (EIA). As such, the EIA has been submitted and is currently under review by the competent authority.

6 MOTIVATION

6.1 Proposed Rezoning

The land development application for the rezoning of the Remainder of Portion 2 of the Farm Cloetesdal 81 Stellenbosch RD and Portion 9 of the Farm Cloetesdal 81 Stellenbosch RD in Stellenbosch, is submitted in terms of the provisions of Section 15(2)a of the Stellenbosch Municipality By-Law on Municipal Land Use Planning, 2023, read together with the relevant provisions of the Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013). In accordance with Section 17(8)c of the Stellenbosch Municipality By-Law on Municipal Land Use Planning, 2023, the proposed development is to be implemented in two phases as depicted on the attached Concept/Phasing Plan, attached hereto as **Appendix D**:

- Phase 1 comprising 436 units
- Phase 2 comprising 380 units.

This phased approach ensures compliance with municipal requirements, facilitates orderly service provision, and allows for the gradual integration of the development into the surrounding urban environment.

The details of the proposed rezoning are outlined in Table 2 below:

Proposed Rezoning	Size (Hectares)	Existing Land Use	Current Zone	Proposed Zone
Remainder of Portion 2 Farm Cloetesdal 81 Stellenbosch RD	12,9068	Vacant land Road	Agriculture and Rural Zone	Subdivisional Area Zone
Portion 9 of the Farm Cloetesdal 81 Stellenbosch RD	1,5240	Road	Public Roads & Parking Zone	Public Roads & Parking Zone

Table 2: Proposed Rezoning

6.2 Parallel Subdivision Application

6.2.1 Proposed Subdivision

The land development application for subdivision of the subject farm portions will be submitted to the Municipality by other consultants appointed by the Municipality upon approval of this rezoning application, as already indicated in section 1 above. The main purpose of the subdivision application will be to create the following land parcels:

Parent Farm Portion	Proposed Farm Portions	Existing Land Use	Current Zone
Remainder of Portion 2 Farm Cloetesdal 81 Stellenbosch RD	Portion A of the Remainder of Portion 2 of the Farm Cloetesdal 81	Vacant	Agriculture and Rural Zone
	Portion B of the Remainder of Portion 2 of the Farm Cloetesdal 81	Vacant	Agriculture and Rural Zone
	Portion C of the Remainder of Portion 2 of the Farm Cloetesdal 81	Road	Agriculture and Rural Zone
	Portion D of the Remainder of Portion 2 of the Farm Cloetesdal 81	Road	Agriculture and Rural Zone
	Portion E of the Remainder of Portion 2 of the Farm Cloetesdal 81	Vacant (river)	Agriculture and Rural Zone

Table 3: Proposed Subdivision

Portion 9 of the Farm Cloetesdal 81 Stellenbosch RD encompasses the R304 road. Stellenbosch Municipality future plan includes widening the R304 into a dual carriageway, enhancing traffic flow and reducing congestion. Additionally, a pedestrian bridge is proposed to

across the railway and river, ensuring access for pedestrians between the neighbouring settlements.

The above proposed Farm Portions to be subdivided from the Remainder of Portion 2 Farm Cloetesdal 81 Stellenbosch RD for the proposed development, will measure **5,75 hectares** combined as illustrated on the Concept/Phasing Plan, attached hereto as **Appendix D**.

6.2.2 Proposed Land Use Zones

The proposed new base zones outlined on Table 4 below, will be approved for each newly created farm portion upon approval of the subdivision application.

Proposed Farm Portions	Existing Land Use	Current Zone	Proposed Zone
Portion A of the Remainder of Portion 2 of the Farm Cloetesdal 81	Vacant	Agriculture and Rural Zone	Multi-Unit Residential Zone
Portion B of the Remainder of Portion 2 of the Farm Cloetesdal 81	Vacant	Agriculture and Rural Zone	Muti-Unit Residential Zone
Portion C of the Remainder of Portion 2 of the Farm Cloetesdal 81	Road	Agriculture and Rural Zone	Public Road & Parking Zone
Portion D of the Remainder of Portion 2 of the Farm Cloetesdal 81	Road	Agriculture and Rural Zone	Public Road & Parking Zone
Portion E of the Remainder of Portion 2 of the Farm Cloetesdal 81	Vacant (river)	Agriculture and Rural Zone	Public-Open Space Zone

Table 4: Proposed Land Use Zones

6.3 Need and Desirability

6.3.1 Need

Over the past decade, Stellenbosch has experienced significant growth, evolving from a historical town into a dynamic urban centre, with expansion driven by economic development, tourism, and increased demand for housing. This rapid urbanization has led to heightened pressure on existing infrastructure and housing resources, particularly for lower- and middle-income residents. As a result, there is a need for the proposed rezoning of the Remainder of Portion 2 of the Farm Cloetesdal 81 and Portion 9 of the Farm Cloetesdal 81, located along the R304 Road as it presents a strategic solution to addressing the Municipality's critical need for affordable housing.

The Stellenbosch Town Housing Market Study, conducted by Centre for Affordable Housing Finance in Africa (CAHF) in August 2022, assesses the dynamics of the town's housing market to inform the development of a local inclusionary housing policy. The study was initiated by the Western Cape Department of Environmental Affairs and Development Planning (DEADP) in partnership with the Department of Human Settlements to understand the residential property landscape, supply, and affordability gaps. It aims to equip the Stellenbosch Municipality with the necessary data to design policies that foster affordable housing in partnership with the private sector. This report also highlights the Municipality's reliance on external research for data, as local governments often lack the resources for detailed market analysis. Stellenbosch is recognized as a key node for economic, educational, and residential growth, making it an important place for affordable housing interventions.

Demand for housing in Stellenbosch is driven by rapid population growth, primarily concentrated in areas such as Khayamandi and Cloetesville, where informal settlements are expanding. The study reveals a severe housing backlog, with approximately 11,396 households on the municipality's housing waiting list, many of whom have waited for more than a decade. In particular, Khayamandi has experienced significant growth, absorbing much of the town's low-income population, with nearly half of the demand database located here. The shortage of affordable housing does not only affect long-term residents but also university students and employees from lower and middle-income brackets. The demand for affordable housing is exacerbated by high property prices, leaving a large portion of the workforce and students unable to secure formal housing.

The supply side of the housing market is heavily skewed towards higher-value properties, with 62% of residential properties in Stellenbosch valued above R1.2 million. There is a significant gap in the provision of affordable housing for lower-income and middle-income households. This shortage has led to increased informal settlements and high demand in areas like Khayamandi and Cloetesville. The number of government-subsidized housing units remains low, and the demand far exceeds the current supply. Many of the residents on the housing waiting list have been waiting for more than 10 years, particularly in areas like Khayamandi and Cloetesville.

The study also identifies a critical gap in the provision of student housing, with over 8,000 students from Stellenbosch University in need of private accommodation, particularly those reliant on the National Student Financial Aid Scheme (NSFAS). Most private developments cater for wealthier students, leaving a shortage of affordable rental units for those in lower income brackets. This has led to the conversion of homes and flats, once available to students, into higher-end tourist accommodation. While new developments for high-income students are underway, such as luxury student housing complexes, the demand for affordable units remains largely unmet.

Drawing on the experiences of Khayamandi and Cloetesville, areas that have long faced housing shortages and infrastructure constraints, this development is poised to alleviate some of the existing pressure. The proposed development will have significant economic and social benefits for Stellenbosch. Economically, it will drive local demand for services, retail, and amenities, supporting small businesses and creating jobs, leading to a cycle of growth that enhances the town's economic resilience. Socially, the development will promote community cohesion by integrating affordable housing close to the urban core, fostering interaction across socio-economic groups. It will also provide housing stability for lower-income families, supporting the Municipality's goals of social justice and equitable urban development. The Rezoning Land Development Application will create new opportunities for affordable housing within proximity to Stellenbosch's key economic hubs, enhancing access for communities that have historically been marginalized by spatial inequalities.

The need for the proposed development is not questionable because it is clear that it will address the challenge of the much-needed affordable housing within the Stellenbosch Municipality. It will also respond to a number of government policies, create job opportunities and aid in driving the economic growth in the Municipal area of jurisdiction.

6.3.2 Desirability

The rezoning of the subject properties is aligned with the Stellenbosch Municipality's Integrated Development Plan (IDP) and Spatial Development Framework (SDF), both of which prioritize high-density, mixed-use developments to cater to the growing population in the Municipality. This proposed development will contribute meaningfully to Stellenbosch's long-term vision of inclusive, integrated communities. Affordable housing is also equally transformative and gives inhabitants the ability to thrive. For students, it alleviates the financial burdens that can distract from academic success, enabling students to focus on their studies and personal growth. For low-income households, affordable housing will allow families to invest in their children's education, health, and overall well-being.

The subject properties strategic position along the R304 corridor makes it a crucial gateway to opportunity for the people of Stellenbosch and its surrounding settlements. The properties' proximity to established areas such as Khayamandi and Cloetesville positions it as an ideal site for social housing that can connect residents to Stellenbosch's vibrant urban economy. For residents of these nearby areas, the proposed development offers access to Stellenbosch's thriving educational institutions, including Stellenbosch University, commercial centres, and public services.

This development will not only reduce the distance between these communities and economic opportunities but will also serve as a critical node for transit-oriented development. With well-established transport routes nearby, the social housing project will offer its residents affordable, reliable mobility, helping them access employment, education, and healthcare more efficiently. For example, the proposed pedestrian bridge that will cross over the railway and river to

connect to Cloetesville will not only link the two settlements but will emphasise the project's integration into Stellenbosch's broader infrastructure will empower residents to fully participate in the social and economic life of the town, contributing to a more inclusive urban fabric.

Moreover, the desirability of rezoning the Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81 for the purposes of developing social housing is given to its proximity of both Stellenbosch's urban core and the established social housing settlements such as Idas Valley and Cloetesville. Developments in nearby areas along the Alberto Costa Way Road have demonstrated how well-designed, thoughtfully planned social housing can uplift both the physical environment and the community spirit.

The desirability of the proposed development lies in its ability to reconcile environmental sensitivity with spatial restructuring and social inclusion. While the property falls within CBAs designated for low-impact, biodiversity-sensitive land uses, these areas are not intended to be isolated or excluded from the urban fabric. Instead, they are meant to be maintained, enhanced, and integrated into the municipal green network. A well-planned social housing development can achieve this by:

- Retaining and rehabilitating sensitive ecological areas,
- Incorporating green corridors and open space systems into the layout, and
- Ensuring that development footprints are spatially efficient and compact.

In addition, the site's proximity to the Adam Tas Corridor makes it highly desirable from a spatial planning perspective. Even though it falls outside the currently approved corridor boundary (between Precinct 9 and Precinct 10), its location means that it is functionally part of the same urban system and will harmonize with the surrounding landscape. For example, the Plankenburg River, which flows near the development, will serve as a focal point for beautification efforts, with plans for ecological restoration, public parks, and recreational spaces along its banks. The proposed development will:

- Support corridor densification,
- Strengthen non-motorised transport connectivity, and
- Reinforce a continuous urban edge along Adam Tas Road.

This contributes to a more compact, efficient, and integrated urban structure, which is a core objective of Stellenbosch's Spatial Development Framework and LSDF.

6.4 Policy Documents

6.4.1 Stellenbosch Municipality Spatial Development Framework (SDF) 2023 (Adam Tas Corridor)

The 2023 Stellenbosch Municipality Spatial Development Framework (SDF) envisions the R304 corridor as a hub for mixed-use development, integrating residential, commercial, and recreational spaces to create vibrant communities. It proposes the creation of urban villages, emphasizing the extension of infrastructure and services to meet the needs of current and future residents. The project is situated within the Adam Tas Corridor as per the 2023 SDF.

6.4.1.1 Adam Tas Corridor

Within the broader framework of the SDF, the Adam Tas Corridor initiative plays a crucial role in transforming a significant urban axis in Stellenbosch. The corridor, named after the historic figure Adam Tas, is envisioned as a dynamic and integrated urban space. The initiative aims to create mixed-use developments that combine residential, commercial, and recreational elements. By fostering a vibrant and inclusive urban environment, the Adam Tas Corridor seeks to attract investment, create jobs, and enhance the overall quality of life for residents.

A central feature of the Adam Tas Corridor initiative is the development of mixed-use spaces. These areas are designed to integrate various functions, such as housing, retail, office space, and leisure activities, within close proximity. Mixed-use developments promote walkability, reduce the need for long commutes, and create lively, multifunctional urban areas. By encouraging diverse land use within the corridor, the municipality aims to create a more sustainable and economically vibrant urban fabric. Importantly, the Affordable Rental Housing Strategy and Plan (2016) is incorporated into these mixed-use developments, ensuring affordable housing options are available within the corridor.

Improving connectivity and accessibility is another key aim of the Adam Tas Corridor initiative. The plan includes the development of efficient public transportation networks, pedestrian pathways, and cycling routes to enhance mobility within the corridor. Ensuring easy access to various parts of the corridor is essential for fostering economic activity and social interaction. Enhanced connectivity also helps to reduce traffic congestion and minimize the environmental impact of transportation. The Affordable Rental Housing Strategy and Plan ensures that residents of social housing units benefit from improved connectivity and accessibility, facilitating their integration into the broader urban community.

Ultimately, the restructuring of zones and the development of the Adam Tas Corridor are aimed at stimulating economic growth and enhancing community well-being. By creating a more organized, connected, and vibrant urban environment, the municipality hopes to attract new businesses, support local enterprises, and provide residents with better opportunities for employment and leisure. The initiatives outlined in the IDP, including the Social Housing Programme, reflect Stellenbosch Municipality's commitment to fostering sustainable

development and improving the quality of life for all its residents. The proposed development is situated within the corridor and will play a crucial role in ensuring that the abovementioned objectives are realised, specifically the creation of more sustainable, inclusive, equitable, and prosperous communities.

6.4.2 Stellenbosch Municipality Integrated Development Plan

The Stellenbosch Municipality Integrated Development Plan (IDP) serves as a strategic framework guiding the municipality's development efforts over a five-year period. Its primary aim is to promote sustainable development by addressing social, economic, and environmental issues within the municipality. The IDP outlines various projects and initiatives to enhance service delivery, infrastructure development, and economic growth, ensuring that all communities benefit from equitable resource distribution.

One of the key objectives of the IDP is to restructure zones within the municipality to improve urban efficiency. This involves a comprehensive review and adjustment of land use patterns to accommodate population growth and evolving economic activities. By strategically zoning areas for residential, commercial, industrial, and recreational purposes, the municipality aims to create a more organized and functional urban environment. This restructuring helps to reduce congestion, optimize land use, and promote sustainable urban growth.

To support the restructuring of zones, the Stellenbosch Municipality, through this subject application, intends to develop social housing on the Remainder of Portion 2 of the Farm Cloetesdal 81 and Portion 9 of the Farm Cloetesdal 81. In the long run, this will include upgrading roads, utilities, public transportation, and community facilities to meet the needs of a growing population, as also recommended by the various specialist studies undertaken in support of the development. Improved infrastructure is essential for supporting economic activities and ensuring that all residents have access to essential services. The IDP outlines specific projects and investments aimed at modernizing infrastructure and expanding service delivery across the municipality.

The integration of the Social Housing Programme with broader urban development initiatives, such as the Adam Tas Corridor, is a critical aspect of the IDP. In addition to providing housing, the programme also aims to provide affordable housing, reducing urban inequality and preventing the negative effects of housing shortages. Additionally, by addressing the housing needs of low- to middle-income households and integrating these efforts with broader urban development strategies, the municipality aims to create a balanced and thriving community. The focus on enhancing infrastructure, engaging communities, and providing support services will further ensure that all residents can benefit from improved living conditions and greater opportunities for social and economic advancement. In conclusion, the proposed development on the Remainder of Portion 2 of the Farm Cloetesdal 81 and Portion 9 of the Farm Cloetesdal 81, supports the vision and objectives of the IDP discussed above.

6.4.3 Development Principles of the Spatial Planning and Land Use Management Act (SPLUMA) 16 of 2013

The Spatial Planning and Land Use Management Act (SPLUMA) of 2013 in Chapter 2 identifies several development principles that should inform any spatial planning, land development, development sustainability, efficiency, good administration spatial resilience and use of land. In this regard, this development adheres to these principles by prioritizing sustainable land use, ensuring equitable access to resources, and promoting community participation in the planning process. The development particularly reinforces principles, referred to on Table 5 below.

SPLUMA Principles	Proposed Development Objective
The principle of spatial justice, which stipulates that planning authorities must ensure that the benefits and opportunities gained from land development are received by the previously disadvantaged communities	The proposed development is well-located between existing settlements such as Khayamandi and Cloetesville settlements. It is also approximately 4 kilometres from the Stellenbosch Central Business District. As a result, it will play a crucial role in the creation of sustainable human settlements where previously disadvantaged communities are spatially connected to existing and future economic and social opportunities.
The principle of spatial efficiency, which emphasises that planning should promote overall efficiency through inter alia the optimisation of existing resources and infrastructure. It furthermore promotes administrative efficiency and decision-making.	The proposed development is located in the midst of existing townships with existing bulk infrastructure such as roads, water and sewer pipelines and electricity powerlines. As a result, the proposed development will benefit from existing resources thereby reducing the cost of development.
The principle of spatial sustainability, which promotes the concept of sustainable spatial growth where the value and importance of agricultural land, environmental sensitive resources, and the demand for development is planned and provided in a harmonious and balanced manner	The land development application aligns with the principles of spatial sustainability, as the proposed development is located within compatible surrounding land uses. Most importantly, an exhaustive environmental impact assessment is currently being undertaken which includes extensive consultations with the stakeholders to confirm and protect the sensitive parts of the project area.

The principle of good administration, whereby all spheres of government ensure an integrated approach to land use and land development that is guided by the spatial planning and land use management systems as embodied in the SPLUMA.	The land development application will be advertised and an extensive public participation process will be undertaken to allow all interested and affected parties to have a say on the land development area. An opportunity will be given to the government departments and other affected stakeholders to provide their sector inputs concerning the land development. Moreover, the proposed development aligns with the IDP, SDF and the Adam Tas Corridor of the Stellenbosch Municipality as explored in sections above.

Table 5: SPLUMA Principles

7 CONCLUSION

This motivational memorandum has provided merits for approval of the rezoning application submitted to the Stellenbosch Municipality in terms of the provisions of Section 15(2)a of the Stellenbosch Municipality By-Law on Municipal Land Use Planning, 2023 read together with the relevant provisions of the Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013).

- The proposed development is intended to be implemented in two phases, with Phase 1 comprising 436 units and Phase 2 comprising 380 units. The proposed phases promote orderly integration, efficient service provision, and compliance with municipal planning and sustainability requirements.
- The rezoning application is in alignment with the Strategic Urban Planning Goals outlined in the Stellenbosch Municipality Integrated Development Plan (IDP) and the Adam Tas Corridor.
- The rezoning application will result in the development of affordable housing, in turn addressing the housing backlog pertaining to low-income to middle-income households.
- All topographical and physical limitations, servitudes, and natural drainage areas guided by professional studies have effectively been accommodated in the sketch plans to ensure the feasibility of the development and to accommodate natural assets sensibly.
- The proposed development will also ensure the establishment of a quality living environment with access to key infrastructure services and unlimited opportunities (both economic and social).
- The proposed development within the Adam Tas Corridor will contribute towards attracting investments and businesses, thereby contributing to the economic vitality of Stellenbosch and ensuring that the IDP's economic growth targets are realised.

It is concluded that this land development application is both necessary and desirable from a town planning perspective and will result in a development that enhances the appearance of the whole area. Approval of this application will have no detrimental effect on the surrounding properties because the proposed development is in harmony with the surrounding land uses within the area.

POWER OF ATTORNEY

I / we, the undersigned,

Geraldine Mettler

(Name(s) of registered owner(s) / owner(s)' authorised representative(s))

ID-number(s)

7211220210088

(ID number(s) of registered owner(s) / owner(s)' authorised representative(s))

in my / our capacity as the registered owner or authorised representative of the owner(s) of the following property(ies)

The Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD and Portion 9 of the Farm Cloetesdal 81, Stellenbosch RD

(Property descriptions)

hereby nominate, constitute and appoint

Nkanivo Development Consultants (Pty) Ltd

(Agent / Consultant's Name)

in terms of

FQ: 68/24

(Council Resolution Reference & Date / Delegation Reference & Date / Board Resolution Reference & Date) (Indicate N/A if not applicable)

with power of substitution to be my lawful agent in my name, place and stead to act on my behalf to apply for the relevant land use rights being sought for the aforementioned property(ies). Furthermore to represent me at any and all enquiries to be held by virtue of such appointment, and generally to do or cause to be done whatever shall be required for all intents and purposes as I might or could do if personally present and acting myself, hereby ratifying everything my Attorney(s) and Agent(s) shall lawfully do or cause to be done by virtue of this Power of Attorney. Accordingly, power of attorney is hereby also granted to the agent to sign and receive all correspondence in respect of the matter referred to above during the application process.

Signed at

STELLENBOSCH (Place) on 13 November 2024 (Date)

in the presence of the undersigned witnesses.

For OWNER / APPLICANT / CLIENT	**Nkanivo Development Consultants (Pty) Ltd**
Geraldine Mettler	**Samuel Chauke**
FULL NAME	**FULL NAME**
OWNER / APPLICANT / CLIENT SIGNATURE	**Nkanivo Development Consultants (Pty) Ltd Representative SIGNATURE**
WITNESS 1 SIGNATURE	**WITNESS 2 SIGNATURE**

The Federal Printing Company (Pty.), Ltd., Cape Town. 39A

LODGED
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Stellenbosch F-6-5/26

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1-5-0

DEED OF TRANSFER

PASSED IN FAVOUR OF

THE COUNCIL OF THE MUNICIPALITY OF STELLENBOSCH

Registered at Deeds Office

Cape Town, on the *day of* *19*

C.H. Brand,
Attorney Notary & Conveyancer,
117 St. George's Street,
Cape Town.

Registered on the Date hereof in
Geregistreer op die Datum hiervan in
the Register of
die Register van
Bk. C 2 Fol. 261 Bk. ..... Fol. .....
for Registrar of Deeds,
vir Registrateur van

DIE GROND
THE LAND
IS OORGEREGISTREER EN MOET IN DIE TOEKOMSTIGE BOEKSTAWE HOUD AS
IS REGISTERED AS, AND MUST IN FUTURE BE DESIGNED AS
Portion 9 (a portion of A)
of the farm Stellenbosch No 81
ANTEKANTOOR,
DEEDS REGISTRY,
CAPE TOWN,
15 - 3 - 40

CHIEF REGISTRATION OFFICER.
HOOF REGISTRASIEAMPTENAAR.

ATTACHED 10-4-1989 No. 636
WITHDRAWN ..... No .....

Deed of Transfer

Drawn by me

Conveyancer

BY VIRTUE OF A POWER OF ATTORNEY.

Know all Men whom it may concern

That CHRISTOFFEL HENDRIK BRAND

appeared before me, Registrar of Deeds,
He, the said Appearer, being duly authorised thereto by a Power of Attorney executed
at Stellenbosch
on the 16th day of March 19 40 , by

BENNIE POLONSKY, born on 15th September 1906.

which power, witnessed in accordance with law, was exhibited to me on this day;
on the 1st February 1940

And that the said Appearer declared that his said Principal had truly and legally sold, and that he, in his capacity as Attorney aforesaid did, by these presents, Cede and Transfer in full and free Property to and on behalf of

THE COUNCIL OF THE MUNICIPALITY OF STELLENBOSCH

~~the~~ ~~Heirs, Executors, Administrators~~ Order or Assigns,

Certain../

ENDORSEMENT IN TERMS OF SECTION 31 (6) OF ACT No. 47 OF 1937 (AS AMENDED).

ENDOSSEMENT KRAGTENS ARTIKEL 31 (6) VAN WET Nr. 47 VAN 1937 (SOOS GEWYSIG).

A portion of

The herein-mentioned property meas ± 1·6196 morgen
Die eiendom hierin vermeld
has been expropriated by the Divisional Council of Stellenbosch
is onteien deur die
In terms of Sec 130 Ord 15/1952
kragtens LDP/TH
Vide Notice of expropriation No. ..... d.d. 9 April 1969
Vide onteieningskennisgewing Nr.
filed as exprop. caveat Ex. Cav. 636/69 plans in duplicate filed
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DEEDS OFFICE,
AKTEKANTOOR,
CAPE TOWN.
KAAPSTAD. - 5 -6- 1969

REGISTRAR OF DEEDS.
REGISTRATEUR VAN AKTES.

Annexure to Transfer 2866/1940

BLADSY/PAGE 4

ENDOSSEMENT OP
ENDORSEMENT ON 2866 1940

EIENDOM/PROPERTY PTN 9 (PTN of LOT A)
of the Farm
"CLOETESDAL"

Ged 35 Meas 2,3116 Ha

OORGEDRAGTEER
TRANSFERRED

Aan DIR ADMINISTRASIE -
To RAAD WES-1 RAP

No 1340 6/84 Restant
Remainder 1,5866 Ha

26-01-1981

M. L. BESTER
Asst.-Registrateur/Asst. Registrar.

81

Certain piece of land land, partly abolished quitrent and partly freehold situate in the Division of Stellenbosch, being Portion 9 (a portion of Lot A) of the farm Cloetesdal, transferred to A. Gelb and L.M. Stella trading in partnership under the style or firm of Gelb & Stella, in equal shares, on the 5th April 1927 No. 3114, and lastly transferred to the Appearer's Principal by Deed of Transfer No. 13486 dated 8th December 1939.

Measuring Four decimal five five one two (4.5512) Morgen.

As will more fully appear from the annexed diagram, subject to such conditions as are referred to in the said Deed of Transfer No. 3114 dated 5th April 1927, and further subject and entitled to:-

(1) The terms and conditions of the Order of the Water Court District No. 1 dated 4th April 1922, annexed to the Deeds of Transfer Nos. 9199 and 9201, dated 29th December 1900, and endorsed thereon on 2nd May 1922, relative to a division of certain water rights

(2) The terms and conditions of certain Notarial Deed of Servitude dated 23rd March 1926, annexed to the said two Deeds of Transfer Nos. 9199 and 9201, dated 29th December 1900, and endorsed thereon on the 16th August 1926, relative to certain water rights.

Further subject and entitled to the following special conditions contained in the said Deed of Transfer No. 3114 dated 5th April 1927, namely:

"(a) The Owner of Lot Cloetesdal Proper this day transferred to M.C. Vos No. 3112 and his successors in title shall be entitled to use the 40 ft. road shown on the annexed diagram as running from the Railway to the road marked Stellenbosch A Road, crossing the land hereby transferred.

(b) The owner of Lot Cloetesdal Proper this day transferred to M.C. Vos No. 3112 and his successors in title, shall have the right of watering their stock in the Plankenberg River on the land hereby transferred where it crosses the 40 ft. road mentioned in subparagraph (a) above.

(c) The owners of Lots B and C this day transferred to M. Zetler and J.J.B. Myburgh separately Nos. 3115 and 3116 portions of the farm Cloetesdal, and their successors in title, shall not have the right of removing sand from the Plankenberg River, but shall allow its free and uninterrupted flow or wash on to the land hereby transferred, save and except that the said owners, and their successors in title, shall have the right to take such sand as they may require for building purposes on the said lots B and C."

Wherefore

Wherefore the Appearer, *q.q.*, renouncing all the Right and Title which his said Principal heretofore had to the Premises, on behalf as aforesaid, did in consequence, also acknowledge his said Principal to be entirely dispossessed of, and disentitled to the same; and that, by virtue of these presents, the said

THE COUNCIL OF THE MUNICIPALITY OF STELLENBOSCH

~~His Heirs, Executors, Administrators,~~ Order or Assigns, now is and henceforth shall be, entitled thereto conformably to local Custom;—Government, however, reserving its Right;—**and finally**, acknowledging his said Principal to have been satisfactorily paid the whole of the Purchase Money, amounting to a sum of Seven Hundred Pounds (£700) on which amount Transfer Duty has been paid.

In Witness whereof I, the said Registrar, together with the Appearer, *q.q.* have subscribed to these Presents, and have caused the Seal of Office to be affixed thereto

Thus done and executed at the Office of the Registrar of Deeds, in Cape Town, the Province of the Cape of Good Hope on the 29th day of the Month of March, in the Year of our Lord One Thousand Nine Hundred and Forty (1940).

q.q. his Principal.

In my presence,

Registrar of Deeds.

Registered in the Register of { Farms / Erven / Townships

Book..... Folio.....

Date of birth 12/5/00

Other identification.....

Proof filed with A.N.C. 1254/39

Clerk-in-Charge.

Delete "order" from vesting + divesting clauses + thereafter "its" + "or" done

(3) P/a liable for duty in respect of mandate - batch penalty done

(3) Date of sale wanting in D. Receipt

(For Mortgages see first page.)

notes contd written

G.P.-S.9453—1938—5,000.

EXAMINERS' NOTES.

(4) Div. Commrs approval of subdivisional diags. wanting. In excess of 1 manger

(5) Reg 49 Act 18/1936 applies re ~~the~~ for-1 the within parties are not natives in terms of Reg. 49 Act 18/1936.

Conveyancer

(6) Prove abolition of quitrent in respect of portion of within Pte.

(7) Sec. 19 Act 47/1937 applies re abolished quitrent portion I am not prepared to certify

(8) Amplify deeds as indicated at X p. 3 done

GALVIN & SALES LTD.,
CAPE TOWN.
No. 83.

REGISTRATEUR VAN AKTES / REGISTRAR OF DEEDS
KAAPSTAD
21 MAR 40
CAPE TOWN

Prepared by:
Attorney,
STELLENBOSCH

Power of Attorney to make Transfer

I the Undersigned, BENNIE POLONSKY, born on 15th September, 1906,
(See Transfer No. 13486 of 1939)

do hereby nominate, constitute, and appoint Christoffel Hendrik Nel with power of Substitution, to be my lawful Attorney and Agent in my name, place, and stead, to appear at the Office of the Registrar of Deeds of this Province in Cape Town, and then and there as my act and deed, to make transfer to

THE COUNCIL OF THE MUNICIPALITY OF STELLENBOSCH

of certain

portion 9 (a portion of Lot A) of the farm Cloetesdal situate in the Division of Stellenbosch

Measuring 4.5512 Morgen,

Held under Deed of Transfer No. 13486 dated 8th December, 1939;

DO NOT WRITE IN MARGIN.

sold to me by them for the sum of SEVEN HUNDRED POUNDS (£700. 0. 0)
on the 1st February, 1940; and I
authorise said Attorney to receive the said purchase price on my behalf, and to acknowledge payment thereof; and generally for effecting the purposes aforesaid, to do or cause to be done, whatsoever shall be requisite, as fully and effectually, for all intents and purposes, as I might or could do if personally present and acting herein—hereby ratifying, allowing, and confirming, and promising, and agreeing to ratify, allow, and confirm, all and whatsoever my said Attorney and Agent shall lawfully do or cause to be done by virtue of these Presents.

Given under my Hand at STELLENBOSCH
this 16 Day of March 1940 in the presence of the undersigned Witnesses.

As witness:
1. [signature] c/o (Cape)
2. [signature]

UNION OF SOUTH AFRICA — UNIE VAN SUID-AFRIKA — REVENUE — IKOMITE

I HEREBY CERTIFY THAT THE WITHIN-DESCRIBED TRANSACTION HAS BEEN APPROVED BY THE ADMINISTRATOR.

CAPETOWN, 2nd March 1940. PROVINCIAL SECRETARY

MUNICIPAL RATES

I certify that all Municipal Rates in respect of property described in the Power of Attorney on the other side hereof have been paid and that there are no arrears due thereon.

This Certificate is available to.....

Municipal Office

.....

Town Clerk.

.....193.....

DIVISIONAL, COUNCIL RATES AND PROVINCIAL TAXES

I certify in respect of the property above described as follows, viz.:—

1. All Divisional Council Rates have been paid thereon up to.....
2. All Provincial Immovable Property Taxes thereon have been paid up to.....

....

and that there are no arrears thereon.

Office of the Divisional Council.

Secretary and Collector.

§ G.P.-S.8101—1938—1,000-100. S.

Revenue Inkomste 816.

(2)

UNION OF SOUTH AFRICA.
UNIE VAN SUID-AFRIKA.
Department of Inland Revenue.
Departement van Binnelandse Inkomste.

A131664

TRANSFER DUTY.—HEREREGTE.

RECEIVER OF REVENUE
15-3-1940
Office Date Stamp.
Kantoor-Datumstempel.
ONTVANGER VAN INKOMSTE

Transferor.....Bennie Polansky.....
Transportgewer

Transferee.....the Council of the Municipality
Transportontvanger of Bellville

Property.....portion 9 (a portion of Lot
Eiendom A) of the farm Elsiesdal
situate in the Division of
Bellville
measuring: 4·5512 morgen.

Mode of disposal.....Private Treaty.....
Wyse van afhandeling

Date of transaction.....day of....., 19.....
Datum van transaksie dag van

Law under which duty charged.....11/1913.....Consideration £.....
Wet waarvolgens hereregte gevra word Konsiderasie

Duty paid on £.....700....., being .....purchase price.....
Hereregte betaal op synde

Received from .....Municipality.....
Ontvang van

of.....Bellville.....the sum of.....Fourteen.....
van die som van

.....Pounds only.....

being transfer duty on the above transaction, as follows :—
synde hereregte op bogemelde transaksie as volg :—

Duty at.....2.....per cent. on £.....700..... £.....14.....
Hereregte teen persent op

Interest at.....per cent. for.....years.....days.....
Rente teen persent vir jaar dae

TOTAL £.....14.....
TOTAAL

.....
Receiver of Revenue.—Ontvanger van Inkomste.

P.T.O.

THE DIVISIONAL COUNCIL OF STELLENBOSCH

I certify that all Divisional Council Rates and Immovable Property Tax on the within mentioned property which are payable in law before transfer can be registered, have been paid.

This Certificate expires on 30/6/40

Date 26/3/40 Secretary/Collector

SUB-DIVISION OF PLAN
Sect. 24 (b), Act No. 9 of 1927

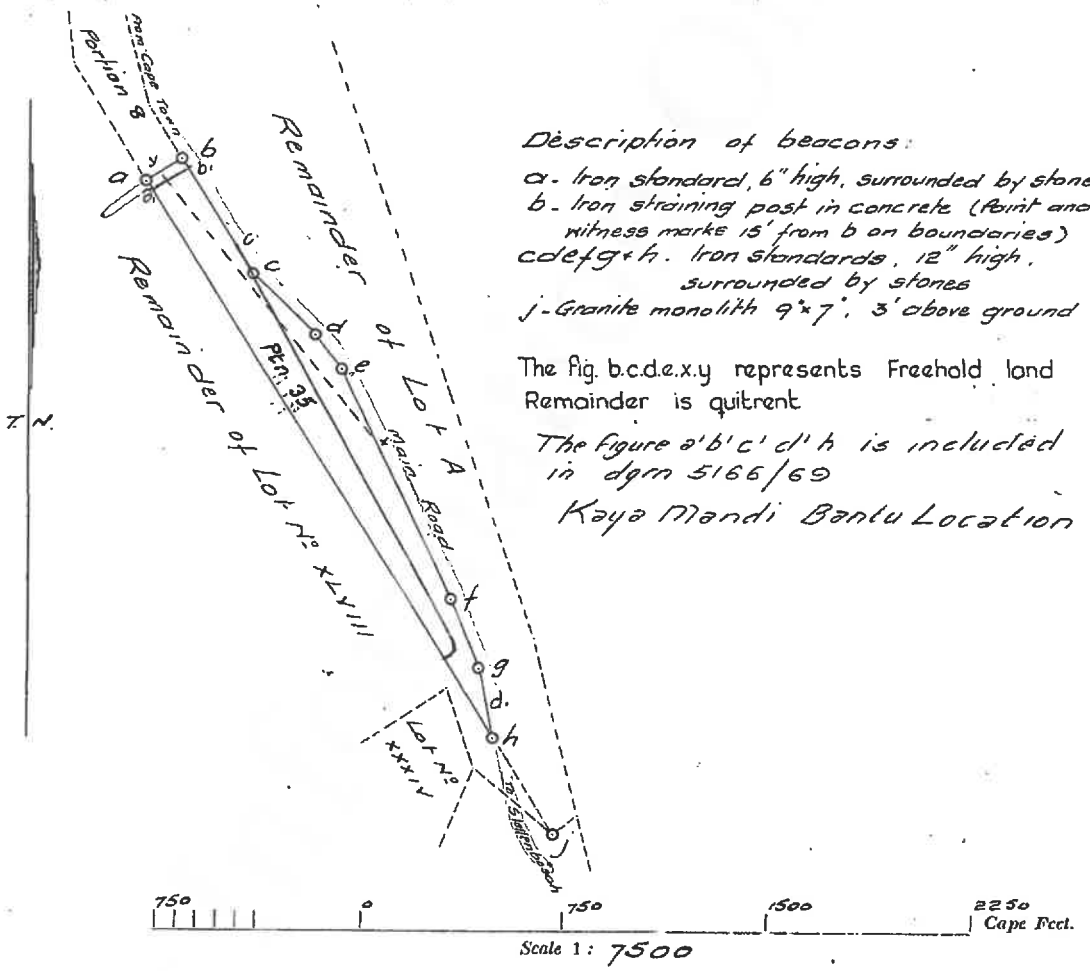
SIDES Cape	Feet	ANGLES OF DIRECTION		SYSTEM Lo CO-ORDINATES y	x
ab	153.6	238.41.30	a	-108830.3	- 7091.3
bc	501.1	328.14.20	b	-108961.5	- 7171.1
cd	320.7	313.54. 0	c	-109225.3	- 6745.0
de	156.0	324.18.50	d	-109456.4	- 6522.6
ef	951.5	334.19.40	e	-109547.4	- 6395.9
fg	277.7	337.57.40	f	-109959.6	- 5538.3
gh	258.0	348.18.10	g	-110063.8	- 5280.9
ha	2430.9	145. 4. 0	h	-110116.1	- 5028.3
hj	414.6	328. 4. 0	j	-110335.4	- 4676.4

S. G. No. 1162/1940

Approved

S. Gildenhuys
Surveyor-General.

16-3-1940



Description of beacons:

a - Iron standard, 6" high, surrounded by stones
b - Iron straining post in concrete (Paint and witness marks 15' from b on boundaries)
cdefgh. Iron standards, 12" high, surrounded by stones
j - Granite monolith 9"x7", 3' above ground

The fig. b.c.d.e.x.y represents Freehold land
Remainder is quitrent

The figure a'b'c'd'h is included in dgm 5166/69
Kaya Mandi Bantu Location

The figure abcdefgh
represents 4.5512 Morgen *of land being*
PORTION 9 (a portion of Lot A) of the farm CLOETESDAL
situate in the Division of Stellenbosch *Province of Cape of Good Hope.*
Surveyed in Feb. 1940 *by me* H.E. King
Land Surveyor.

This diagram is annexed to Transfer Deed No 2866 *dated* 29 MAR 1940 *in favour of* The Council of the Municipality of Stellenbosch.
Registrar of Deeds.

The original diagram is No. A4829/1926 *annexed to* D/T 1927. 73. 3114

S. G. File No. S.R. No. E.266/1940.
Degree Sheet 6H8D3/Y53

FOR ENDORSEMENTS SEE BACK OF DIAGRAM

A 6 S.P.C.T.

Location ~~SURVEY~~ DIAGRAM AFFECTING THIS PROPERTY FILED
WITH ..... The Farm N° 183 .....

~~SURVEY~~ RECORD	DIAGRAM NO.	SUBDIVISION	AREA HA./SQ. M.	TITLE PLAN NO.	INITIALED	REMDR.
~~E755/1977~~	~~2956/1977~~	~~Ptn. 34~~	Withdrawn			
E23/80	68/80	Ptn 35	2.3116	3406/81	BC	

1-2 (1)

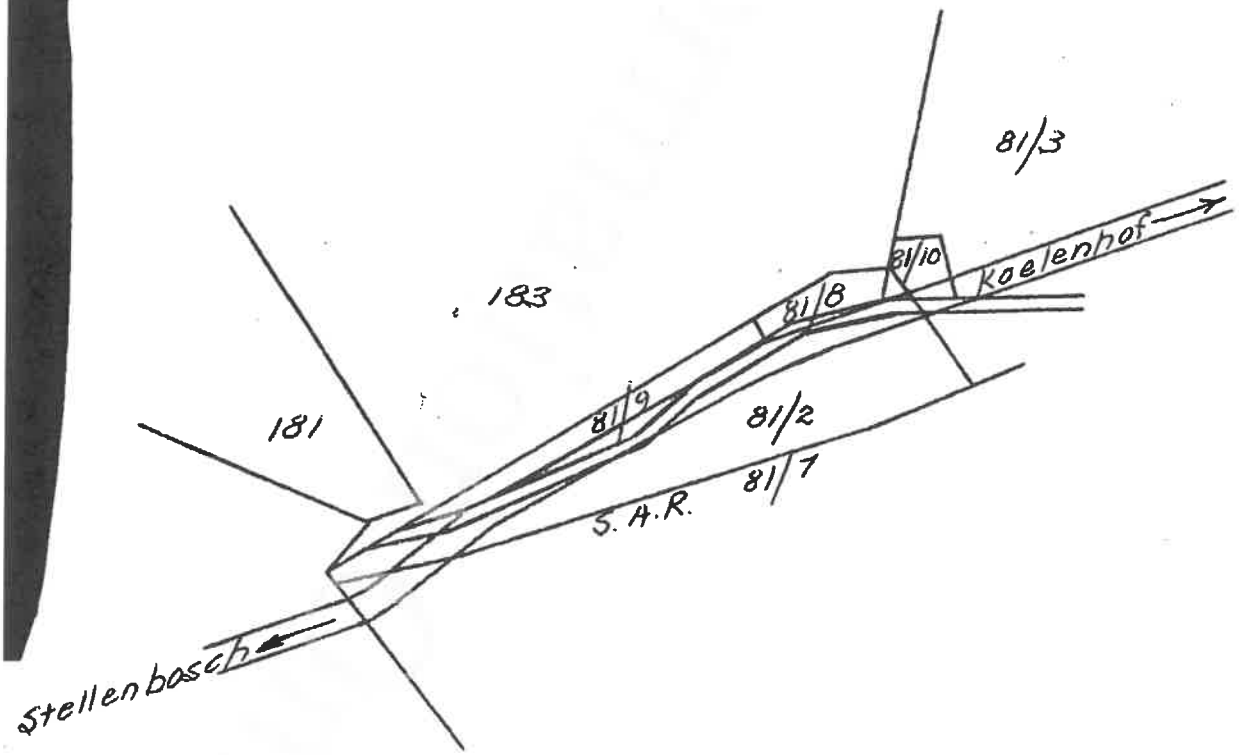
LOCALITY PLAN.



Exp
Gen
62/69

Stbosch
Farms
~~81/7~~
81 B 2

SITE PLAN.



DIVISIONAL COUNCIL OF STELLENBOSCH - EXPROPRIATION DATA.

Owner: Municipality of Stellenbosch. Transfer No. 2866/29.3.40

Address: STELLENBOSCH. Extent: 4.5512 M.

Expr. Area: 1.6196M.

Description: Farm 81/9

Reason: Area required for widening of M.R.4 to statutory width of 160 Cape feet.

Law to watched

No 1(a) Bond for Release by

12448

1954

BOND

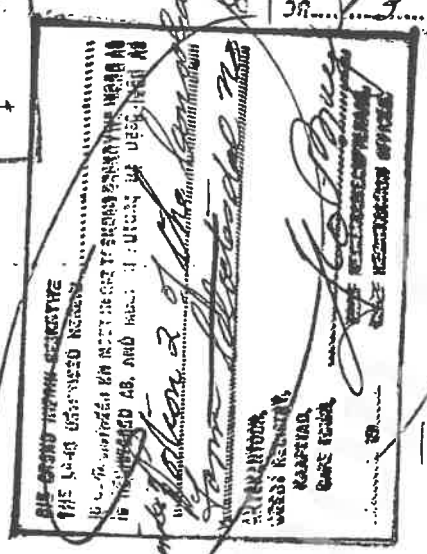
with 1a

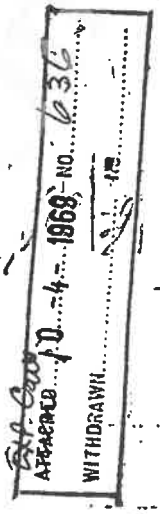
1 1a

(1)

LODGED
4-8-1944

LODGED
29-8-1944





12448

1944

Rezoned
Sec 27 (2) 1934
Sec 27 (3) 1934
Sec 27 (4) 1934

DEED OF TRANSFER

(In pursuance of Section 27 of the Slums Act 1934 No. 53 of 1934)

Prepared by

Conveyancer

Rebate 14-57

KNOW ALL MEN WHOM IT MAY CONCERN:

WHEREAS the Municipality of Stellenbosch with the written approval of the Minister of Public Health has, in terms of Section 17 (1) of the Slums Act 1934 (No. 53 of 1934) entered into a written agreement with

BENNIE POLONSKY
(born 15th September 1906)

for...

for the acquisition from him of the landed property hereinafter more fully described, for the sum of Three Thousand Pounds (£3,000.)

NOW THEREFORE in pursuance of the provisions of Section 27(2) of the said Act, I, the Registrar of Deeds, Cape Town, do hereby cede and transfer in full and free property unto and on behalf of

THE MUNICIPALITY OF STELLENBOSCH

or its Assigns:

Certain piece of land, partly perpetual quitrent and partly freehold, situate in the Division of Stellenbosch, being the remaining extent of Lot A, a portion of Cloetesdal.

MEASURING as per remaining extent Fifteen decimal nought six two nine (15,0629) Morgen.

EXTENDING as the Deed of Transfer with a diagram annexed made in favour of Abraham Gelb and Leopold Maurice Stella, trading in partnership under the style or firm of Gelb and Stella, in equal shares, on the 5th April 1927 No. 3114, and a subsequent Deed of Transfer made in favour of the Appearer's Constituent on the 8th December 1939 No. 13486 will more fully point out.

SUBJECT to such conditions as are referred to in the aforesaid Deed of Transfer No. 3114 dated 5th April 1927, and further subject and entitled to:-

(1) The terms and conditions of the Order of the Water Court District No. 1 dated 4th April 1922, annexed to the Deeds of Transfer Nos. 9199 and 9201, dated 29th December 1900, and endorsed thereon on 2nd May 1922, relative to a division of certain water rights.

(2) The terms and conditions of certain Notarial Deed of Servitude dated 23rd March 1926, annexed to the said two Deeds of Transfer Nos. 9199 and 9201, dated 29th December 1900, and endorsed thereon on the 16th August 1926, relative to certain water rights.

Further subject and entitled to the following special conditions contained in the said Deed of

Transfer...

Transfer No. 3114 dated 5th April 1927, namely:

(a) The owner of Lot Cloetesdal Proper this day transferred to M.C.Vos No. 3112 and his successors in title shall be entitled to use the 40 ft. road shown on the annexed diagram as running from the Railway to the road marked Stellenbosch A Road, crossing the land hereby transferred.

(b) The owner of Lot Cloetesdal Proper this day transferred to M.C.Vos No. 3112 and his successors in title, shall have the right of watering their stock in the Plankenberg River on the land hereby transferred where it crosses the 40 ft. road mentioned in subparagraph (a) above.

(c) The owners of Lots B and C this day transferred to M. Zetler and J.J.B.Myburgh separately Nos. 3115 and 3116 portions of the farm Cloetesdal, and their successors in title, shall not have the right of removing sand from the Plankenberg River, but shall allow its free and uninterrupted flow or wash on to the land hereby transferred, save and except that the said owners, and their successors in title, shall have the right to take such sand as they may require for building purposes on the said Lots B and C.

ENDORSEMENT IN TERMS OF SECTION 31 (8) OF ACT No. 47 OF 1937 (AS AMENDED).
ENDOSSEMENT KRAGTENS ARTIKEL 31 (8) VAN WET Nr. 47 VAN 1937 (SOOS GEWYSIG).
The herein-mentioned property
Die eiendom hierin vermeld
has been expropriated by the Divisional Council of Stellenbosch
is onteien deur die
In terms of Sec. 130 Ord 15 1952
kragtens
Vide Notice of expropriation No. 44121 d.d. 9 April 1969
Vide ... caveat 636/69 ... duplicate filed
Ilasseer
DEEDS OFFICE,
KAAPSTAD.
- 5 -6- 1969
REGISTRAR OF DEEDS,
REGISTRATEUR VAN AKTES.
CAPE TOWN.

a portion of

AND THAT by virtue of these presents:

THE MUNICIPALITY OF STELLENBOSCH

or Its Assigns, now is and henceforth shall be entitled thereto conformably to local Custom; Government, however, reserving its rights;

IN WITNESS WHEREOF, I, the said Registrar, have subscribed to these presents, and have caused the seal of Office to be affixed thereto.

THUS DONE AND EXECUTED at the Office of the Registrar of Deeds in Cape Town in the Province of the Cape of Good Hope on the ~~Fourth~~ Fourth day of the Month of ~~August~~ September in the Year of Our Lord One Thousand Nine Hundred and Forty Four (1944).

In my presence,

REGISTRAR OF DEEDS.

Registered in the Register of
Farms
~~Erven~~
~~Townships~~

Book C5 Folio 261(31)

Clerk-in-Charge.

Date of birth.....
Other identification.....
Proof filed with.....

ANNEXURE D

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

OBJECTIONS RECEIVED AND COMMENT ON OBJECTIONS

1 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 12:44
To: Oarabile@nkanivo.co.za
Subject: FW: Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Simone Stevenson <simone_moller@yahoo.com>
Date: 2025/04/14 12:36 (GMT+02:00)
To: info@nkanivo.co.za, municipal.manager@stellenbosch.gov.za
Subject: Reference: LU/TP917/2024

Nkanivo Development Consultants (PTY) LTD
Tel: 012 807 7445
Email: info@nkanivo.co.za

Geraldine Mettler
Stellenbosch Municipality
Tel: 021 808 8025
Email: municipal.manager@stellenbosch.gov.za

Reference: LU/TP917/2024

I hereby Strongly oppose the planned development of the proposed land planning and rezoning application:

Extract:
"The purpose of the land development application is to then obtain approval of the municipality for the rezoning of the remainder of portion 2 farm Cloetesdal 81 Stellenbosch rd and portion 9 of the farm Cloetesdal 81 Stellenbosch rd in Stellenbosch, western cape province from agricultural rural zone & public roads and parking zone to subdivisional area overlay zone to allow for the following land uses: multi-unit residential zone, public open space zone and public road and parking zone"

Comprehensive Community Concerns: Crime and Loss of Green Spaces
1. Escalation of Criminal Activity
Potential Crime Spillover
• Proximity to High-Crime Areas:
The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may

enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.

• Weakened Deterrent Factors:

Established security measures and community vigilance are fundamental in maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety

• Overburdened SAPS:

The local South African Police Service (SAPS) is already operating under severe resource constraints in response to the ongoing crime issues in Cloetesville. By extending the service area and increasing the population density, there is a real possibility that the local police force will find it even more challenging to effectively monitor and respond to criminal incidents. This may lead to slower response times and fewer proactive policing measures, essentially leaving residents more vulnerable.

• Disruption of Established Security Networks:

Many long-term residents rely on established formal security networks and community-led safety initiatives. The potential influx of new residents from a socioeconomically different background could disrupt these tightly knit, community-based safety measures. At this point there is no guarantee of safety for residents. Local groups in Cloetesville have faltered to maintain safety in their own areas, now the plan is just to create a larger opportunity for criminal elements to take hold of newer developments.

2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

• Essential Community Green Space:

The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

• Erosion of Health and Recreation Benefits:

Green spaces have a well-documented positive impact on mental and physical health. They offer a space for exercise, relaxation, and social interaction, reducing stress and fostering a sense of community. The destruction of these areas for additional housing will not only limit outdoor activities but will also remove a natural defence against urban pollution and noise pollution, leading to a decline in both residents' quality of life and overall community health.

Long-Term Urban Degradation

• Loss of Ecological Balance:

The green space serves as an essential element in maintaining local biodiversity. Its loss could lead to a decline in local flora and fauna, upsetting the ecological balance that contributes to a healthier, more sustainable urban environment. This ecological degradation can contribute to a cycle of environmental decline that affects air quality, water runoff management, and even local climate regulation.

• Aesthetic and Cultural Degradation:

Beyond environmental factors, green spaces provide an aesthetic and cultural value that reflects the identity of our neighbourhood. The unique character of Mount Simon Estate is partially defined by its natural surroundings. Replacing these with development not only diminishes natural beauty but also undermines the cultural and historical identity of

the community, making it less attractive to potential home buyers and long-term residents alike.

3. Broader Implications for Community Cohesion and Property Value
Erosion of Homeowner Investment
• Deterioration of Neighbourhood Reputation:

The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.
• Fragmentation of Socioeconomic Status:

Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.
Societal Costs and Economic Implications
• Impact on Local Services and Infrastructure:

With the population set to increase significantly, local services, particularly the police and emergency responders, may experience further strain. This could result in cuts or reallocations of resources away from current community needs, ultimately affecting the quality of services such as road safety, local healthcare, and emergency responsiveness.
• Long-Term Diminishment of Quality of Life:
The combined impact of increased criminal activity and loss of green spaces contributes to a decline in the overall quality of life. Residents who value a balanced lifestyle with strong community ties, ample recreation, and consistent safety will find these changes particularly detrimental, making long-term residency less viable and reducing the appeal of the neighbourhood for both current and potential homeowners.

Conclusion

In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.

Simone Stevenson

2 (begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 10:47
To: Oarabile@nkanivo.co.za
Subject: FW: OBJECTION TO REZONING REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 FOR SOCIAL HOUSING

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Caro Opperman <opperman.caro@gmail.com>
Date: 2025/04/14 10:36 (GMT+02:00)
To: info@nkanivo.co.za, municipal.manager@stellenbosch.gov.za
Subject: OBJECTION TO REZONING REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 FOR SOCIAL HOUSING

Good day

Reference: LU/TP917/2024

I hereby strongly oppose the planned development of the proposed land planning and rezoning application. Kindly see the reasons and relevant extract as follows:

Extract:

"The purpose of the land development application is to then obtain approval of the municipality for the rezoning of the remainder of portion 2 farm Cloetesdal 81 Stellenbosch rd and portion 9 of the farm Cloetesdal 81 Stellenbosch rd in Stellenbosch, western cape province from agricultural rural zone & public roads and parking zone to subdivisional area overlay zone to allow for the following land uses: multi-unit residential zone, public open space zone and public road and parking zone"

Comprehensive Community Concerns: Crime and Loss of Green Spaces

1. Escalation of Criminal Activity

Potential Crime Spillover

- Proximity to High-Crime Areas:
  The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.

- Weakened Deterrent Factors:
  Established security measures and community vigilance are fundamental in maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety

- Overburdened SAPS:
  The local South African Police Service (SAPS) is already operating under severe resource constraints in response to the ongoing crime issues in Cloetesville. By extending the service area and increasing the population density, there is a real possibility that the local police force will find it even more challenging to effectively monitor and respond to criminal incidents. This may lead to slower response times and fewer proactive policing measures, essentially leaving residents more vulnerable.

- Disruption of Established Security Networks:
  Many long-term residents rely on established formal security networks and community-led safety initiatives. The potential influx of new residents from a socioeconomically different background could disrupt these tightly knit, community-based safety measures. At this point there is no guarantee of safety for residents. Local groups in Cloetesville have faltered to maintain safety in their own areas, now the plan is just to create a larger opportunity for criminal elements to take hold of newer developments.

2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

- Essential Community Green Space:

  The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

- Erosion of Health and Recreation Benefits:

  Green spaces have a well-documented positive impact on mental and physical health. They offer a space for exercise, relaxation, and social interaction, reducing stress and fostering a sense of community. The destruction of these areas for additional housing will not only limit outdoor activities but will also remove a

natural defence against urban pollution and noise pollution, leading to a decline in both residents' quality of life and overall community health.

Long-Term Urban Degradation

- Loss of Ecological Balance:

  The green space serves as an essential element in maintaining local biodiversity. Its loss could lead to a decline in local flora and fauna, upsetting the ecological balance that contributes to a healthier, more sustainable urban environment. This ecological degradation can contribute to a cycle of environmental decline that affects air quality, water runoff management, and even local climate regulation.

- Aesthetic and Cultural Degradation:

  Beyond environmental factors, green spaces provide an aesthetic and cultural value that reflects the identity of our neighbourhood. The unique character of Mount Simon Estate is partially defined by its natural surroundings. Replacing these with development not only diminishes natural beauty but also undermines the cultural and historical identity of the community, making it less attractive to potential home buyers and long-term residents alike.

3. Broader Implications for Community Cohesion and Property Value

Erosion of Homeowner Investment

- Deterioration of Neighbourhood Reputation:

  The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

- Fragmentation of Socioeconomic Status:

  Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.

Societal Costs and Economic Implications

- Impact on Local Services and Infrastructure:

  With the population set to increase significantly, local services, particularly the police and emergency responders, may experience further strain. This could result in cuts or reallocations of resources away from current community needs, ultimately affecting the quality of services such as road safety, local healthcare, and emergency responsiveness.

- Long-Term Diminishment of Quality of Life:
  The combined impact of increased criminal activity and loss of green spaces contributes to a decline in

the overall quality of life. Residents who value a balanced lifestyle with strong community ties, ample recreation, and consistent safety will find these changes particularly detrimental, making long-term residency less viable and reducing the appeal of the neighbourhood for both current and potential homeowners.

Conclusion

In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.

Warm regards

Caro Opperman

073 254 1707

3 (Beg)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 10:46
To: Oarabile@nkanivo.co.za
Subject: FW: Opposing LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Annine Lawrence <annine@untether.co.za>
Date: 2025/04/14 10:32 (GMT+02:00)
To: info@nkanivo.co.za
Cc: municipal.manager@stellenbosch.gov.za
Subject: Opposing LU/TP917/2024

Nkanivo Development Consultants (PTY) LTD
Tel: 012 807 7445
Email: info@nkanivo.co.za

Geraldine Mettler
Stellenbosch Municipality
Tel: 021 808 8025
Email: municipal.manager@stellenbosch.gov.za

Reference:Nkanivo Development Consultants (PTY) LTD
Tel: 012 807 7445
Email: info@nkanivo.co.za

Geraldine Mettler
Stellenbosch Municipality
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Comprehensive Community Concerns: Crime and Loss of Green Spaces
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Potential Crime Spillover
• Proximity to High-Crime Areas:
The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.
• Weakened Deterrent Factors:
Established security measures and community vigilance are fundamental in maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety
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Extract:
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annine lawrence

M: +27 63 026 5051
E: annine@untether.co.za
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Emergency: +27 72 026 6263

+27 84 585 2806

The content of this email is confidential and intended for the recipient specified in message only. It is strictly forbidden to share any part of this message with any third party, without a written consent of the sender. If you received this message by mistake, please reply to this message and follow with its deletion, so that we can ensure such a mistake does not occur in the future.

4 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 10:46
To: Oarabile@nkanivo.co.za
Subject: FW: Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Leannè Rocher <leannerocher@gmail.com>
Date: 2025/04/14 10:32 (GMT+02:00)
To: info@nkanivo.co.za, municipal.manager@stellenbosch.gov.za
Subject: Reference: LU/TP917/2024

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Extract:
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ReplyForward
Add reaction

--
Kind Regards/ Vriendelike Groete,

Leannè Rocher

082 553 8254

5(begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 10:29
To: Oarabile@nkanivo.co.za
Subject: FW: Opposing planned development LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Annine Lawrence <anninevdwjag@gmail.com>
Date: 2025/04/14 10:26 (GMT+02:00)
To: info@nkanivo.co.za
Cc: municipal.manager@stellenbosch.gov.za
Subject: Opposing planned development LU/TP917/2024

Nkanivo Development Consultants (PTY) LTD
Tel: 012 807 7445
Email: info@nkanivo.co.za

Geraldine Mettler
Stellenbosch Municipality
Tel: 021 808 8025
Email: municipal.manager@stellenbosch.gov.za

Reference: LU/TP917/2024

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6 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 10:24
To: Oarabile@nkanivo.co.za
Subject: FW: Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Christoff Snyman <mr_snyman@hotmail.com>
Date: 2025/04/14 10:21 (GMT+02:00)
To: municipal.manager@stellenbosch.gov.za, info@nkanivo.co.za
Subject: Reference: LU/TP917/2024

Nkanivo Development Consultants (PTY) LTD

Tel: 012 807 7445

Email: info@nkanivo.co.za

Geraldine Mettler

Stellenbosch Municipality

Tel: 021 808 8025

Email: municipal.manager@stellenbosch.gov.za

Reference: LU/TP917/2024

I hereby Strongly oppose the planned development of the proposed land planning and rezoning application:

Extract:

"The purpose of the land development application is to then obtain approval of the municipality for the rezoning of the remainder of portion 2 farm Cloetesdal 81 Stellenbosch rd and portion 9 of the farm Cloetesdal 81 Stellenbosch rd in Stellenbosch, western cape province from agricultural rural zone & public

roads and parking zone to subdivisional area overlay zone to allow for the following land uses: multi-unit residential zone, public open space zone and public road and parking zone"

Comprehensive Community Concerns: Crime and Loss of Green Spaces

1. Escalation of Criminal Activity

Potential Crime Spillover

- **Proximity to High-Crime Areas:**
  The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.
- **Weakened Deterrent Factors:**
  Established security measures and community vigilance are fundamental in maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety

- **Overburdened SAPS:**
  The local South African Police Service (SAPS) is already operating under severe resource constraints in response to the ongoing crime issues in Cloetesville. By extending the service area and increasing the population density, there is a real possibility that the local police force will find it even more challenging to effectively monitor and respond to criminal incidents. This may lead to slower response times and fewer proactive policing measures, essentially leaving residents more vulnerable.
- **Disruption of Established Security Networks:**
  Many long-term residents rely on established formal security networks and community-led safety initiatives. The potential influx of new residents from a socioeconomically different background could disrupt these tightly knit, community-based safety measures. At this point there is no guarantee of safety for residents. Local groups in Cloetesville have faltered to maintain safety in their own areas, now the plan is just to create a larger opportunity for criminal elements to take hold of newer developments.

2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

- **Essential Community Green Space:**

  The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

- **Erosion of Health and Recreation Benefits:**

  Green spaces have a well-documented positive impact on mental and physical health. They offer a space for exercise, relaxation, and social interaction, reducing stress and fostering a sense of community. The destruction of these areas for additional housing will not only limit outdoor activities but will also remove a natural defence against urban pollution and noise pollution, leading to a decline in both residents' quality of life and overall community health.

Long-Term Urban Degradation

- **Loss of Ecological Balance:**

  The green space serves as an essential element in maintaining local biodiversity. Its loss could lead to a decline in local flora and fauna, upsetting the ecological balance that contributes to a healthier, more sustainable urban environment. This ecological degradation can contribute to a cycle of environmental decline that affects air quality, water runoff management, and even local climate regulation.

- **Aesthetic and Cultural Degradation:**

  Beyond environmental factors, green spaces provide an aesthetic and cultural value that reflects the identity of our neighbourhood. The unique character of Mount Simon Estate is partially defined by its natural surroundings. Replacing these with development not only diminishes natural beauty but also undermines the cultural and historical identity of the community, making it less attractive to potential home buyers and long-term residents alike.

3. Broader Implications for Community Cohesion and Property Value

Erosion of Homeowner Investment

- **Deterioration of Neighbourhood Reputation:**

  The introduction of a large-scale social housing project adjacent to an area known for its relative

tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

- **Fragmentation of Socioeconomic Status:**

  Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.

Societal Costs and Economic Implications

- **Impact on Local Services and Infrastructure:**

  With the population set to increase significantly, local services, particularly the police and emergency responders, may experience further strain. This could result in cuts or reallocations of resources away from current community needs, ultimately affecting the quality of services such as road safety, local healthcare, and emergency responsiveness.

- **Long-Term Diminishment of Quality of Life:**
  The combined impact of increased criminal activity and loss of green spaces contributes to a decline in the overall quality of life. Residents who value a balanced lifestyle with strong community ties, ample recreation, and consistent safety will find these changes particularly detrimental, making long-term residency less viable and reducing the appeal of the neighbourhood for both current and potential homeowners.

Conclusion

In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.

Regards,

MR JC SNYMAN
OWNER
MOUNT SIMON ESTATE
0834687977

6 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 14:12
To: Oarabile@nkanivo.co.za
Subject: FW: Reference: LU/TP917/2024

Sent from my Galaxy

-------- Original message --------
From: christoff@tutella.co.za
Date: 2025/04/14 13:55 (GMT+02:00)
To: info@nkanivo.co.za, municipal.manager@stellenbosch.gov.za
Subject: Reference: LU/TP917/2024

Nkanivo Development Consultants (PTY) LTD

Tel: 012 807 7445

Email: info@nkanivo.co.za

Geraldine Mettler

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---

1. Safety Concerns and Increased Crime Risks

Potential for Crime Spillover

- Encroachment from High-Crime Areas:
  The application clearly positions the development near existing settlements like Cloetesville, where crime rates are already high. With 816 new units, there is a significant risk that criminal elements and associated disturbances from Cloetesville could spill over into the Mount Simon Estate area. This proximity facilitates easier movement for offenders and may invite burglaries, vandalism, and other types of criminal activity into an area that has hitherto enjoyed a relatively secure environment.
- Strain on Limited Law Enforcement:
  The local SAPS are under considerable pressure to manage current crime levels in Cloetesville. Adding a large influx of residents from low-income housing could further stretch these resources. With increased calls for service, reduced police visibility, and slower emergency response times, the residents of Mount Simon Estate could find themselves more vulnerable during critical moments.

Traffic-Related Safety Hazards

- Increased Traffic and Congestion:
-

  The design of the development calls for using the same entrance currently servicing Mount Simon Estate. This convergence is expected to increase both vehicular volume and pedestrian traffic. The congestion not only elevates the risk of road accidents but also complicates access for emergency vehicles. In emergencies, this delay could have a profound impact on response times and overall public safety.

-
- Community Disruption:
-

  As traffic intensifies, pedestrian safety becomes compromised. Families, children, and elderly residents may face heightened risks when crossing roads or when local emergency responders struggle to navigate through crowded access points, further undermining the established safety network of the community.

---

2. Negative Impact on Green Spaces and the Local Environment

Loss of Critical Community Greenspace

- Reduction of Open and Recreational Areas:
-

  The rezoning application seeks to replace portions of the agricultural rural zone with multi-unit residential buildings, alongside dedicated public open space areas. However, much of the remaining green space around Mount Simon Estate is already limited, and the proposed development is set to consume these areas. Green space is not just a luxury; it provides essential benefits like cleaner air, opportunities for physical exercise, and a place for community gatherings. Their reduction would diminish the quality of life and adversely affect both environmental health and resident well-being.

-
- Environmental Degradation:
-

  Losing green space has implications beyond aesthetics. Natural areas act as buffers against urban pollution, help regulate local temperatures, and support biodiversity. The conversion of these spaces to dense urban housing disrupts this balance, potentially leading to higher temperatures, increased dust and noise pollution, and a reduced capacity for the area to support local flora and fauna.

Implications for Community Identity and Property Values

- Erosion of Neighbourhood Character:
-

  The green spaces and well-managed open areas serve as a defining characteristic of Mount Simon Estate. These elements are part of what makes the community attractive to homeowners. The planned development could dilute the visual and experiential quality of the environment, leading to a loss of community identity that has been carefully cultivated over time.

-
- Detrimental Effects on Property Values:
-

  Homeowners in established areas like Mount Simon Estate place a high value on environmental aesthetics and safety. The introduction of low-income residential units nearby, combined with the loss of green spaces, risks depreciating property values. Prospective buyers may be deterred by the prospect of increased crime, heightened traffic, and diminished natural amenities—a situation that not only impacts current homeowners economically but also jeopardizes future investments in the neighbourhood.

3. Broader Impact on Traffic and Infrastructure

Increased Pressure on Local Roadways

- Augmented Traffic Towards Stellenbosch:
-

  The development's location and design imply a significant increase in commuter traffic along the shared entrance road (R304). Residents of Mount Simon Estate, along with users of the new development, will impose additional stress on road infrastructure that is already burdened. With Stellenbosch serving as a crucial urban hub, any extra congestion can lead to longer travel times, increased fuel consumption, and potentially more traffic-related incidents.

-
- Compromised Emergency and Daily Commutes:
-

  As the volume of vehicles increases, both everyday commuting and emergency services may be affected. The shared access point does not only pose a risk for higher accident rates; it may also result in chronic delays that hamper daily routines and reduce overall accessibility, further straining the community's resilience during peak times.

Infrastructure and Public Service Strain

- Overburdened Public Amenities:
-

  In addition to traffic concerns, the community's infrastructure—including road maintenance, public safety, and utility services—may be stretched beyond its current capacity. This infrastructural strain could lead to deteriorating conditions over time, making it harder for local authorities to maintain the high living standards that residents of Mount Simon Estate currently enjoy.

Conclusion

The rezoning application for 816 social housing units, as detailed in the proposed document, presents a number of negative implications for the Mount Simon Estate area. From a safety perspective, the development could exacerbate local crime levels by encouraging spillover from adjacent high-crime areas, while further stretching already limited law enforcement resources. Traffic congestion—especially at shared access points—raises serious concerns over increased accident risks and delayed emergency responses. Additionally, the inevitable reduction in precious green space would not only compromise the environmental quality and aesthetic appeal of the neighbourhood but would also likely precipitate a decline in property values.

In summary, the integration of this large-scale, low-income social housing development into the vicinity of Mount Simon Estate threatens to undermine community safety, environmental health, and long-term property investment. It is critical that these concerns are highlighted during the public participation process to ensure that the planning and development process addresses the legitimate interests of existing residents.

Regards,

Christoff Snyman
Security Service provider to Mount Simon Estate

7 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 20:19
To: Oarabile@nkanivo.co.za
Subject: FW: Complaint Against Development

Sent from my Galaxy

-------- Original message --------
From: Jani Harmse <jani@yukidesign.co.za>
Date: 2025/04/14 20:12 (GMT+02:00)
To: info@nkanivo.co.za, municipal.manager@stellenbosch.gov.za
Subject: Complaint Against Development

Reference: LU/TP917/2024

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Extract:
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Comprehensive Community Concerns: Crime and Loss of Green Spaces

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- **Weakened Deterrent Factors:**

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Strain on Law Enforcement and Community Safety

- **Overburdened SAPS:**

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The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood'sreputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

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Societal Costs and Economic Implications

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22 April 2025

Nkanivo Development Consultants (PTY) LTD

Tel: 012 807 7445

Email: info@nkanivo.co.za

Geraldine Mettler

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2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

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  The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

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Yours sincerely

Elize van der Merwe

Owner of 1 Overberg Road, Mt Simon Estate

8 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 14 April 2025 12:44
To: Oarabile@nkanivo.co.za
Subject: FW: Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Simone Stevenson <simone_moller@yahoo.com>
Date: 2025/04/14 12:36 (GMT+02:00)
To: info@nkanivo.co.za, municipal.manager@stellenbosch.gov.za
Subject: Reference: LU/TP917/2024

Nkanivo Development Consultants (PTY) LTD
Tel: 012 807 7445
Email: info@nkanivo.co.za

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Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.
Societal Costs and Economic Implications
• Impact on Local Services and Infrastructure:

With the population set to increase significantly, local services, particularly the police and emergency responders, may experience further strain. This could result in cuts or reallocations of resources away from current community needs, ultimately affecting the quality of services such as road safety, local healthcare, and emergency responsiveness.
• Long-Term Diminishment of Quality of Life:
The combined impact of increased criminal activity and loss of green spaces contributes to a decline in the overall quality of life. Residents who value a balanced lifestyle with strong community ties, ample recreation, and consistent safety will find these changes particularly detrimental, making long-term residency less viable and reducing the appeal of the neighbourhood for both current and potential homeowners.

Conclusion

In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.

Simone Stevenson

9 (begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Tuesday, 06 May 2025 12:58
To: Oarabile@nkanivo.co.za
Subject: FW: [EX] Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: mm <Municipal.Manager@stellenbosch.gov.za>
Date: 2025/05/06 12:50 (GMT+02:00)
To: info@nkanivo.co.za
Subject: FW: [EX] Reference: LU/TP917/2024

fya

STELLENBOS
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MUNISIPALITEIT • UMASIPALA • MU

About Stellenbosch Municipality
Our mission is to deliver cost-effective services that will provide the most enabling environment for civil and corporate citizens.
Our head office is at Town House Complex, Plein Street, Stellenbosch, 7600, South Africa.
For more information about Stellenbosch Municipality, please call +2721-808-8111, or visit www.stellenbosch.gov.za

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From: Chevonne Carstens <carstenschevonne@gmail.com>
Sent: Monday, 14 April 2025 10:35
To: mm <Municipal.Manager@stellenbosch.gov.za>
Subject: [EX] Reference: LU/TP917/2024

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Reference: LU/TP917/2024

I hereby Strongly oppose the planned development of the proposed land planning and rezoning application:

Extract:

"The purpose of the land development application is to then obtain approval of the municipality for the rezoning of the remainder of portion 2 farm Cloetesdal 81 Stellenbosch rd and portion 9 of the farm Cloetesdal 81 Stellenbosch rd in Stellenbosch, western cape province from agricultural rural zone & public roads and parking zone to subdivisional area overlay zone to allow for the following land uses: multi-unit residential zone, public open space zone and public road and parking zone"

Comprehensive Community Concerns: Crime and Loss of Green Spaces

1. Escalation of Criminal Activity

Potential Crime Spillover

Proximity to High-Crime Areas:

The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.

Weakened Deterrent Factors:

Established security measures and community vigilance are fundamental in maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety

Overburdened SAPS:

The local South African Police Service (SAPS) is already operating under severe resource constraints in response to the ongoing crime issues in Cloetesville. By extending the service area and increasing the population density, there is a real possibility that the local police force will find it even more challenging to effectively monitor and respond to criminal incidents. This may lead to slower response times and fewer proactive policing measures, essentially leaving residents more vulnerable.

Disruption of Established Security Networks:

Many long-term residents rely on established formal security networks and community-led safety initiatives. The potential influx of new residents from a socioeconomically different background could disrupt these tightly knit, community-based safety measures. At this point there is no guarantee of safety for residents. Local groups in Cloetesville have faltered to maintain safety in their own areas, now the plan is just to create a larger opportunity for criminal elements to take hold of newer developments.

2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

Essential Community Green Space:

The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

Erosion of Health and Recreation Benefits:

Green spaces have a well-documented positive impact on mental and physical health. They offer a space for exercise, relaxation, and social interaction, reducing stress and fostering a sense of community. The destruction of these areas for additional housing will not only limit outdoor activities but will also remove a natural defence against urban pollution and noise pollution, leading to a decline in both residents' quality of life and overall community health.

Long-Term Urban Degradation

Loss of Ecological Balance:

The green space serves as an essential element in maintaining local biodiversity. Its loss could lead to a decline in local flora and fauna, upsetting the ecological balance that contributes to a healthier, more sustainable urban environment. This ecological degradation can contribute to a cycle of environmental decline that affects air quality, water runoff management, and even local climate regulation.

Aesthetic and Cultural Degradation:

Beyond environmental factors, green spaces provide an aesthetic and cultural value that reflects the identity of our neighbourhood. The unique character of Mount Simon Estate is partially defined by its natural surroundings. Replacing these with development not only diminishes natural beauty but also undermines the cultural and historical identity of the community, making it less attractive to potential home buyers and long-term residents alike.

3. Broader Implications for Community Cohesion and Property Value

Erosion of Homeowner Investment

Deterioration of Neighbourhood Reputation:

The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

Fragmentation of Socioeconomic Status:

Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.

Societal Costs and Economic Implications

Impact on Local Services and Infrastructure:

With the population set to increase significantly, local services, particularly the police and emergency responders, may experience further strain. This could result in cuts or reallocations of resources away from current community needs, ultimately affecting the quality of services such as road safety, local healthcare, and emergency responsiveness.

Long-Term Diminishment of Quality of Life:

The combined impact of increased criminal activity and loss of green spaces contributes to a decline in the overall quality of life. Residents who value a balanced lifestyle with strong community ties, ample recreation, and consistent safety will find these changes particularly detrimental, making long-term residency less viable and reducing the appeal of the neighbourhood for both current and potential homeowners.

Conclusion

In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.

10(Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Tuesday, 06 May 2025 12:49
To: Oarabile@nkanivo.co.za
Subject: FW: [EX] Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: mm <Municipal.Manager@stellenbosch.gov.za>
Date: 2025/05/06 12:47 (GMT+02:00)
To: info@nkanivo.co.za
Subject: FW: [EX] Reference: LU/TP917/2024

FYA

STELLENBOS

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Our mission is to deliver cost-effective services that will provide the most enabling environment for civil and corporate citizens.
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From: Megan Carstens <megancarstens95@gmail.com>
Sent: Monday, 14 April 2025 10:34
To: mm <Municipal.Manager@stellenbosch.gov.za>
Subject: [EX] Reference: LU/TP917/2024

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Reference: LU/TP917/2024

I hereby Strongly oppose the planned development of the proposed land planning and rezoning application:

Extract:

"The purpose of the land development application is to then obtain approval of the municipality for the rezoning of the remainder of portion 2 farm Cloetesdal 81 Stellenbosch rd and portion 9 of the farm Cloetesdal 81 Stellenbosch rd in Stellenbosch, western cape province from agricultural rural zone & public roads and parking zone to subdivisional area overlay zone to allow for the following land uses: multi-unit residential zone, public open space zone and public road and parking zone"

Comprehensive Community Concerns: Crime and Loss of Green Spaces

1. Escalation of Criminal Activity

Potential Crime Spillover

Proximity to High-Crime Areas:

The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.

Weakened Deterrent Factors:

Established security measures and community vigilance are fundamental in maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety

Overburdened SAPS:

The local South African Police Service (SAPS) is already operating under severe resource constraints in response to the ongoing crime issues in Cloetesville. By extending the service area and increasing the population density, there is a real possibility that the local police force will find it even more challenging to effectively monitor and respond to criminal incidents. This may lead to slower response times and fewer proactive policing measures, essentially leaving residents more vulnerable.

Disruption of Established Security Networks:

Many long-term residents rely on established formal security networks and community-led safety initiatives. The potential influx of new residents from a socioeconomically different background could disrupt these tightly knit, community-based safety measures. At this point there is no guarantee of safety for residents. Local groups in Cloetesville have faltered to maintain safety in their own areas, now the plan is just to create a larger opportunity for criminal elements to take hold of newer developments.

2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

Essential Community Green Space:

The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

Erosion of Health and Recreation Benefits:

Green spaces have a well-documented positive impact on mental and physical health. They offer a space for exercise, relaxation, and social interaction, reducing stress and fostering a sense of community. The destruction of these areas for additional housing will not only limit outdoor activities but will also remove a natural defence against urban pollution and noise pollution, leading to a decline in both residents' quality of life and overall community health.

Long-Term Urban Degradation

Loss of Ecological Balance:

The green space serves as an essential element in maintaining local biodiversity. Its loss could lead to a decline in local flora and fauna, upsetting the ecological balance that contributes to a healthier, more sustainable urban environment. This ecological degradation can contribute to a cycle of environmental decline that affects air quality, water runoff management, and even local climate regulation.

Aesthetic and Cultural Degradation:

Beyond environmental factors, green spaces provide an aesthetic and cultural value that reflects the identity of our neighbourhood. The unique character of Mount Simon Estate is partially defined by its natural surroundings. Replacing these with development not only diminishes natural beauty but also undermines the cultural and historical identity of the community, making it less attractive to potential home buyers and long-term residents alike.

3. Broader Implications for Community Cohesion and Property Value

Erosion of Homeowner Investment

Deterioration of Neighbourhood Reputation:

The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

Fragmentation of Socioeconomic Status:

Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.

Societal Costs and Economic Implications

Impact on Local Services and Infrastructure:

With the population set to increase significantly, local services, particularly the police and emergency responders, may experience further strain. This could result in cuts or reallocations of resources away from current community needs, ultimately affecting the quality of services such as road safety, local healthcare, and emergency responsiveness.

Long-Term Diminishment of Quality of Life:

The combined impact of increased criminal activity and loss of green spaces contributes to a decline in the overall quality of life. Residents who value a balanced lifestyle with strong community ties, ample recreation, and consistent safety will find these changes particularly detrimental, making long-term residency less viable and reducing the appeal of the neighbourhood for both current and potential homeowners.

Conclusion

In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.

11 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 05 May 2025 16:16
To: Oarabile@nkanivo.co.za
Subject: FW: Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Jillian <williamsjilliandonne@gmail.com>
Date: 2025/05/05 16:08 (GMT+02:00)
To: municipal.manager@stellenbosch.gov.za, info@nkanivo.co.za
Subject: Reference: LU/TP917/2024

I hereby Strongly oppose the planned development of the proposed land planning and rezoning application:

Extract:

"The purpose of the land development application is to then obtain approval of the municipality for the rezoning of the remainder of portion 2 farm Cloetesdal 81 Stellenbosch rd and portion 9 of the farm Cloetesdal 81 Stellenbosch rd in Stellenbosch, western cape province from agricultural rural zone & public roads and parking zone to subdivisional area overlay zone to allow for the following land uses: multi-unit residential zone, public open space zone and public road and parking zone"

Comprehensive Community Concerns: Crime and Loss of Green Spaces

1. Escalation of Criminal Activity

Potential Crime Spillover

- **Proximity to High-Crime Areas:**
  The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social

housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.

- **Weakened Deterrent Factors:**
  Established security measures and community vigilance are fundamental in maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety

- **Overburdened SAPS:**
  The local South African Police Service (SAPS) is already operating under severe resource constraints in response to the ongoing crime issues in Cloetesville. By extending the service area and increasing the population density, there is a real possibility that the local police force will find it even more challenging to effectively monitor and respond to criminal incidents. This may lead to slower response times and fewer proactive policing measures, essentially leaving residents more vulnerable.
- **Disruption of Established Security Networks:**
  Many long-term residents rely on established formal security networks and community-led safety initiatives. The potential influx of new residents from a socioeconomically different background could disrupt these tightly knit, community-based safety measures. At this point there is no guarantee of safety for residents. Local groups in Cloetesville have faltered to maintain safety in their own areas, now the plan is just to create a larger opportunity for criminal elements to take hold of newer developments.

2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

- **Essential Community Green Space:**

  The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.
- **Erosion of Health and Recreation Benefits:**

  Green spaces have a well-documented positive impact on mental and physical health. They offer a space for exercise, relaxation, and social interaction, reducing stress and fostering a sense of community. The destruction of these areas for additional housing will not only limit outdoor activities but will also remove a natural defence against urban pollution and noise pollution, leading to a decline in both residents' quality of life and overall community health.

--
Kind Regards,
Jillian Donné Williams

12 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 12 May 2025 16:55
To: Oarabile@nkanivo.co.za
Subject: FW: Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Odelia Snyman <workodelia@gmail.com>
Date: 2025/05/12 16:49 (GMT+02:00)
To: info@nkanivo.co.za, municipal.manager@stellenbosch.gov.za
Subject: Reference: LU/TP917/2024

Good day

I am an owner and resident of Mount Simon Estate Stellenbosch.

With this email I hereby Strongly oppose the planned development of the proposed land planning and rezoning application.

Comprehensive Community Concerns: Crime and Loss of Green Spaces
1. Escalation of Criminal Activity
Potential Crime Spillover
• Proximity to High-Crime Areas:
The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.
• Weakened Deterrent Factors:
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Strain on Law Enforcement and Community Safety

• Overburdened SAPS:
The local South African Police Service (SAPS) is already operating under severe resource constraints in response to the

ongoing crime issues in Cloetesville. By extending the service area and increasing the population density, there is a real possibility that the local police force will find it even more challenging to effectively monitor and respond to criminal incidents. This may lead to slower response times and fewer proactive policing measures, essentially leaving residents more vulnerable.

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Many long-term residents rely on established formal security networks and community-led safety initiatives. The potential influx of new residents from a socioeconomically different background could disrupt these tightly knit, community-based safety measures. At this point there is no guarantee of safety for residents. Local groups in Cloetesville have faltered to maintain safety in their own areas, now the plan is just to create a larger opportunity for criminal elements to take hold of newer developments.

2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

• Essential Community Green Space:

The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

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Long-Term Urban Degradation

• Loss of Ecological Balance:

The green space serves as an essential element in maintaining local biodiversity. Its loss could lead to a decline in local flora and fauna, upsetting the ecological balance that contributes to a healthier, more sustainable urban environment. This ecological degradation can contribute to a cycle of environmental decline that affects air quality, water runoff management, and even local climate regulation.

• Aesthetic and Cultural Degradation:

Beyond environmental factors, green spaces provide an aesthetic and cultural value that reflects the identity of our neighbourhood. The unique character of Mount Simon Estate is partially defined by its natural surroundings. Replacing these with development not only diminishes natural beauty but also undermines the cultural and historical identity of the community, making it less attractive to potential home buyers and long-term residents alike.

3. Broader Implications for Community Cohesion and Property Value

Erosion of Homeowner Investment

• Deterioration of Neighbourhood Reputation:

The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

• Fragmentation of Socioeconomic Status:

Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.

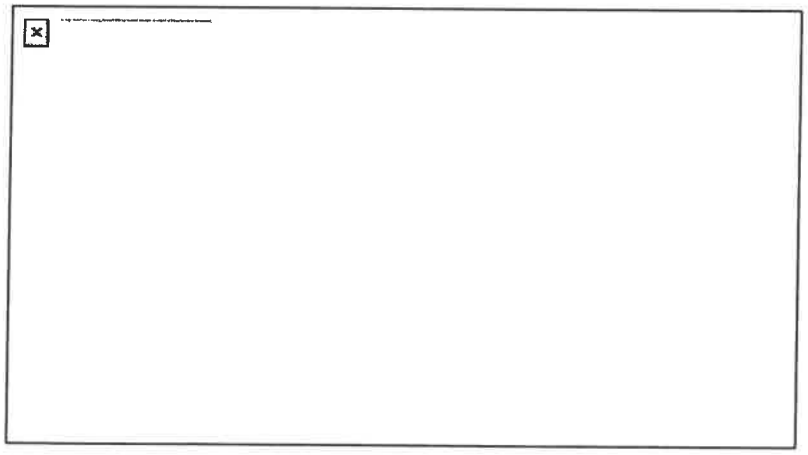
Societal Costs and Economic Implications
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--



Nkanivo Development Consultants (PTY) LTD

Tel: 012 807 7445

Email: info@nkanivo.co.za

Geraldine Mettler

Stellenbosch Municipality

Tel: 021 808 8025

Email: municipal.manager@stellenbosch.gov.za

Reference: LU/TP917/2024

Subject: Strong Objection to Proposed Land Rezoning and Development Application: Cloetesdal 81, Stellenbosch

---

I hereby strongly oppose the proposed land rezoning and development application concerning:

Extract from the Application:
"The purpose of the land development application is to obtain municipal approval for the rezoning of the remainder of Portion 2 of Farm Cloetesdal 81 Stellenbosch Rd and Portion 9 of Farm Cloetesdal 81 Stellenbosch Rd in Stellenbosch, Western Cape Province, from Agricultural Rural Zone and Public Roads and Parking Zone to Subdivisional Area Overlay Zone. This will allow for the following land uses: Multi-Unit Residential Zone, Public Open Space Zone, and Public Road and Parking Zone."

Comprehensive Community Concerns

---

1. Escalation of Criminal Activity

Potential Crime Spillover

- **Proximity to High-Crime Areas:**
  Cloetesville already struggles with significant criminal activity. Placing 816 social housing units adjacent to Mount Simon Estate risks facilitating a spillover effect. This new development could create a conduit for criminal elements, increasing incidents of burglary, vandalism, and other criminal behavior. We've experienced a

disturbing trend of police inaction, leaving residents vulnerable to crime without recourse.

- **Weakened Security Deterrents:**
  The character and security of Mount Simon Estate are preserved through strong community vigilance and private security infrastructure. Introducing a high-density development with significant socioeconomic challenges risks undermining these deterrents. Criminals may see this expansion as an opportunity, perceiving it as a less secure area, putting residents at further risk. We cannot allow gang activity or drug-related crimes to infiltrate our neighbourhood, especially when municipal authorities cannot ensure our safety.

Strain on Law Enforcement and Public Safety

- **Overburdened SAPS:**
  The South African Police Service in the area is already overstretched. Expanding their jurisdiction through increased population density will dilute their capacity further, resulting in longer response times and reduced preventative policing. This would significantly compromise the safety of existing and future residents.
- **Disruption of Community-Led Security Initiatives:**
  Our neighbourhood relies on well-organized security networks. Introducing a large number of residents from socioeconomically diverse backgrounds—without a proven integration plan—threatens to disrupt these structures. Community groups in Cloetesville have already struggled to maintain safety; expanding into new developments without adequate planning will only worsen this trend.

---

2. Irreversible Loss of Green Spaces

Environmental and Social Consequences

- **Destruction of Essential Community Green Space:**
  The green belts around Mount Simon Estate are not empty land—they are vital community assets. They provide space for recreation, contribute to cleaner air, mitigate heat, and enhance mental well-being. Replacing them with concrete developments is an unacceptable trade-off that diminishes the quality of life for current and future residents.
- **Loss of Health and Recreational Benefits:**
  Green spaces are proven to improve physical and mental health. Eliminating them will reduce opportunities for exercise, social interaction, and stress relief. Urban development at this scale also introduces increased noise and pollution, directly impacting health and wellness.

Long-Term Urban and Ecological Decline

- **Loss of Biodiversity and Ecological Balance:**
  These green areas are crucial to maintaining local biodiversity. Their destruction risks reducing animal and plant populations and will negatively impact air and

water quality, drainage, and temperature moderation—leading to an unsustainable urban ecosystem.

- **Cultural and Aesthetic Degradation:**
  Natural landscapes are an integral part of our community's character. Their loss diminishes the aesthetic value of the area and erodes cultural and historical identity, making the neighbourhood less desirable to current homeowners and prospective buyers.

---

3. Community Cohesion and Property Value

Negative Impact on Investments and Social Dynamics

- **Reputational Damage and Decreased Property Values:**
  A large-scale social housing development adjacent to a stable, owner-occupied community can change perceptions of the area, potentially deterring investment and lowering property values. Concerns over safety, overcrowding, and environmental loss all contribute to a less desirable living environment.
- **Socioeconomic Disparities and Fragmentation:**
  Integrating communities without a strategy to manage differing economic and social conditions creates divisions. These fractures can undermine neighbourhood cohesion and hinder collaboration on safety and community enhancement efforts.

Strain on Local Infrastructure and Services

- **Overloaded Services:**
  The development will place increased demand on existing services including law enforcement, healthcare, and emergency response. Without proportional investment and planning, the quality of service for all residents—new and existing—will suffer.
- **Long-Term Quality of Life Decline:**
  The cumulative effect of heightened crime, reduced green space, social fragmentation, and infrastructure strain threatens the liveability of the area. Families who value a safe, clean, and cohesive community will find these changes unacceptable.

Conclusion

In conclusion, this development raises significant concerns that cannot be ignored. It risks:

- Enabling criminal activity to spread,
- Destroying vital green spaces,
- Eroding neighbourhood character,
- Decreasing property values, and
- Undermining community safety and cohesion.

We, as concerned residents and stakeholders, urge the municipality to reject this rezoning and development application. A more balanced, integrated urban planning strategy must be pursued—one that respects existing communities, protects natural resources, and prioritizes safety and sustainability.

Mount Simon Estate deserves better.



Signed

Marie Kruger

4 Overberg Street

(Owner)

Mt Simone Estate

Nkanivo Development Consultants (PTY) LTD

Tel: 012 807 7445

Email: info@nkanivo.co.za

Geraldine Mettler

Stellenbosch Municipality

Tel: 021 808 8025

Email: municipal.manager@stellenbosch.gov.za

Reference: LU/TP917/2024

I hereby Strongly oppose the planned development of the proposed land planning and rezoning application:

Extract:

"The purpose of the land development application is to then obtain approval of the municipality for the rezoning of the remainder of portion 2 farm Cloetesdal 81 Stellenbosch rd and portion 9 of the farm Cloetesdal 81 Stellenbosch rd in Stellenbosch, western cape province from agricultural rural zone & public roads and parking zone to subdivisional area overlay zone to allow for the following land uses: multi-unit residential zone, public open space zone and public road and parking zone"

Comprehensive Community Concerns: Crime and Loss of Green Spaces

1. Escalation of Criminal Activity

Potential Crime Spillover

- **Proximity to High-Crime Areas:**
  The existing challenges in Cloetesville raise significant concerns about a spillover effect. Adding 816 social housing units adjacent to Mount Simon Estate will inadvertently create a bridge for criminal elements. The physical closeness may enable individuals with nefarious intents to operate with less detection, increasing the risk that criminal activities such as burglaries, vandalism, and other disturbances might migrate into our neighbourhood. We have had numerous incidents where the police are just not responding to crime and where criminals are targeting local residents.
- **Weakened Deterrent Factors:**
  Established security measures and community vigilance are fundamental in

maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety

- **Overburdened SAPS:**
  The local South African Police Service (SAPS) is already operating under severe resource constraints in response to the ongoing crime issues in Cloetesville. By extending the service area and increasing the population density, there is a real possibility that the local police force will find it even more challenging to effectively monitor and respond to criminal incidents. This may lead to slower response times and fewer proactive policing measures, essentially leaving residents more vulnerable.
- **Disruption of Established Security Networks:**
  Many long-term residents rely on established formal security networks and community-led safety initiatives. The potential influx of new residents from a socioeconomically different background could disrupt these tightly knit, community-based safety measures. At this point there is no guarantee of safety for residents. Local groups in Cloetesville have faltered to maintain safety in their own areas, now the plan is just to create a larger opportunity for criminal elements to take hold of newer developments.

2. Irreversible Loss of Green Spaces

Environmental and Social Impacts

- **Essential Community Green Space:**

  The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

- **Erosion of Health and Recreation Benefits:**

  Green spaces have a well-documented positive impact on mental and physical health. They offer a space for exercise, relaxation, and social interaction, reducing stress and fostering a sense of community. The destruction of these areas for additional housing will not only limit outdoor activities but will also remove a natural defence against urban pollution and noise pollution, leading to a decline in both residents' quality of life and

overall community health.

Long-Term Urban Degradation

- **Loss of Ecological Balance:**

  The green space serves as an essential element in maintaining local biodiversity. Its loss could lead to a decline in local flora and fauna, upsetting the ecological balance that contributes to a healthier, more sustainable urban environment. This ecological degradation can contribute to a cycle of environmental decline that affects air quality, water runoff management, and even local climate regulation.

- **Aesthetic and Cultural Degradation:**

  Beyond environmental factors, green spaces provide an aesthetic and cultural value that reflects the identity of our neighbourhood. The unique character of Mount Simon Estate is partially defined by its natural surroundings. Replacing these with development not only diminishes natural beauty but also undermines the cultural and historical identity of the community, making it less attractive to potential home buyers and long-term residents alike.

3. Broader Implications for Community Cohesion and Property Value

Erosion of Homeowner Investment

- **Deterioration of Neighbourhood Reputation:**

  The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

- **Fragmentation of Socioeconomic Status:**

  Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.

Societal Costs and Economic Implications

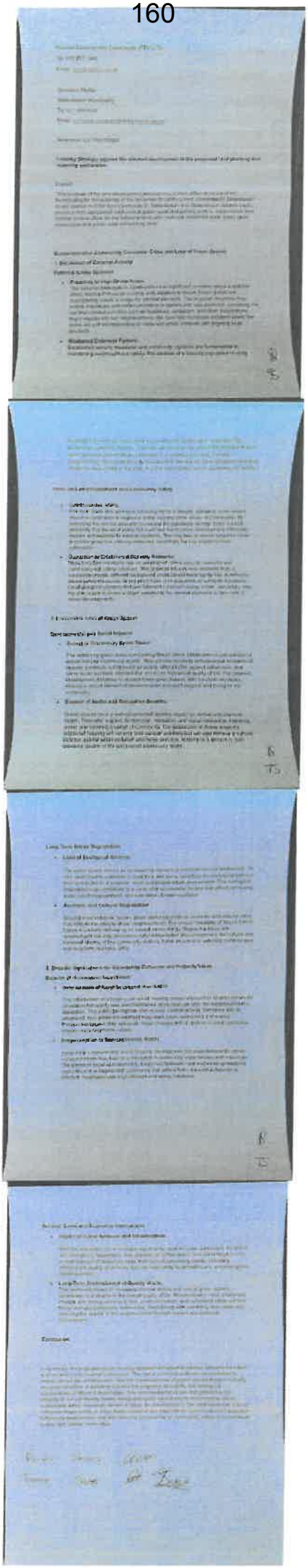
- **Impact on Local Services and Infrastructure:**

  With the population set to increase significantly, local services, particularly the police and emergency responders, may experience further strain. This could result in cuts or reallocations of resources away from current community needs, ultimately affecting the quality of services such as road safety, local healthcare, and emergency responsiveness.

- **Long-Term Diminishment of Quality of Life:**
  The combined impact of increased criminal activity and loss of green spaces contributes to a decline in the overall quality of life. Residents who value a balanced lifestyle with strong community ties, ample recreation, and consistent safety will find these changes particularly detrimental, making long-term residency less viable and reducing the appeal of the neighbourhood for both current and potential homeowners.

Conclusion

In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.



13 (Begin)

Oarabile Modibe

From:	Nkanivo Development Consultants <info@nkanivo.co.za>
Sent:	Friday, 09 May 2025 08:55
To:	Oarabile@nkanivo.co.za
Subject:	FW: Objection to proposed development Cloetesdal
Follow Up Flag:	Follow up
Flag Status:	Flagged

Sent from my Galaxy

-------- Original message --------
From: Graham Bawden <gbawden@gmail.com>
Date: 2025/05/09 08:50 (GMT+02:00)
To: info@nkanivo.co.za
Subject: Objection to proposed development Cloetesdal

From: Graham Bawden, 4 Overberg Street, MountSimon,Stellenbosch 7600

Email: gbawden@gmail.com

Dear Sir

I have been a resident of Mount Simon for over 5 years andwish to record my objections to the proposed REZONING THE REMAINDER OF PORTION 2 OF THEFARM CLOETESDAL NO. 81 AND PORTION 9 OF THE FARM CLOETESDAL NO. 81 TOSUBDIVISIONAL AREA

Impact on traffic

The R304 corridor is heavily congested every morning andafternoon. Some mornings the traffic is backed up to the Welgevonden trafficlights.Adding over 800 units to a bottleneck – 1 main road into Stellenbosch– is insanity. Due to the lack of public transport in Stellenbosch mostresidents will have more than one car, so the 800 units becomes 1200 extra carson the road.This is on top of the Redwood and Newinbosch developmentswhich when complete are going to increase traffic volumes.

Over densification

This development will over densify this corridor – 800 odd units here, next to Mount Simon and opposite Khayamandi and adjacent to Newinbosch and Redwood. This is far too built up for what is a single entranceinto a major city.

Loss of a green lung and open space

The open field next to Mount Simon provides both a greenlung and recreational space to residents. Most evenings, you will find soccer being played on one or both sides of the wetland. Replacing this will a single

soccer club will not improve access for players who play socially.In summer the area under the trees is enjoyed by picnickers and dog walkers, something they will no longer be able to enjoy if this development goes ahead.

Impact on natural environment

The developers are under stating the impact on the natural environment this development will have. The open area next to Mount Simon is home to mongoose, herons, plovers and other animals. The tall trees provide cover for eagles and owls, in addition to providing shade in summer for locals. Cutting these trees down to make way for a development should not be considered

Crime

This development is apparently earmarked for low cost housing, which sadly will attract a criminal element. Cloetesville, over the river, is already home to gangs and at night we regularly hear gunshots.Adding this development will make this worse

Crime choke point

There have been a number of protests in Khayamandi that resulted in the R304 being closed. This development just makes the choke pointworse – the majority of traffic from Brackenfell and the N1 comes in on this road. This development will create an opportunity for criminals and protesters to easily block roads and cause chaos.

Graham Bawden

14 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Tuesday, 06 May 2025 17:25
To: oarabile@nkanivo.co.za
Subject: FW: LU/TP917/2024: Comments on land development proposal

Follow Up Flag: Follow up
Flag Status: Flagged



From: valme kelfkens <valmekelfkens@gmail.com>
Sent: Tuesday, 06 May 2025 17:16
To: info@nkanivo.co.za
Subject: LU/TP917/2024: Comments on land development proposal

Name: Valmé Kelfkens (Contact details: 0827987245)
Name: Rex Kelfkens (Contact details: 0823861075
Physical Address: Mount Simon Estate, Overberg 13, Stellenbosch.

With reference to the subject line matter we would like to raise the following concerns and/or queries:
1. Regarding the local wetland and established trees, have the required environmental authorizations in terms of NEMA been obtained? If not, have the required studies been done to confirm if any environmental requirements have been triggered, and what is the status of the subsequent processes? Additionally, can the Environmental Management Program (EMPr) be shared with us.
2. What will be done to improve the local infrastructure and services; specifically the Mount Simon Drive road, and sewerage. Based on the projected volume of people there will be a substantial increase in traffic, and the road in its current state cannot accommodate such traffic volumes.
3. Have other development options as alternatives to the social housing been considered? If so what options were considered and why were these rejected?

Our interest in the development is that we are property owners and residents at Mount Simon Estate and this development directly impacts us.

Regards
Rex and Valmé KELFKENS

15 (Begin)

Oarabile Modibe

From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Tuesday, 06 May 2025 12:58
To: Oarabile@nkanivo.co.za
Subject: FW: [EX] Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: mm <Municipal.Manager@stellenbosch.gov.za>
Date: 2025/05/06 12:50 (GMT+02:00)
To: info@nkanivo.co.za
Subject: FW: [EX] Reference: LU/TP917/2024

fya

STELLENBOS

About Stellenbosch Municipality
Our mission is to deliver cost-effective services that will provide the most enabling environment for civil and corporate citizens.
Our head office is at Town House Complex, Plein Street, Stellenbosch, 7600, South Africa.
For more information about Stellenbosch Municipality, please call +2721-808-8111, or visit www.stellenbosch.gov.za

Disclaimer:
The information contained in this communication from municipal.manager@stellenbosch.gov.za sent at 2025-05-06 12:50:16 is confidential and may be legally privileged. It is intended solely for use by info@nkanivo.co.za and others authorized to receive it. If you are not info@nkanivo.co.za you are hereby notified that any disclosure, copying, distribution or taking action in reliance of the contents of this information is strictly prohibited and may be unlawful. Powered by IOCO

From: Chevonne Carstens <carstenschevonne@gmail.com>
Sent: Monday, 14 April 2025 10:35
To: mm <Municipal.Manager@stellenbosch.gov.za>
Subject: [EX] Reference: LU/TP917/2024

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Reference: LU/TP917/2024

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Comprehensive Community Concerns: Crime and Loss of Green Spaces

1. Escalation of Criminal Activity

Potential Crime Spillover

Proximity to High-Crime Areas:

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Weakened Deterrent Factors:

Established security measures and community vigilance are fundamental in maintaining neighbourhood safety. The addition of a densely populated housing development—with its associated socioeconomic challenges—may alter the established deterrent factors. Criminals will perceive the expanded residential area as an area with potentially less resistance to unlawful activities, thereby compromising the overall security environment. We will not allow gangsters and drug dealers to take a hold of the area. And the municipality cannot guarantee our safety.

Strain on Law Enforcement and Community Safety

Overburdened SAPS:

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Environmental and Social Impacts

Essential Community Green Space:

The remaining green areas surrounding Mount Simon Estate are not just patches of nature but vital communal assets. They provide residents with essential recreational spaces, contribute to improved air quality, offer a buffer against urban heat, and serve as an aesthetic element that enhances the overall quality of life. The planned development threatens to replace these green havens with concrete structures, erasing a critical element of environmental and psychological well-being for the community.

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Long-Term Urban Degradation

Loss of Ecological Balance:

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3. Broader Implications for Community Cohesion and Property Value

Erosion of Homeowner Investment

Deterioration of Neighbourhood Reputation:

The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

Fragmentation of Socioeconomic Status:

Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.

Societal Costs and Economic Implications

Impact on Local Services and Infrastructure:

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In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.

16 (Begin)

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From: Nkanivo Development Consultants <info@nkanivo.co.za>
Sent: Monday, 12 May 2025 16:55
To: Oarabile@nkanivo.co.za
Subject: FW: Reference: LU/TP917/2024

Follow Up Flag: Follow up
Flag Status: Flagged

Sent from my Galaxy

-------- Original message --------
From: Odelia Snyman <workodelia@gmail.com>
Date: 2025/05/12 16:49 (GMT+02:00)
To: info@nkanivo.co.za, municipal.manager@stellenbosch.gov.za
Subject: Reference: LU/TP917/2024

Good day

I am an owner and resident of Mount Simon Estate Stellenbosch.

With this email I hereby Strongly oppose the planned development of the proposed land planning and rezoning application.

Comprehensive Community Concerns: Crime and Loss of Green Spaces
1. Escalation of Criminal Activity
Potential Crime Spillover
• Proximity to High-Crime Areas:
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Tel: 012 807 7445

Email: info@nkanivo.co.za

Geraldine Mettler

Stellenbosch Municipality

Tel: 021 808 8025

Email: municipal.manager@stellenbosch.gov.za

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Erosion of Homeowner Investment

- **Deterioration of Neighbourhood Reputation:**

  The introduction of a large-scale social housing project adjacent to an area known for its relative tranquillity and well-maintained landscape can alter the neighbourhood's reputation. The public perception of increased criminal activity combined with an urbanized, less green environment may deter future investment in the area. Prospective buyers may associate these changes with a decline in living conditions, directly impacting home values.

- **Fragmentation of Socioeconomic Status:**

  Integrating a high-density social housing development into a predominantly owner-occupied estate may lead to a mismatch in community expectations and resources. The potential social and economic disconnect between new and existing residents could result in a fragmented community that suffers from reduced collaborative efforts in neighbourhood improvement and safety initiatives.

Societal Costs and Economic Implications

- **Impact on Local Services and Infrastructure:**

  With the population set to increase significantly, local services, particularly the police and emergency responders, may experience further strain. This could result in cuts or reallocations of resources away from current community needs, ultimately affecting the quality of services such as road safety, local healthcare, and emergency responsiveness.

- **Long-Term Diminishment of Quality of Life:**
  The combined impact of increased criminal activity and loss of green spaces contributes to a decline in the overall quality of life. Residents who value a balanced lifestyle with strong community ties, ample recreation, and consistent safety will find these changes particularly detrimental, making long-term residency less viable and reducing the appeal of the neighbourhood for both current and potential homeowners.

Conclusion

In summary, the proposed social housing development presents serious concerns from both a crime and environmental perspective. The risk of a criminal spillover—exacerbated by overburdened law enforcement—and the irreversible loss of green spaces threaten not only the physical safety of residents but also the long-term desirability and ecological sustainability of Mount Simon Estate. This document emphasizes that preserving the integrity of our community means safeguarding our natural assets and ensuring robust, sustainable safety measures remain in place. As stakeholders in the neighbourhood, it is our collective responsibility to voice these concerns and advocate for a more balanced approach to housing development, one that does not compromise on community safety, environmental quality, and overall home value.

Belangegroep Stellenbosch Interest Group

HM/CB/0815/32
interestgroupstellenbosch@gmail.com
09-05-2025

Oarabile Modibe
info@nkanivo.co.za

Dear Oarabile Modibe

Comment by the Stellenbosch Interest Group (SIG) on the Rezoning Application with regards to Portion 9 and the Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch

The Stellenbosch interest Group (SIG) supports development for social housing on this site. However, it is of the opinion that this long stretch of land along the R304 gateway to Stellenbosch is not suitable for the development of eleven bulky four-storey apartment blocks as proposed.



The R304 is one of the main access routes to Stellenbosch. From the junction of the Welgevonden Boulevard to the Kayamandi Bridge, it offers uninterrupted views of the rural area against the backdrop of mountains east of the R44. These views have been respected by

all existing developments to the east of the road by the application of height restrictions. Visual impact studies were required as a prerequisite for approval of these developments.

A shortcoming of the basic assessment documentation is that it does not contain a visual impact study. Even in the heritage impact study, no reference to the potential visual impact could be found.



The proposed apartment blocks as depicted on the plans will be in stark contrast to the single-storey Mount Simon development immediately to the north of the site. (See picture above.) The excessive height and bulk of the blocks a few metres away from the edge of the street will erode the sense of place of the town and visually disrupt the physical beauty of the entrance to the town. The blocks are more suited to the centre of a city, not an historical town.

The current internal layout does not make optimal use of available space; for example the inclusion of passages results in unnecessary wasted space. To improve effective use of space, all unit entrances should open directly into the living area, with access to adjoining rooms provided from this central space. For example:

- In the one-bedroom unit, consider relocating the bathroom from its current position near the entrance to a location behind and across the back of the bedroom area.
- In two-bedroom unit type 1, the passage leading to the bedrooms is redundant. Instead, provide direct access to the bedrooms from the living area.

These principles should be applied consistently across all unit types to maximise usable space and enhance flow and functionality.

To reduce the visual impact of the bulky structures, the height of the blocks nearest the road should be limited to a maximum of two storeys. Additionally, for the benefit of future apartment residents, a solid wall should be constructed along the western boundary of the development. This wall should be flanked by vegetation—preferably trees—on both sides, similar to the approach used at Mount Simon, to help absorb and reduce traffic noise from the adjacent road. We strongly urge that more space for social housing will be made available on the land adjacent to Kayamandi which was bought by the municipality from the late Stefan Smit a couple of years ago.

Ronnie Donaldson
Chairperson

GENERAL RESPONSE

Demand for housing in Stellenbosch is driven by rapid population growth, primarily concentrated in areas such as Khayamandi and Cloetesville, where informal settlements are expanding. In particular, Khayamandi has experienced significant growth, absorbing much of the town's low-income population. Drawing on the experiences of Khayamandi and Cloetesville, areas that have long faced housing shortages and infrastructure constraints, this development is poised to alleviate some of the existing pressure. The shortage of affordable housing does not only affect long-term residents but also university students and employees from low and middle-income brackets

Social housing is not government-subsidised ownership housing, nor does it represent temporary or informal shelter. Rather, it is a permanent form of well-designed, well-located, and professionally managed rental accommodation for working individuals and households with low to moderate incomes. Tenants pay monthly rentals that contribute to the ongoing sustainability and maintenance of the development, and the development as a whole contributes to the Municipal rates base, supporting local services and infrastructure. In this case, the development forms part of a broader vision to create a more inclusive, integrated urban environment and plays a key role in transforming historically underutilised land into vibrant, functional neighbourhoods.

The award-winning Anchorage Social Housing Project in Eerste River and Conradie Social Housing in Cape Town, delivered by institutions such as SOHCO and the Social Housing Company (SOHCO) demonstrate how well-managed social housing leads to neighbourhood upliftment, improved safety, and a stronger sense of community. Social housing promotes urban renewal, encourages economic participation by placing people closer to jobs and services, and supports dignified living through good-quality, secure tenure options. Far from being a liability, this development represents a long-term investment in the area and in the city's growth.

Furthermore, the proposed development will harmonize with the surrounding landscape. It will encourage green building techniques and environmental sustainability, integrating eco-friendly materials and energy-efficient systems that contribute to the long-term sustainability of the area. The aesthetic appeal of the development will extend beyond the buildings themselves to include landscaped public spaces, tree-lined streets, and pedestrian walkways that enhance connectivity to neighbouring areas. The Plankenburg River, which flows near the development, will serve as a focal point for beautification efforts, with plans for ecological restoration, public parks, and recreational spaces along its banks. This will not only enhance the quality of life for residents but also elevate the broader aesthetic appeal of Stellenbosch's urban edge and encourage balance between environmental conservation and development.

CRIME AND SAFETY

Crime is a complex socio-spatial issue, particularly in areas experiencing pressure from informal settlements, youth unemployment, and poor infrastructure.

The site is located near Kayamandi, a community that faces challenges related to crime, social marginalisation, and rapid informal growth. Vacant land on the urban edge often becomes a hotspot for:

- Illegal dumping and land invasions;
- Drug and gang-related activity;
- Theft, vandalism, and safety concerns, especially for women and children walking long distances to access services or transport.

Therefore, the development will implement the Crime Prevention Through Environmental Design (CPTED) principles, which aim to reduce crime and improve safety through thoughtful planning. Proposed features include:

- Natural surveillance - residential units are oriented toward public streets and spaces, allowing passive observation. The "eyes on the street" approach discourages crime and enhances community policing.
- Controlled access points - clearly defined entrances and pathways limit unauthorised movement and reduce the likelihood of opportunistic crime.
- Public lighting and visibility - the integration of well-lit pedestrian routes and public spaces makes areas safer at night and reduces fear of crime, especially for women, children, and the elderly.
- Clear boundaries - fencing has the potential to reduce anti-social behaviour by fostering a sense of ownership.

In reality, accredited Social Housing Institutions manage these developments as secure, access-controlled estates with on-site caretaking, formal leases, and community oversight. National and local case studies, such as the Steenvilla development in Cape Town, have shown that well-designed and properly managed social housing can actually improve safety by bringing formal surveillance, managed public spaces, and increased urban activity into underutilised or poorly lit areas.

TRAFFIC IMPACT

The Traffic Impact Assessment (TIA) prepared comprehensively evaluated the potential impact of the proposed residential development on the surrounding road network. Key findings and recommendations included:

- The development is expected to generate approximately 136 trips during both AM and PM peak hours, which is considered moderate for a residential development of this scale.
- The intersection of R304 and Mount Simon Drive, currently operating at a poor level of service, will be upgraded to a signalised intersection. This upgrade will significantly

improve flow and safety during peak periods, ensuring the road network can accommodate current and future traffic volumes.

- Sufficient on-site parking is provided in line with Stellenbosch Municipality zoning requirements, reducing the likelihood of spillover parking into adjacent areas.
- The study proposes access points along Mount Simon Drive to accommodate both light and heavy vehicles, with appropriate pedestrian infrastructure, including 2.0 m sidewalks and safe crossing points.

The TIA concludes that with the proposed upgrades and access designs, the development can be accommodated without causing undue congestion or compromising road safety.

Notably, the Kayamandi Taxi Rank, located near the proposed development site, serves as a key public transport hub, providing regular access to the Stellenbosch CBD and surrounding areas. The development's proximity to this facility supports the promotion of public transport use and aligns with principles of integrated planning. Social housing in this context is not only about providing accommodation but also serves as a strategic tool to promote well-designed, inclusive urban development and spatial transformation. By situating the project near existing transport infrastructure, the proposal enhances accessibility, reduces dependency on private vehicles, and contributes positively to the broader development of the area.

ENVIRONMENTAL ASPECT

Environmental protection remains a key priority, and the development has undergone a formal environmental assessment process in line with the National Environmental Management Act (NEMA) and various Departments (i.e., Western Cape: Department of Environmental Affairs and Development Planning (DEAD&P)) have been consulted with to ensure sustainability.

As part of the statutory process in terms of the NEMA, an Environmental Impact Assessment (EIA) Report has been prepared. This report incorporates the following specialist studies that aimed at evaluating the environmental feasibility of the proposed development in relation to the sensitivity and characteristics of the project area:

- Wetland Assessment
- Terrestrial Ecology Compliance Statement
- Stormwater Management Plan
- Heritage Impact Assessment
- Floodline Report
- Geotechnical Investigate Report

Recommendations of the assessments are as follows:

- Avoiding the most sensitive portions of the site, particularly areas closest to the river and containing intact Renosterveld.
- Implementing a biodiversity offset strategy, in line with provincial conservation guidelines, where unavoidable impacts occur.

- Limiting vegetation clearance to only areas needed for housing and services and restoring disturbed areas with appropriate indigenous vegetation.
- A minimum 32-metre buffer will be maintained between the development and the river.
- A detailed Environmental Management Programme (EMPr) will guide construction near watercourses and sensitive areas/plant species to prevent erosion, pollution and eradication.
- Sustainable stormwater systems will be implemented to reduce runoff and siltation entering the river.
- Open space corridors within the project area will support ecological movement and reduce habitat fragmentation.

It is important to note that this is not a typical profit-driven development, but a social housing initiative that places strong emphasis on integration, sustainability, and community benefit. The environmental aspects of the development have been carefully considered through formal processes, including environmental screening and specialist studies where required, to ensure that any potential impacts are mitigated. Moreover, social housing developments are planned with long-term sustainability in mind, incorporating green building principles, efficient land use, and accessible open spaces. The intention is not to displace valuable green areas but to develop responsibly within the urban edge, in line with spatial planning frameworks and environmental guidelines.

BULK ENGINEERING SERVICES AND INFRASTRUCTURE UPGRADES

A Bulk Engineering Services Assessment was undertaken to evaluate the capacity and availability of essential Municipal infrastructure required to support the proposed development. This included an analysis of potable water supply, sanitation (wastewater), stormwater management, electricity distribution, and solid waste removal systems. The findings of the assessment confirm the feasibility of servicing the development and identify the infrastructure demands that Stellenbosch Municipality will need to address to ensure that service provision remains adequate and unconstrained throughout.

RESPONSES

TRAFFIC IMPACT

The Traffic Impact Assessment (TIA) prepared comprehensively evaluated the potential impact of the proposed residential development on the surrounding road network. Key findings and recommendations included:

- The development is expected to generate approximately 136 trips during both AM and PM peak hours, which is considered moderate for a residential development of this scale.
- The intersection of R304 and Mount Simon Drive, currently operating at a poor level of service, will be upgraded to a signalised intersection. This upgrade will significantly improve flow and safety during peak periods, ensuring the road network can accommodate current and future traffic volumes.
- Sufficient on-site parking is provided in line with Stellenbosch Municipality zoning requirements, reducing the likelihood of spillover parking into adjacent areas.
- The study proposes access points along Mount Simon Drive to accommodate both light and heavy vehicles, with appropriate pedestrian infrastructure, including 2.0 m sidewalks and safe crossing points.

The TIA concludes that with the proposed upgrades and access designs, the development can be accommodated without causing undue congestion or compromising road safety.

Notably, the Kayamandi Taxi Rank, located near the proposed development site, serves as a key public transport hub, providing regular access to the Stellenbosch CBD and surrounding areas. The development's proximity to this facility supports the promotion of public transport use and aligns with principles of integrated planning. Social housing in this context is not only about providing accommodation but also serves as a strategic tool to promote well-designed, inclusive urban development and spatial transformation. By situating the project near existing transport infrastructure, the proposal enhances accessibility, reduces dependency on private vehicles, and contributes positively to the broader development of the area.

DENSITY

While the scale of the development is substantial, it is deliberately located within a planned growth corridor and will be supported by infrastructure upgrades and responsive design interventions. The amendment of the Site Development Plan (SDP) will directly address concerns regarding over-densification, ensuring that the final layout aligns with the evolving nature of the area and broader urban planning goals.

OPEN SPACE

With regard to the existing open space, the intention is not to eliminate recreational use of the area, but rather to formalise, diversify, and manage it more sustainably. The development will include publicly accessible green space, social amenities, and recreational infrastructure that continue to serve local communities; providing a safe, inclusive environment that supports both housing and quality of life.

IMPACT ON THE ENVIRONMENT

The environmental sensitivity of the site and its role in supporting local fauna and flora has been carefully assessed as part of the Basic Assessment Report (BAR) and related environmental investigations in terms of the National Environmental Management Act (NEMA). The development has been informed by specialist environmental input, and steps will be taken to ensure that the design and implementation minimise habitat disruption, retain significant vegetation where possible, and provide structured, ecologically sensitive public spaces. While it is true that some transformation of the land is required, the development seeks to balance human settlement needs with environmental stewardship. This will be achieved by:

- Retaining as much natural vegetation and canopy cover as possible within designated open spaces;
- Introducing indigenous landscaping and urban greening initiatives as part of the final design;
- Incorporating buffer zones to allow for protection of the watercourses and sensitive areas/plant species
- Implementing the Environmental Management Programme (EMPr) will guide construction near watercourses and sensitive areas/plant species to prevent erosion, pollution and eradication.

While change to the landscape is inevitable, it will be undertaken in a responsible, regulated, and environmentally conscious manner.

It is important to note that this is not a typical profit-driven development, but a social housing initiative that places strong emphasis on integration, sustainability, and community benefit. The environmental aspects of the development have been carefully considered through formal processes, including environmental screening and specialist studies where required, to ensure that any potential impacts are mitigated. Moreover, social housing developments are planned with long-term sustainability in mind, incorporating green building principles, efficient land use, and accessible open spaces. The intention is not to displace valuable green areas but to develop responsibly within the urban edge, in line with spatial planning frameworks and environmental guidelines.

CRIME AND SAFETY

History shows that excluding people from access to well-located housing only deepens inequality, spatial segregation, and social instability. Formal housing, that is well-designed and supported, promotes:

- A stronger sense of community ownership;
- Reduced informal sprawl into unmanaged land;
- Safer, better-managed urban environments;
- Improved visibility, service delivery, and law enforcement presence.

Concerns about crime and safety are valid and shared by Urban Planners, the Municipality and the community. However, the proposed development is part of the solution — not the problem. It contributes to long-term urban stability, better housing conditions, and infrastructure improvements, which are essential to reducing unrest and building safer, more integrated communities.

In reality, accredited Social Housing Institutions manage these developments as secure, access-controlled estates with on-site caretaking, formal leases, and community oversight. National and local case studies, such as the Steenvilla development in Cape Town, have shown that well-designed and properly managed social housing can actually improve safety by bringing formal surveillance, managed public spaces, and increased urban activity into underutilised or poorly lit areas.

COMMENT FROM VALMÉ & REX KELFKENS

Question *1. Regarding the local wetland and established trees, have the required environmental authorizations in terms of NEMA been obtained? If not, have the required studies been done to confirm if any environmental requirements have been triggered, and what is the status of the subsequent processes? Additionally, can the Environmental Management Program (EMPr) be shared with us.*

Response #1

ENVIRONMENTAL ASPECT

Environmental protection remains a key priority, and the development has undergone a formal environmental assessment process in line with the National Environmental Management Act (NEMA) and various Departments (i.e. Western Cape: Department of Environmental Affairs and Development Planning (DEAD&P)) have been consulted with to ensure sustainability.

As part of the statutory process in terms of the NEMA, an Environmental Impact Assessment (EIA) Report has been prepared. This report incorporates the following specialist studies that aimed at evaluating the environmental feasibility of the proposed development in relation to the sensitivity and characteristics of the project area:

- Wetland Assessment
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Recommendations of the assessments are as follows:

- Avoiding the most sensitive portions of the site, particularly areas closest to the river and containing intact Renosterveld.
- Implementing a biodiversity offset strategy, in line with provincial conservation guidelines, where unavoidable impacts occur.
- Limiting vegetation clearance to only areas needed for housing and services and restoring disturbed areas with appropriate indigenous vegetation.
- A minimum 32-metre buffer will be maintained between the development and the river.
- A detailed Environmental Management Programme (EMPr) will guide construction near watercourses and sensitive areas/plant species to prevent erosion, pollution and eradication.
- Sustainable stormwater systems will be implemented to reduce runoff and siltation entering the river.

- Open space corridors within the project area will support ecological movement and reduce habitat fragmentation.

Through careful design, implementation of specialist recommendations, and long-term environmental oversight, the project will limit negative impacts while delivering lasting socio-economic benefits.

It is important to note that this is not a typical profit-driven development, but a social housing initiative that places strong emphasis on integration, sustainability, and community benefit. The environmental aspects of the development have been carefully considered through formal processes, including environmental screening and specialist studies where required, to ensure that any potential impacts are mitigated. Moreover, social housing developments are planned with long-term sustainability in mind, incorporating green building principles, efficient land use, and accessible open spaces. The intention is not to displace valuable green areas but to develop responsibly within the urban edge, in line with spatial planning frameworks and environmental guidelines.

Please Note: The Environmental Management Programme (EMPr) has been compiled as part of the Basic Assessment Report (BAR) but it is currently being prepared to be reviewed by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP).

Question 2. *What will be done to improve the local infrastructure and services; specifically the Mount Simon Drive road, and sewerage. Based on the projected volume of people there will be a substantial increase in traffic, and the road in its current state cannot accommodate such traffic volumes.*

Response #2

TRAFFIC IMPACT

The Traffic Impact Assessment (TIA) prepared comprehensively evaluated the potential impact of the proposed residential development on the surrounding road network. Key findings and recommendations included:

- The development is expected to generate approximately 136 trips during both AM and PM peak hours, which is considered moderate for a residential development of this scale.
- The intersection of R304 and Mount Simon Drive, currently operating at a poor level of service, will be upgraded to a signalised intersection. This upgrade will significantly improve flow and safety during peak periods, ensuring the road network can accommodate current and future traffic volumes.
- Sufficient on-site parking is provided in line with Stellenbosch Municipality zoning requirements, reducing the likelihood of spillover parking into adjacent areas.

- The study proposes access points along Mount Simon Drive to accommodate both light and heavy vehicles, with appropriate pedestrian infrastructure, including 2.0 m sidewalks and safe crossing points.

The TIA concludes that with the proposed upgrades and access designs, the development can be accommodated without causing undue congestion or compromising road safety.

Notably, the Kayamandi Taxi Rank, located near the proposed development site, serves as a key public transport hub, providing regular access to the Stellenbosch CBD and surrounding areas. The development's proximity to this facility supports the promotion of public transport use and aligns with principles of integrated planning. Social housing in this context is not only about providing accommodation but also serves as a strategic tool to promote well-designed, inclusive urban development and spatial transformation. By situating the project near existing transport infrastructure, the proposal enhances accessibility, reduces dependency on private vehicles, and contributes positively to the broader development of the area.

DENSITY

While the scale of the development is substantial, it is deliberately located within a planned growth corridor and will be supported by infrastructure upgrades and responsive design interventions. The amendment of the Site Development Plan (SDP) will directly address concerns regarding over-densification, ensuring that the final layout aligns with the evolving nature of the area and broader urban planning goals.

BULK ENGINEERING SERVICES AND INFRASTRUCTURE UPGRADES

A Bulk Engineering Services Assessment was undertaken to evaluate the capacity and availability of essential Municipal infrastructure required to support the proposed development. This included an analysis of potable water supply, sanitation (wastewater), stormwater management, electricity distribution, and solid waste removal systems. The findings of the assessment confirm the feasibility of servicing the development and identify the infrastructure demands that Stellenbosch Municipality will need to address to ensure that service provision remains adequate and unconstrained throughout.

Question *3. Have other development options as alternatives to the social housing been considered? If so what options were considered and why were these rejected?*

Response #3

SOCIAL HOUSING BENEFITS

History shows that excluding people from access to well-located housing only deepens inequality, spatial segregation, and social instability. The proposed development (i.e., Social Housing) is policy-aligned and will aim to achieve the following:

- The site is within a restructuring zone, where state-subsidised rental housing is explicitly encouraged;

- There is a significant demand for well-located, affordable rental units for working-class residents and students in Stellenbosch;
- Social housing enables higher residential densities in a planned, managed, and regulated environment;
- It promotes spatial equity and integration, directly contributing to SPLUMA principles and the Municipality's Human Settlements Strategy.

The proposed development will contribute to long-term urban stability, better housing conditions, a stronger sense of community ownership, reduced informal sprawl into unmanaged land, safer, better-managed urban environments and improved visibility, service delivery, and law enforcement presence.

Social housing is not government-subsidised ownership housing, nor does it represent temporary or informal shelter. Rather, it is a permanent form of well-designed, well-located, and professionally managed rental accommodation for working individuals and households with low to moderate incomes. Tenants pay monthly rentals that contribute to the ongoing sustainability and maintenance of the development, and the development as a whole contributes to the Municipal rates base, supporting local services and infrastructure. In this case, the development forms part of a broader vision to create a more inclusive, integrated urban environment and plays a key role in transforming historically underutilised land into vibrant, functional neighbourhoods.

The award-winning Anchorage Social Housing Project in Eerste River and Conradie Social Housing in Cape Town, delivered by institutions such as SOHCO and the Social Housing Company (SOHCO) demonstrate how well-managed social housing leads to neighbourhood upliftment, improved safety, and a stronger sense of community. Social housing promotes urban renewal, encourages economic participation by placing people closer to jobs and services, and supports dignified living through good-quality, secure tenure options. Far from being a liability, this development represents a long-term investment in the area and in the city's growth.

ANNEXURE E

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

COMMENT FROM THE MANAGER: ELECTRICAL SERVICES

ELETRICITY SERVICES: CONDITIONS OF APPROVAL
Farm 81/2 and 9 Stellenbosch - LU/18098 - TP917/2024

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. Metering panel box to build in boundary wall.

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. No electricity supply will be switched on (energised) if the Development contributions, take-over Inspection and Certificate(s) of Compliance are outstanding.

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

11/04/2025

Date

ANNEXURE F

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

COMMENT FROM THE DEPARTMENT: COMMUNITY SERVICES

(ENVIRONMENTAL PLANNER)

INTEROFFICE
MEMORANDUM

STELLENBOSCH
STELLENBOSCH • PNIEL • FRANSCHHOEK
MUNICIPALITY • UMASIPALA • MUNISIPALITEIT

DEPARTMENT: COMMUNITY SERVICES
Stellenbosch Municipality, 123 Merriman Avenue, Stellenbosch, 7599

To:	**Administrative Officer: Land Use Management Nicole Katts**	From:	**Senior Environmental Planner: Schalk van der Merwe**
CC:	**Manager: Environmental Management Tammy Leibrandt**	Date:	**24 April 2025**
Re:	**LAND USE APPLICATION: FARM 81/2 AND 9, STELLENBOSCH - LU/18098**		

The above application refers. It is noted that the relevant application process to acquire an Environmental Authorization in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) Environmental Impact Assessment (EIA) Regulations, to allow for the implementation of the proposed development, is at a relatively early stage. A decision on the above land use application may be delayed as relevant information in the form of specialist studies and Environmental Assessment Practitioner report, as it pertains to the assessment of the above development, is being generated during the NEMA process.

At this stage, from an environmental planning point of view, this department has no objection to the application on condition that:

1. The detailed development proposal includes hard landscaping measures between the development and the Plankenbrug River that will ensure the safety of occupants, especially children, and visitors to the proposed development;
2. The EIA, conducted in terms of NEMA, include the above measures for assessment;
3. Activities on site, during construction and thereafter, comply with the Western Cape Noise Control Regulations;
4. During construction the owner, developer or agent acting on his/her behalf, take all reasonable steps to prevent nuisance caused by dust in accordance with the National Dust Control Regulations; and
5. Any removal of trees be dealt with in accordance with the Stellenbosch Tree Management Policy.

S VD MERWE
SENIOR ENVIRONMENTAL PLANNER
COMMUNITY SERVICES

Tel: +27 21 808 8679 | Email: schalk.vandermerwe@stellenbosch.gov.za
Physical Address: 123 Merriman Avenue, Stellenbosch, 7600 | Postal Address: PO Box 17, Stellenbosch, 7599
Website: www.stellenbosch.gov.za

ANNEXURE G

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

COMMENT FROM THE DIRECTORATE:

INFRASTRUCTURE SERVICES

STELLENBOSCH MUNICIPALITY

STELLENBOSCH·PNIEL·FRANSCHHOEK

MEMORANDUM

DIREKTORAAT: INFRASTRUKTUURDIENSTE
DIRECTORATE: INFRASTRUCTURE SERVICES

CIVIL ENGINEERING SERVICES

To ▫ Aan:	**Director: Planning + Economic Development**
Att Aandag:	**Nicole Katts**
From ▫ Van:	**Manager: Development (Infrastructure Services)**
Author ▫ Skrywer:	**Tyrone King**
Date ▫ Datum:	**12 March 2026**
Our Ref ▫ Ons Verw:	**Civil LU 2868**
Town Planning Ref:	**LU/18098 – TP 917/2024**
Re ▫ Insake:	**Farm 81/2 & 9, Stellenbosch: Application is made in terms of the Stellenbosch Municipal Land Use Planning Bylaw, 2023 on Farm No. 81/2 & Farm No. 81/9, Stellenbosch Division for: 1. The rezoning of the said property from Agriculture and Rural Zone to Subdivisional Area in terms of Section 15(2)(a) of the said Bylaw to allow for the following uses: a) 2 x Multi-Unit Residential Zone portions to enable the development of social housing units; b) 1 x Public Open Space; and c) 1 x Public Road and Parking Zone.**

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

- Proposed Zoning Layout Plan – Cloetesdal Farm No 81 Remainder of Portion 2 & Portion 9 (**See attached**)
- Civil engineering services report by Civilconsult dated September 2025
- TIA by Delta dated April 2025

Background: These approval conditions only focuses on the rezoning of the subject property and states the bulk external upgrades trigged by the development. It is expected that the following step will be the submission of an internal subdivision plan and/or an SDP. Additional conditions may be set at that point in time, when more details regarding the engineering services, especially the internal services and connection points, are available. Comments on the internal road and building layout, parking etc will be provided when the detail SDP's are received for comment.

In consideration of provisions related to Civil Engineering Services the application is supported subject to the following conditions:

Specific Conditions:

These conditions must be complied with prior to any **Occupation Certificates** being issued, unless specifically stated otherwise below.

The upgrades listed below are critical in terms of providing the capacity needed by this social housing project. Many of these upgrades have significant funding implications and these should be planned and budgeted for pro-actively, to ensure that they are completed in advance of the units being occupied.

1. Water

1.1 The following upgrades must be installed to create capacity:

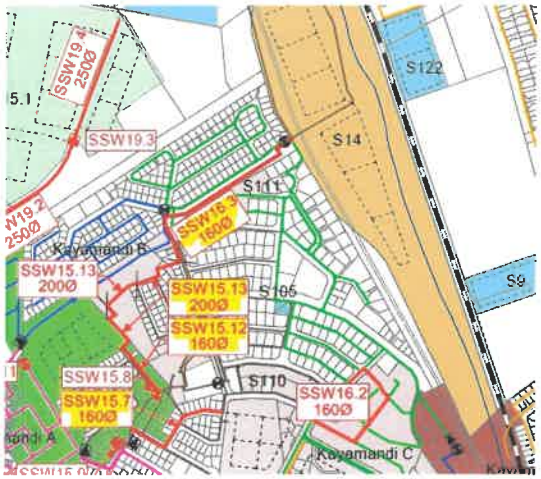
1.1.1 The new Kayamandi reservoir must be completed (construction is underway)

1.1.2 SSW16.3: upgrade required:160mm Ø pipeline

1.1.3 SSW15.12: upgrade required:160mm Ø pipeline

1.1.4 SSW15.13: upgrade required: 200mm Ø pipeline

1.1.5 SSW15.7: upgrade required: 160mm Ø pipeline



1.2 A bulk water meter conforming to the specifications of the Directorate: Infrastructure Services must be installed, the municipal account for the said meter must be activated and the consumer deposit must be paid.

2. Sewer

2.1 The following upgrades must be installed to create capacity:

2.1.1 SSS26.1: 160mm Ø new gravity main

2.1.2 SSS27.3: 400mm Ø new gravity main. While this item primarily services upstream Kayamandi developments, it should be implemented if it falls within the site boundary

2.1.3 SSS1.2: upgrade required: 600mm Ø

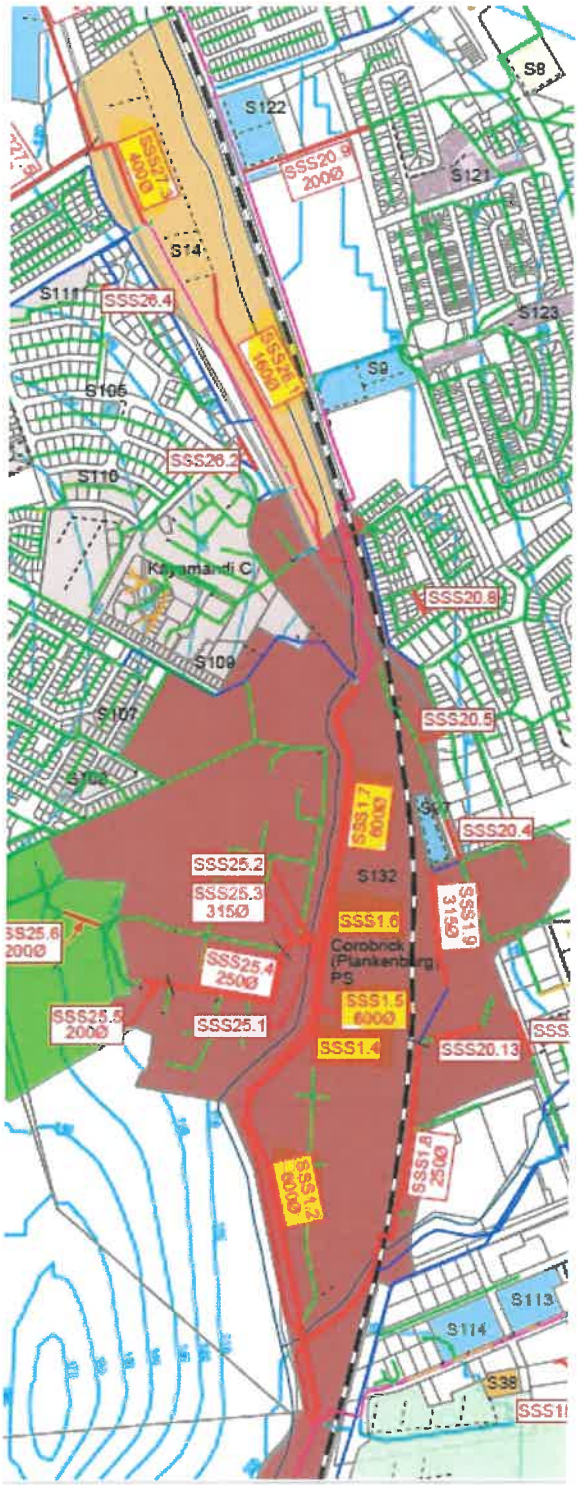
2.1.4 SSS1.4: upgrade existing flow diversion

2.1.5 SSS1.5: upgrade required: 600mm Ø

2.1.6 SSS1.6: upgrade existing flow diversion

2.1.7 SSS1.7: upgrade required: 600mm Ø

4


S8
S122
SSS20.9
200Ø
S121
S14
S111
SSS26.4
S123
S9
S105
SSS26.2
S110
Käyrämäki C
SSS20.8
S109
S107
SSS20.5
S106
SSS17
600Ø
S7
SSS20.4
SSS25.2
S132
SSS25.3
315Ø
SSS1.0
SSS1.9
315Ø
SSS25.6
200Ø
Corrobrick
(Plankenberg)
PS
SSS25.4
250Ø
SSS1.5
600Ø
SSS25.5
200Ø
SSS25.1
SSS1.4
SSS20.13
SSS1.8
250Ø
SSS1.2
600Ø
S113
S114
S38

2.2 Sewer pumpstations must be avoided – please take this into account for the detail design.

3. Roads

3.1 The following external, bulk upgrades must be installed. These are the same items required for the Northern Extension development, located across the R304 and is required to accommodate the existing background traffic as well as the additional traffic from the new- and ongoing developments in the area. See **Annexure: Roads**:

	Item + (Reference number on Annexure: Roads)	Estimate
3.1.1	R304 / Welgevonden Boulevard intersection upgrade (1A.1)	R17m
3.1.2	R304 Dualling between Newinbosch Access and R44 (1A.2) and including:	
	R304 / Sokuqala Street intersection upgrade (1A.2.1)	
	R304 / Masitandane Road intersection upgrade (1A.2.2)	
	Bridge widening	R180m
	Total (ex VAT)	***R197m***

3.2 The pedestrian sidewalks along the R304 must be extended to seamlessly connect with the existing sidewalks along the R304 - see below.

(Blue = existing sidewalk; Yellow = new sidewalk required)



Figure 11-1: Existing and Proposed Pedestrian walkways

3.3 Any conditions stated by the Provincial Roads Engineer must be complied with.

4. Stormwater

4.1 The engineering report proposes that the stormwater generated be discharged directly into the Plankenburg river. Further details must be provided at engineering drawing approval stage. Additional conditions may also be set at that stage.

Adequate erosion mitigation measures must be provided at the discharge points. Discharge points must be positioned above the 1:100-year floodline of the Plankeburg river.

All stormwater management infrastructure, inlet and outlet structures and erosion protection must be completed to municipal standards before an Occupation Certificate is issued.

5. Solid Waste

5.1 Refuse removal infrastructure such as a refuse truck embayment and a refuse room must be clearly indicated on the SDP drawings, engineering drawings and building plans. These infrastructure items must be completed before an Occupation Certificate is issued. See criteria below:

- Refuse rooms compliant with municipal standards, are to be provided for all premises other than single residential erven. The size of the refuse storage area depends on the rate of refuse generation and the frequency of the collection service. For design purposes, sufficient space should be available to store two weeks' refuse

- A refuse truck embayment bay with minimum dimensions of 15 meters in length x 2, 5 meters in width plus 45 degrees splay entrance, on a public street, must be provided where either traffic flows or traffic sight lines are affected. The refuse bays must be positioned such that the rear of the parked refuse vehicle is closest to the refuse collection area.

6. Servitudes

6.1 The 5m sewer line servitude along the western boundary of the site (along the R304) must be registered – in order to protect the existing bulk sewer line.

7. Installation of Engineering Services

7.1 Over and above the bulk and external upgrades identified above, each newly created erf (or each building where subdivision is not applicable) must also be fully serviced ito water- and sewer connections, stormwater drainage and roads/access points. All internal and link engineering services for the development must be installed by the developer at his cost.

7.2 Detail engineering drawings must be submitted for approval prior to the commencement of construction. The engineering drawings approval letter issued by the Municipality will constitute the "engineering services agreement" for the provision and installation of services between the municipality and the land owner / developer, as stated in the municipality's land-use planning by-law.

8. As - Builts

8.1 Upon completion, a complete set of as-built drawings, as well as the asset verification information (in the case of municipal services) be submitted in a format acceptable to the Municipality. These drawings must be signed by a professionally registered engineer.

General Conditions

9. The implementation of the development wrt the provision of civil engineering services, must comply with the "*General guidelines and standard practices for the provision of civil engineering services for new developments*" as published on the municipality's website and as amended from time-to-time.

10. The design of the civil engineering services for the development must comply with the "*Design Guidelines and Minimum Standards for Civil Engineering Services*" as published on the municipality's website and as amended from time-to-time.

11. The internal services (inside the property boundary) will be maintained by the managing agent of the social housing complex. The external services (outside the property boundary) will be maintained by the Municipality.
12. The Developer will be held liable for any damage to municipal infrastructure, caused as a direct result of the development of the subject property. The Developer will therefore be required to carry out the necessary rehabilitation work, at his/her cost, to the standards of the Directorate: Infrastructure Services, prior to transfer of the first property or approval of any building plans or occupation certificate, whichever occurs first.
13. The developer will be held liable for any nuisance, health or other risk to the public, caused as a direct result of the development of the subject property. Where in the opinion of the Municipality a nuisance, health or other risk to the public is caused due to construction activities and/or a lack of maintenance of any service, the Municipality may give the Developer and/or Owner's Association written notice to remedy the defect, failing which the Municipality may carry out the work itself or have it carried out, at the cost of the Developer and/or Owner's Association.

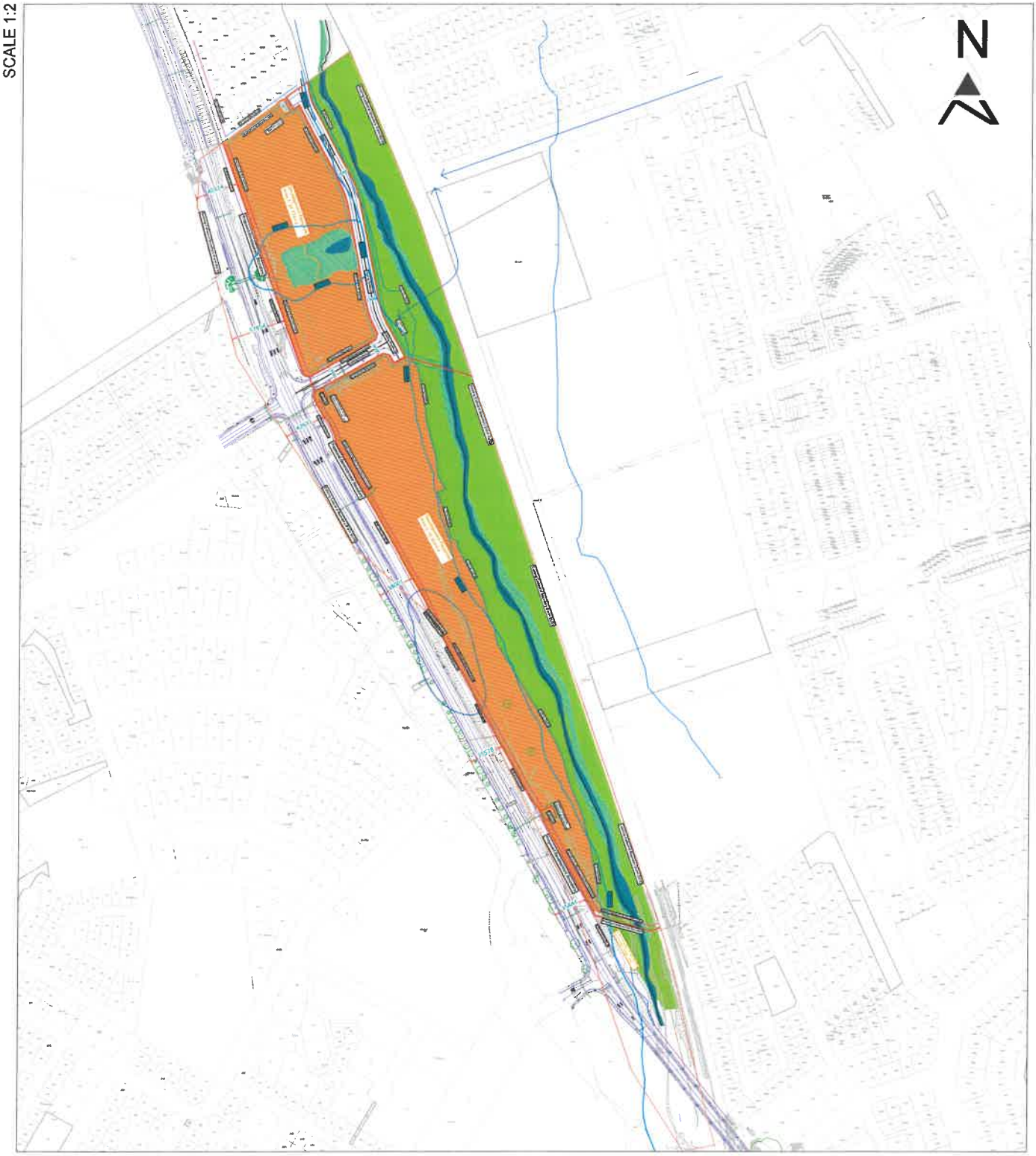
Tyrone King Pr Tech Eng
Manager: Development (Infrastructure Services)

W:\2.0 DEVELOPMENT\01 Land Use applications\2868 (TK) Farm 81-2 & 9 Stellenbosch (LU-18098 TP917-2024) Kayamandi Housing (below R304)\2868 () Farm 81-2 & 9 Stellenbosch (LU-18098 TP917-2024)_rezoning approved.doc

PROPOSED ZONING LAYOUT PLAN

STELLENBOSCH MUNICIPALITY ▪ ZONING SCHEME BY-LAW ▪ 2023

SCALE 1:2



CLOETESDAL FARM NO. 81

REMAINIDER OF PORTION 2 & PORTION 9

REFERENCE

Portion Boundary

PROPOSED USE ZONE

MULTI-UNIT RESIDENTIAL ZONE

PUBLIC OPEN SPACE ZONE

PUBLIC ROAD & PARKING ZONE

APPROVED BY (DEPARTMENT)

DATE

STELLENBOSCH MUNICIPALITY

ANNEXURE: ROADS

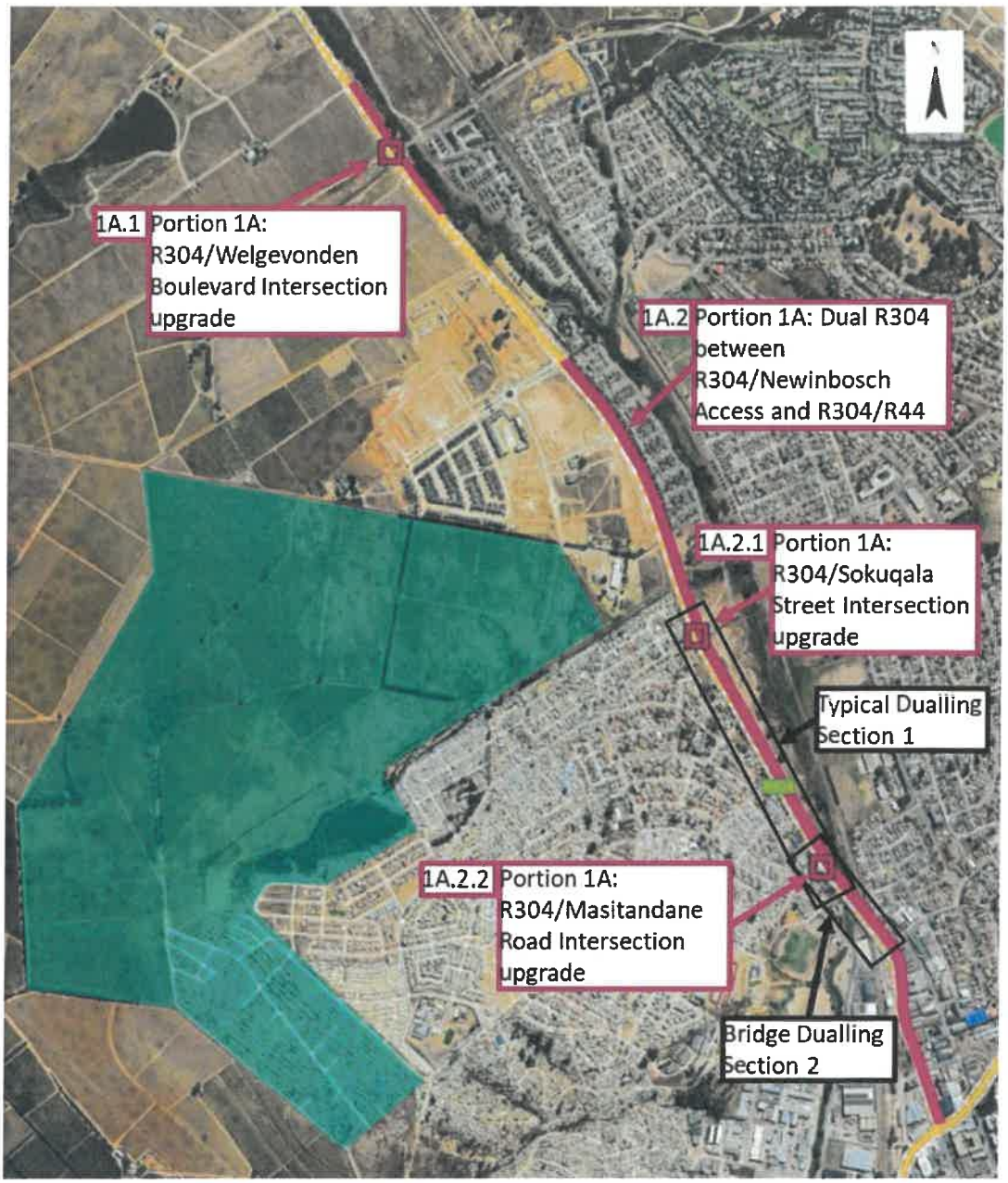


Figure 30: Portion 1A Required Road Infrastructure

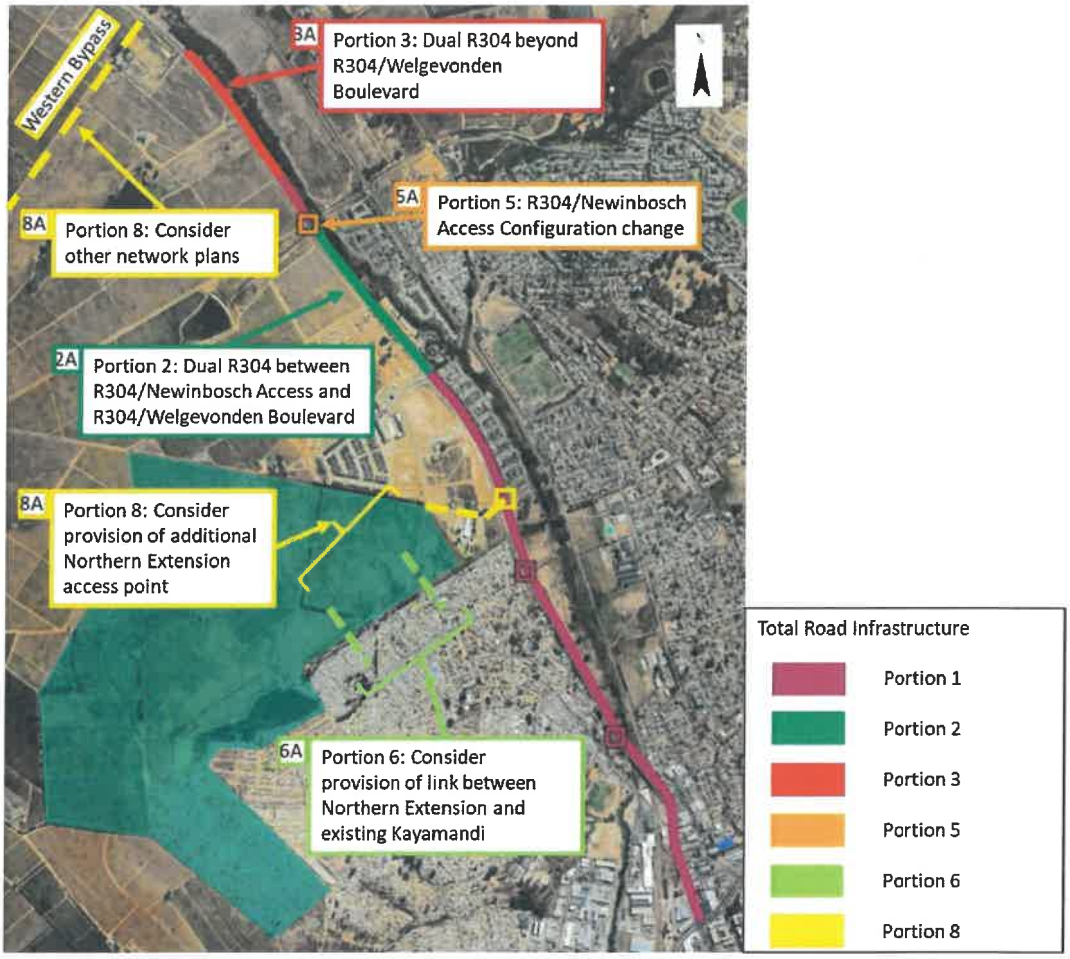
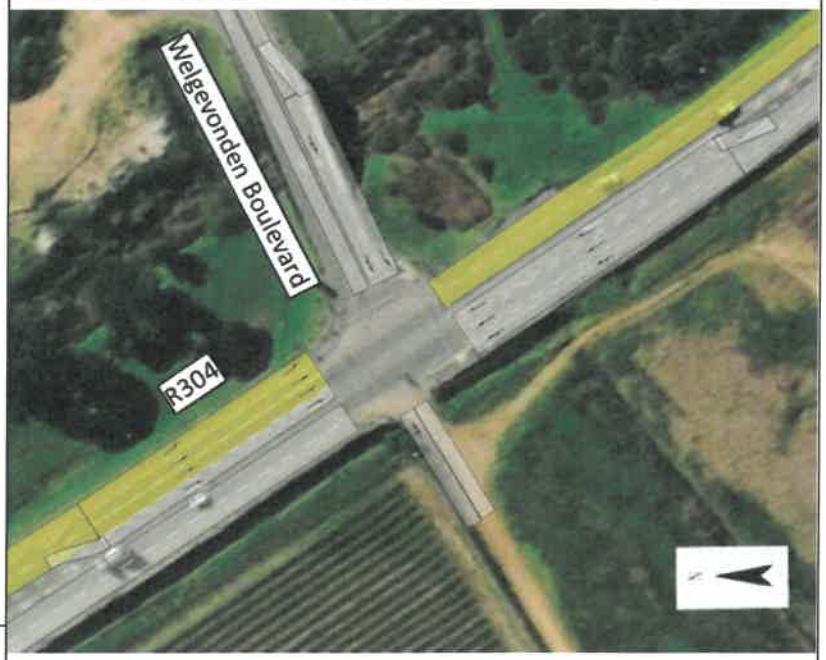


Figure 31: Total Required Road Infrastructure

Appendix E

Basic Road Infrastructure Concepts

Upgrade Trigger (Development Trips)	Description	Basic Concepts
Portion 1 Infrastructure Upgrades		
A1.1 - R304 / Welgevonden Boulevard Intersection Upgrade		
0 AM Peak Hour trips. **0 PM Peak Hour trips.**	It is proposed to upgrade the R304/Welgevonden Boulevard intersection. It is proposed to widen the intersection by providing additional through lanes for both directions of travel leading up to the intersection. After which the R304 will continue as a single lane per direction. Turning lanes will also be provided for both the right turn moves and a turning lane for the left turning movement for vehicles traveling into Stellenbosch.	 
Estimated Construction Cost (Excl VAT & Incl Professional Fees): R 16 990 595.00		

<table>
<tr><th>Upgrade Trigger (Development Trips)</th><th>Description</th><th>Basic Concepts</th></tr>
<tr><td colspan="3">A1.2 - R304 Dualling between Newinbosch Access and R44</td></tr>
<tr><td>0 AM Peak Hour trips.

0 PM Peak Hour trips</td><td>It is proposed to dual the R304 between the existing R304/Newinbosch Access and R304 / R44 (Adam Tas Road) intersections to alleviate congestion on the R304 and to accommodate the growth in background traffic. This will provide 2 lanes per direction on the R304.

This in turn will result in upgrades required for both the R304/Sokuqala Street and R304/Masitandane Road intersections, indicated as upgrade A1.2.1 and A1.2.2 respectively on Figure 30.

Additionally, the bridge near the R304/Masitandane Road intersection must be widened.</td><td>A1.2.1 – Upgrade of R304 / Sokuqala Street


A1.2.2 – Upgrade of R304 / Masitandane Road

</td></tr>
<tr><td colspan="2">Estimated Construction Cost (Excl VAT & Incl Professional Fees): R 178 221 530.00</td><td></td></tr>
</table>



Figure 38:Typical Dualling Section 1 of R304

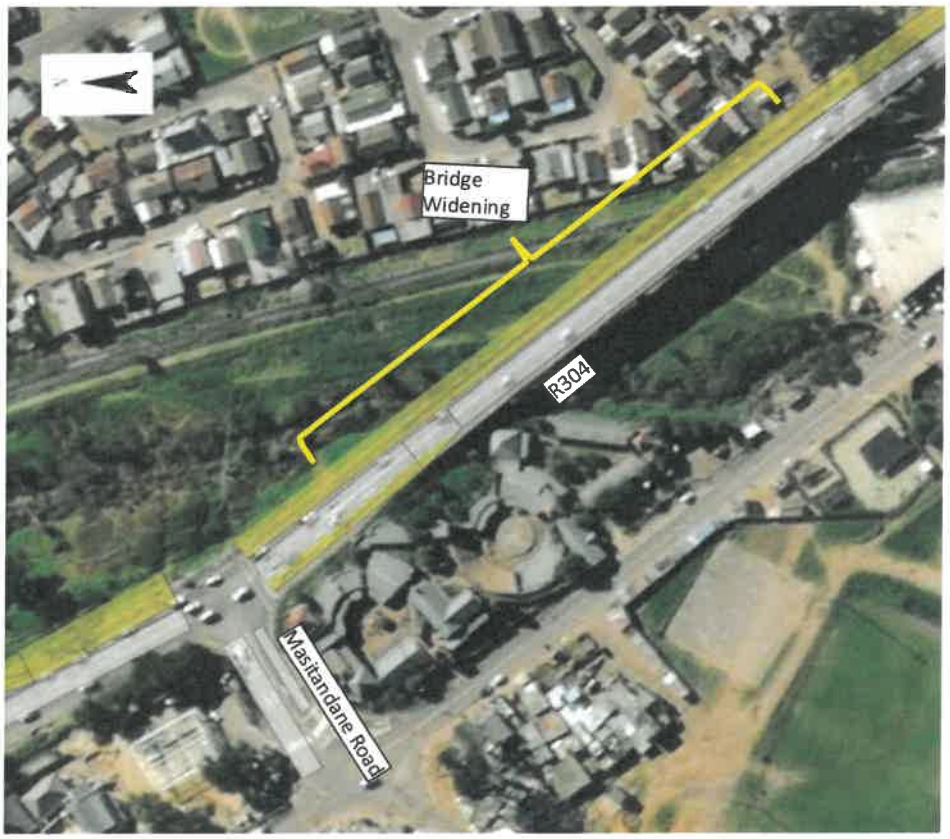


Figure 39: Bridge Dualling Section 2 of R304

Upgrade Trigger (Development Trips)	Description	Basic Concepts
Portion 2 Infrastructure Upgrades		
A2 - R304 Dualling between Welgevonden Boulevard and Newinbosch Access		
311 AM Peak Hour trips. **230 PM Peak Hour trips**	It is proposed to completely dual the R304 between the R304/Welgevonden Boulevard and R304/Newinbosch Access intersections.	
Estimated Construction Cost (Excl VAT & Incl Professional Fees): R 10 829 508.00		
Portion 3 Infrastructure Upgrades		
A3 - R304 Extended Dualling beyond Welgevonden Boulevard		
478 AM Peak Hour trips. **397 PM Peak Hour trips**	It is proposed to extend the dualling of the R304 beyond the Welgevonden Boulevard and R304 intersection for the traffic flowing out of Stellenbosch, however the length of the extension is uncertain. The extension of the dualling may have to be to the next intersection, which is the R304/Bottelary Road. Or with the link with potential Western Bypass, which may link up with the R304, approximately 800 m from R304/Welgevonden Boulevard intersection. The costing for this upgrade was based on the dualling extending to the planned link with the potential Western Bypass link.	
Estimated Construction Cost (Excl VAT & Incl Professional Fees): R 18 000 415.00*		

Upgrade Trigger (Development Trips)	Description	Basic Concepts
Portion 6 Infrastructure Upgrades		
A6 – Consideration of an Additional Access Point		
761 AM Peak Hour trips. **650 PM Peak Hour trips**	At this point of the development an additional access will be required to alleviate traffic on the existing R304/Newinbosch Access intersection. The layout of the development provides provisions for future links. Consideration should be given to utilising one of the links for providing an additional access point for the Northern Extension to the existing Kayamandi.	
Estimated Construction Cost (Excl VAT & Incl Professional Fees): R 23 407 846.00		
Portion 8 Infrastructure Upgrades		
A8 – Consideration of second Additional Access Point and Greater Network Plan		
942 AM Peak Hour trips. **754 PM Peak Hour trips**	At this point the greater network plan will be required to accommodate the bulk demand travelling along the R304. Future plans like the Western Bypass needs to be considered at this point in time. Furthermore, consideration can also be given in terms of providing another access point for the Northern Extension. The layout plan provides multiple provisions for future links that provide additional access.	
Estimated Construction Cost (Excl VAT & Incl Professional Fees): R 34 010 379.76		

Louisa Engelbrecht

From: Lester Vanstavel
Sent: Monday, 30 March 2026 13:09
To: Louisa Engelbrecht
Cc: Chrizelle Kriel; Shaun October
Subject: REQUEST FOR THE MPT TO CONSIDER THE REZONING APPLICATION FOR FARM 81/2 AND FARM 81/9

Dear Louisa

MOTIVATION: REQUEST FOR THE MUNICIPAL PLANNING TRIBUNAL (MPT) TO CONSIDER THE REZONING APPLICATION FOR FARM 81/2 AND FARM 81/9, STELLENBOSCH, FOR THE SOCIAL HOUSING DEVELOPMENT, PENDING THE OUTSTANDING COMMENT FROM THE WESTERN CAPE DEPARTMENT OF INFRASTRUCTURE

This motivation serves to formally request that the Land Use Management Department consider the submission of the rezoning application to the Municipal Planning Tribunal (MPT) for approval, notwithstanding the outstanding comment from the competent authority, the Provincial Department of Infrastructure.

The subject application was circulated for comments as part of the public participation process that took place for 30 days between the 10th of April 2025 – 12th of May 2025. However, it has been approximately one year since the comments were requested. Despite multiple follow-ups, comments from the Provincial Department of Infrastructure (PDoI) were only received on 16 March 2026—approximately one year later—significantly delaying the application process.

Kindly see the attached recent correspondence from the competent authority below.

The delay in obtaining the required comment is primarily attributed to the following:

- Pending approval of the proposed dualling of the R304;
- Delays in the approval of the Northern Extension housing development (only approved on 26 March 2026); and
- Limited availability of detailed information due to the outstanding approval of the final Site Development Plan (SDP) on Farm 81/2 and 81/9.

To mitigate further delays, it is recommended that Land Use Management proceed to submit the rezoning land development application to MPT for consideration. This submission would acknowledge the outstanding PDoI comment, which can be incorporated once received and when the Site Development Plan is submitted for approval.

Kindly see below, recent correspondence received on 16 March 2026 from the Provincial Department of Infrastructure stating that the Department support the development in principle.

From: Barend du Preez <barend@pescasa.co.za>
Sent: Wednesday, 18 March 2026 10:21
To: oarabile@nkanbvo.co.za
Cc: Vanessa Stoffels <Vanessa.Stoffels@westerncape.gov.za>
Subject: RE: Application for the rezoning of a property - App No: 2025-04-0072

Hi Oarabile,

My sincere apologies for the late response.

We are currently finalising the development conditions. Since the Newinbosch development has already implemented various road infrastructure projects, we need to assess how this development might have shared those requirements

Did the applicant submit the land use change application concurrently with the EIA application?

Please be assured that we will prioritise our comments on the land use application as soon as it is referred to this Branch. In the meantime, we propose sending an email regarding the EIA stating that we support the development in principl that formal conditions for the development will be detailed in our subsequent comments on the land use change application.

Please do not hesitate to contact us should you have any queries.

Kind regards | Vriendelike groete

Barend du Preez Pr Eng
On behalf of:
Chief Engineer: Road Use Management
Chief Directorate Road Planning
Transport Infrastructure Branch
Department of Infrastructure
Western Cape Government

1st Floor, 9 Dorp Street, Cape Town

Tel: +27 21 483 6996
Mobile: +27 83 701 2299
Email: barend@pescasa.co.za
Website: www.westerncape.gov.za

Your favourable consideration of this request will be highly appreciated.

Kind regards,
Lester van Stavel
Manager: Housing Development
Integrated Human Settlements
Stellenbosch Municipality

T: +27 21 808 8462
NPK building, 2nd Floor, corner of Ryneveld – and Van Riebeeck Street, Stellenbosch, 7600
www.stellenbosch.gov.za

ANNEXURE H

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

COMMENT FROM THE DEPARTMENT OF

ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

See link below for BAR and specialist studies

- https://drive.google.com/drive/folders/1wxro8fzlONbo-POuidcFMG5Ds2Fd2l9e?usp=sharing

FILE NR: F81/2 S
SCAN NR:
COLLABORATOR NR: 784672

Western Cape Government

Department of Environmental Affairs and Development Planning
Helene Janser
Directorate: Development Management (Region 2)
Helene.Janser@westerncape.gov.za | Tel: 084 585 2000

Reference: 15/3/2/12/BS2

STELLENBOSCH MUNICIPALITY
PLANNING AND DEVELPOMENT SERVICES
29 APR 2025
RECEIVED

Nkanivo Development Consultants (Pty) Ltd
Email: info@nkanivo.co.za

FOR ATTENTION: SAMUEL CHAUKE

PROVINCIAL PLANNING COMMENT: APPLICATION FOR REZONING OF PORTIONS 2 AND 9 OF FARM CLOETESDAL NO. 81, STELLENBOSCH DIVISION

1. Your request for comment on the proposed rezoning has reference.

2. The application under consideration is for the rezoning of the Remainder of Portions 2 and 9 of the Farm Cloetesdal No. 81, Stellenbosch Division, from Agricultural & Rural Zone and Public Roads & Parking Zone to Subdivisional Area to allow for the following Land Uses: Multi-Unit Residential Zone, Public Open Space Zone and Public Road & Parking Zone.

3. The purpose of the application is to establish a mixed-use development comprising 816 residential units, commercial and community facilities. Although the subject property measures 19.27 hectares, the developable area is constrained by the road reserve associated with the R304, as well as the floodline of the Plankenburg River.

4. The subject properties are located inside the urban edge as per the approved Stellenbosch Spatial Development Framework and are located within the study area of the adopted Local Spatial Development Framework (LSDF) for the Adam Tas Corridor.

5. Although identified in 2016 as a Social Housing Restructuring Zone (Site D), it should be noted that the development is not aligned with the LSDF proposal, which earmarks the majority of the site for park (open space). Only proposed Portion A, measuring 2,63ha (described as the area between the R304 and Mount Simon Drive), is earmarked in the LSDF for Future Development.

6. Whilst this Directorate has no objection to the proposed development from a provincial planning perspective, due regard should be given to section 19 of the Land Use Planning Act, which requires the Municipality to determine whether the proposed

development complies with or is consistent with the purpose of the LSDF, or whether a deviation from the LSDF is justified and has been sufficiently motivated.

Kobus Munro Digitally signed by Kobus Munro
Date: 2025.04.25 14:49:42 +02'00'

DIRECTOR: DEVELOPMENT MANAGEMENT (REGION 2)

Copy to: Bulelwa Mdoda, Stellenbosch Municipality

leago
Environmental Solutions

12 March 2026

The Head of Department
Department of Environmental Affairs and Development Planning
Private Bag X 9086
Cape Town,
8000

For Attention: Ntanganedzeni Mabasa
Reference: 16/3/3/6/7/1/B4/45/1122/25

RE: COMMENT ON THE DRAFT BASIC ASSESSMENT REPORT ("BAR") IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT ("NEMA"), 1998 (ACT NO. 107 OF 1998) AND THE ENVIRONMENTAL IMPACT ASSESSMENT ("EIA") REGULATIONS, 2014 (AS AMENDED) FOR THE PROPOSED HOUSING DEVELOPMENT ON PORTION 9 AND THE REMAINDER OF PORTION 2 OF FARM CLOETESDAL NO. 81, STELLENBOSCH

Below are the responses addressing the comments that were raised by the Competent Authority on the Pre-Consultation Draft Basic Assessment Report for the above mentioned project:

3.1. Please take note that the comment was well noted and the listed activities being applied for have been updated in both the Environmental Authorisation Application and Draft Basic Assessment Report (BAR).

3.2. Please refer to Section B (sub-section 4.4) of the draft BAR for the detailed description of the proposed development / activity.

3.3. The updated Wetland Assessment compiled by MORA Ecological Services is included as Appendix G2 of the Draft BAR. Please also take note that during the pre-consultation process, both the Department of Water & Sanitation (DWS) and Cape Nature were consulted with and their comments are included as Appendix E2 and E3 (E3.1) of the Draft BAR.

Unit 18, King Fisher Building
Hazeldean Office Park
697 Silver Lakes Road
Pretoria, 0054

Mobile (+27) 81 428 6116

info@leagoenviro.co.za
leagoenviro.co.za

Environmental Solutions

3.4. Please take note that comments received from the Department of Water and Sanitation confirmed that the proposed development triggers water uses in terms of sections 21 c and i. As a result, the proof of application is attached as part of Appendix E3 (E3.2) of the report.

3.5. Please take note that some portions of the development are affected by the 1:100 floodline. In addition, please take note that the Site Development Plan depicting the floodline in relation to the proposed development is attached as Appendix B1 of the Draft BAR.

3.6. Please take note that the updated Heritage Impact Assessment is included as Appendix G3 of the Draft BAR. Additionally, the comments from Heritage Western Cape (HWC) are included as Appendix E1. It must be noted that the Draft BAR will also be circulated to HWC and their final comments will also be included as part of the Final BAR.

3.7. Please take note that the Western Cape Government Department of Transport and Public Works was consulted during the pre-consultation phase however no comments were received at that stage. It must be noted that the Draft BAR will also be circulated and their final comments will also be included as part of the Final BAR.

3.8. Please take note that the confirmation of services letters from the Stellenbosch Municipality are included as Appendix E16 of the Draft BAR.

3.9. Please take note that the Site Development Plan of the proposed development is included as Appendix B1 of the Draft BAR and relevant section of the reports have also been updated.

3.10. Please refer to Section J (sub section 2.5) of the Draft BAR.

3.11. Please refer to Appendix F of the Draft Basic Assessment Report for proof of the public participation undertaken to date.

3.12. The Comments & Response Report is attached as Appendix F7 of the Draft BAR. It must be noted that some of the comments are being addressed as part of this submission.

Unit 18, King Fisher Building
Hazeldean Office Park
697 Silver Lakes Road
Pretoria, 0054

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3.13. Please refer to Appendix F of the Draft Basic Assessment Report for proof of the public participation undertaken to date

4. The comment is noted and the reference will be quoted in future for ease of reference for any future correspondence.

5. The comment is noted and the applicant will also be advised accordingly.

6. The comment is well noted.

Should you require further clarity regarding this letter, please contact the undersigned at cell: 081 428 6116 or email: info@leagoenviro.co.za.

Yours Faithfully,

.....

Mankaleme M. Magoro
Managing Director
Leago Environmental Solutions

Unit 18, King Fisher Building
Hazeldean Office Park
697 Silver Lakes Road
Pretoria, 0054

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Western Cape Government

Department of Environmental Affairs and Development Planning

BASIC ASSESSMENT REPORT

THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS.

APRIL 2024

Western Cape Government

Department of Environmental Affairs and Development Planning

BASIC ASSESSMENT REPORT

THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS.

APRIL 2024

(For official use only)	
Pre-application Reference Number (if applicable):	
EIA Application Reference Number:	
NEAS Reference Number:	
Exemption Reference Number (if applicable):	
Date BAR received by Department:	
Date BAR received by Directorate:	
Date BAR received by Case Officer:	

GENERAL PROJECT DESCRIPTION

(This must Include an overview of the project including the Farm name/Portion/Erf number)

The clearance of indigenous vegetation for the purpose of developing social housing on Portion 9 and Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD, within Stellenbosch Municipality, in the Western Cape Province. The applicant, Stellenbosch Local Municipality intends to rezone the two farm portions for the purpose of developing social housing of 1 to 4 storey walk up buildings. The project area covers approximately 17.47 hectares in extent, however, only about 6.51 hectares will be cleared for the proposed development.

IMPORTANT INFORMATION TO BE READ PRIOR TO COMPLETING THIS BASIC ASSESSMENT REPORT

1. **The purpose** of this template is to provide a format for the Basic Assessment report as set out in Appendix 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) in order to ultimately obtain Environmental Authorisation.

2. The Environmental Impact Assessment ("EIA") Regulations is defined in terms of Chapter 5 of the National Environmental Management Act, 19998 (Act No. 107 of 1998) ("NEMA") hereinafter referred to as the "NEMA EIA Regulations".

3. *Submission of documentation, reports and other correspondence:*

   The Department has adopted a digital format for corresponding with proponents/applicants or the general public. If there is a conflict between this approach and any provision in the legislation, then the provisions in the legislation prevail. If there is any uncertainty about the requirements or arrangements, the relevant Competent Authority must be consulted.

   The Directorate: Development Management has created generic e-mail addresses for the respective Regions, to centralise their administration. Please make use of the relevant general administration e-mail address below when submitting documents:

   DEADPEIAAdmin@westerncape.gov.za
   Directorate: Development Management (Region 1):
   City of Cape Town; West Coast District Municipal area;
   Cape Winelands District Municipal area and Overberg District Municipal area.

   DEADPEIAAdmin.George@westerncape.gov.za
   Directorate: Development Management (Region 3):
   Garden Route District Municipal area and Central Karoo District Municipal area

   General queries must be submitted via the general administration e-mail for EIA related queries. Where a case-officer of DEA&DP has been assigned, correspondence may be directed to such official and copied to the relevant general administration e-mail for record purposes.

   All correspondence, comments, requests and decisions in terms of applications, will be issued to either the applicant/requester in a digital format via email, with digital signatures, and copied to the Environmental Assessment Practitioner ("EAP") (where applicable).

4. The required information must be typed within the spaces provided in this Basic Assessment Report ("BAR"). The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided.

5. All applicable sections of this BAR must be completed.

6. Unless protected by law, all information contained in, and attached to this BAR, will become public information on receipt by the Competent Authority. If information is not submitted with this BAR due to such information being protected by law, the applicant and/or Environmental Assessment Practitioner ("EAP") must declare such non-disclosure and provide the reasons for believing that the information is protected.

7. This BAR is current as of **April 2024.** It is the responsibility of the Applicant/ EAP to ascertain whether subsequent versions of the BAR have been released by the Department. Visit this Department's website at http://www.westerncape.gov.za to check for the latest version of this BAR.

8. This BAR is the standard format, which must be used in all instances when preparing a BAR for Basic Assessment applications for an environmental authorisation in terms of the NEMA EIA Regulations when the Western Cape Government Department of Environmental Affairs and Development Planning ("DEA&DP") is the Competent Authority.

9. Unless otherwise indicated by the Department, one hard copy and one electronic copy of this BAR must be submitted to the Department at the postal address given below or by delivery thereof to the Registry Office of the Department. Reasonable access to copies of this Report must be provided to the relevant Organs of State for consultation purposes, which may, if so indicated by the Department, include providing a printed copy to a specific Organ of State.

10. This BAR must be duly dated and originally signed by the Applicant, EAP (if applicable) and Specialist(s) and must be submitted to the Department at the details provided below.

11. The Department's latest Circulars pertaining to the "One Environmental Management System" and the EIA Regulations, any subsequent Circulars, and guidelines must be taken into account when completing this BAR.

12. Should a water use licence application be required in terms of the National Water Act, 1998 (Act No. 36 of 1998) ("NWA"), the "One Environmental System" is applicable, specifically in terms of the synchronisation of the consideration of the application in terms of the NEMA and the NWA. Refer to this Department's Circular EADP 0028/2014: One Environmental Management System.

13. Where Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) ("NHRA") is triggered, a copy of Heritage Western Cape's final comment must be attached to the BAR.

14. The Screening Tool developed by the National Department of Environmental Affairs must be used to generate a screening report. Please use the Screening Tool link https://screening.environment.gov.za/screeningtool to generate the Screening Tool Report. The screening tool report must be attached to this BAR.

15. Where this Department is also identified as the Licencing Authority to decide on applications under the National Environmental Management: Air Quality Act (Act No. 29 of 2004) ('NEM:AQA"), the submission of the Report must also be made as follows, for-
Waste Management Licence Applications, this report must also (i.e., another hard copy and electronic copy) be submitted for the attention of the Department's Waste Management Directorate (Tel: 021-483-2728/2705 and Fax: 021-483-4425) at the same postal address as the Cape Town Office.

    Atmospheric Emissions Licence Applications, this report must also be (i.e., another hard copy and electronic copy) submitted for the attention of the Licensing Authority or this Department's Air Quality Management Directorate (Tel: 021 483 2888 and Fax: 021 483 4368) at the same postal address as the Cape Town Office.

DEPARTMENTAL DETAILS	
CAPE TOWN OFFICE: **DIRECTORATE: DEVELOPMENT MANAGEMENT (REGION 1)** (City of Cape Town, West Coast District, Cape Winelands District & Overberg District)	**GEORGE REGIONAL OFFICE:** **DIRECTORATE: DEVELOPMENT MANAGEMENT (REGION 3)** (Central Karoo District & Garden Route District)
The completed Form must be sent via electronic mail to: DEADPEIAAdmin@westerncape.gov.za Queries should be directed to the Directorate: Development Management (Region 1) at: E-mail: DEADPEIAAdmin@westerncape.gov.za Tel: (021) 483-5829 Western Cape Government Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 1) Private Bag X 9086 Cape Town, 8000	The completed Form must be sent via electronic mail to: DEADPEIAAdmin.George@westerncape.gov.za Queries should be directed to the Directorate: Development Management (Region 3) at: E-mail: DEADPEIAAdmin.George@westerncape.gov.za Tel: (044) 814-2006 Western Cape Government Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 3) Private Bag X 6509 George, 6530

MAPS

Provide a location map (see below) as Appendix A1 to this BAR that shows the location of the proposed development and associated structures and infrastructure on the property.	
Locality Map:	The scale of the locality map must be at least 1:50 000. For linear activities or development proposals of more than 25 kilometres, a smaller scale e.g., 1:250 000 can be used. The scale must be indicated on the map. The map must indicate the following: • an accurate indication of the project site position as well as the positions of the alternative sites, if any; • road names or numbers of all the major roads as well as the roads that provide access to the site(s) • a north arrow; • a legend; and • a linear scale. For ocean based or aquatic activity, the coordinates must be provided within which the activity is to be undertaken and a map at an appropriate scale clearly indicating the area within which the activity is to be undertaken. Where comment from the Western Cape Government: Transport and Public Works is required, a map illustrating the properties (owned by the Western Cape Government: Transport and Public Works) that will be affected by the proposed development must be included in the Report.
Provide a detailed site development plan / site map (see below) as Appendix B1 to this BAR; and if applicable, all alternative properties and locations.	
Site Plan:	Detailed site development plan(s) must be prepared for each alternative site or alternative activity. The site plans must contain or conform to the following: • The detailed site plan must preferably be at a scale of 1:500 or at an appropriate scale. The scale must be clearly indicated on the plan, preferably together with a linear scale. • The property boundaries and numbers of all the properties within 50m of the site must be indicated on the site plan. • On land where the property has not been defined, the co-ordinates of the area in which the proposed activity or development is proposed must be provided. • The current land use (not zoning) as well as the land use zoning of each of the adjoining properties must be clearly indicated on the site plan. • The position of each component of the proposed activity or development as well as any other structures on the site must be indicated on the site plan. • Services, including electricity supply cables (indicate aboveground or underground), water supply pipelines, boreholes, sewage pipelines, storm water infrastructure and access roads that will form part of the proposed development **must** be clearly indicated on the site plan. • Servitudes and an indication of the purpose of each servitude must be indicated on the site plan. • Sensitive environmental elements within 100m of the site must be included on the site plan, including (but not limited to): o Watercourses / Rivers / Wetlands o Flood lines (i.e., 1:100 year, 1:50 year and 1:10 year where applicable);

	○ Coastal Risk Zones as delineated for the Western Cape by the Department of Environmental Affairs and Development Planning ("DEA&DP"): ○ Ridges; ○ Cultural and historical features/landscapes; ○ Areas with indigenous vegetation (even if degraded or infested with alien species). • Whenever the slope of the site exceeds 1:10, a contour map of the site must be submitted. • North arrow A map/site plan must also be provided at an appropriate scale, which superimposes the proposed development and its associated structures and infrastructure on the environmental sensitivities of the preferred and alternative sites indicating any areas that should be avoided, including buffer areas.
Site photographs	Colour photographs of the site that shows the overall condition of the site and its surroundings (taken on the site and taken from outside the site) with a description of each photograph. The vantage points from which the photographs were taken must be indicated on the site plan, or locality plan as applicable. If available, please also provide a recent aerial photograph. Photographs must be attached to this BAR as **Appendix C**. The aerial photograph(s) should be supplemented with additional photographs of relevant features on the site. Date of photographs must be included. Please note that the above requirements must be duplicated for all alternative sites.
Biodiversity Overlay Map:	A map of the relevant biodiversity information and conditions must be provided as an overlay map on the property/site plan. The Map must be attached to this BAR as **Appendix D**.
Linear activities or development and multiple properties	GPS co-ordinates must be provided in degrees, minutes and seconds using the Hartebeeshoek 94 WGS84 co-ordinate system. Where numerous properties/sites are involved (linear activities) you must attach a list of the Farm Name(s)/Portion(s)/Erf number(s) to this BAR as an Appendix. For linear activities that are longer than 500m, please provide a map with the co-ordinates taken every 100m along the route to this BAR as **Appendix A3**.

ACRONYMS

DAFF:	Department of Forestry and Fisheries
DEA:	Department of Environmental Affairs
DEA& DP:	Department of Environmental Affairs and Development Planning
DHS:	Department of Human Settlement
DoA:	Department of Agriculture
DoH:	Department of Health
DWS:	Department of Water and Sanitation
EMPr:	Environmental Management Programme
HWC:	Heritage Western Cape
NFEPA:	National Freshwater Ecosystem Protection Assessment
NSBA:	National Spatial Biodiversity Assessment
TOR:	Terms of Reference
WCBSP:	Western Cape Biodiversity Spatial Plan
WCG:	Western Cape Government

ATTACHMENTS

Note: The Appendices must be attached to the BAR as per the list below. Please use a ✓ (tick) or a **x** (cross) to indicate whether the Appendix is attached to the BAR.

The following checklist of attachments must be completed.

APPENDIX			**✓ (Tick) or x (cross)**
Appendix A:	**Maps**		
	Appendix A1:	**Locality Map**	**✓ (topographical & aerial locality maps attached)**
	~~Appendix A2:~~	~~Coastal Risk Zones as delineated in terms of ICMA for the Western Cape by the Department of Environmental Affairs and Development Planning~~	~~Not Applicable~~
	~~Appendix A3:~~	~~Map with the GPS co-ordinates for linear activities~~	~~Not Applicable~~
Appendix B:	**Appendix B1:**	**Site Development Plan(s)**	**✓ (the concept plan and land assembly proposal are also included)**
	Appendix B2	**A map of appropriate scale, which superimposes the proposed development and its associated structures and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffer areas;**	✓
Appendix C:	**Photographs**		✓
Appendix D:	**Biodiversity overlay map**		✓
Appendix E:	**Permit(s) / license(s) / exemption notice, agreements, comments from State Department/Organs of state and service letters from the municipality.**		
	Appendix E1:	**Final comment/ROD from HWC**	**Comments from HWC. Final comments will be provided after the review of the draft BAR.**
	Appendix E2:	**Copy of comment from Cape Nature**	**Comments from Cape Nature on the pre-consultation BAR are attached. Final comments will be provided after the review of the draft BAR.**
	Appendix E3:	**Final Comment from the DWS**	**Comments from DWS on the pre-consultation BAR are attached. Final**

			comments will be provided after the review of the draft BAR.
	Appendix E4:	Comment from the DEA: Oceans and Coast	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E5:	Comment from the DAFF	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E6:	Comment from WCG: Transport and Public Works	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E7:	Comment from WCG: DoA	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E8:	Comment from WCG: DHS	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E9:	Comment from WCG: DoH	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E10:	Comment from DEA&DP: Pollution Management	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E11:	Comment from DEA&DP: Waste Management	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E12:	Comment from DEA&DP: Biodiversity	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E13:	Comment from DEA&DP: Air Quality	The pre-consultation BAR was circulated, however, no comments received to date.

	Appendix E14:	Comment from DEA&DP: Coastal Management	The pre-consultation BAR was circulated, however, no comments received to date.
	Appendix E15:	**Comment from the local authority**	**Comments from Stellenbosch Municipality on the pre-consultation BAR are attached. Final comments will be provided after the review of the draft BAR.**
	Appendix E16:	**Confirmation of all services (water, electricity, sewage, solid waste management)**	✓
	Appendix E17:	Comment from the District Municipality	The pre-consultation BAR was circulated, however, no comments received to date.
	~~Appendix E18:~~	~~Copy of an exemption notice~~	~~Not Applicable~~
	~~Appendix E19~~	~~Pre-approval for the reclamation of land~~	~~Not Applicable~~
	Appendix E20:	**Proof of agreement/TOR of the specialist studies conducted.**	✓ **(Refer to the attached specialist studies reports on Appendix G)**
	Appendix E21:	**Proof of land use rights**	✓
	~~Appendix E22:~~	~~Proof of public participation agreement for linear activities~~	~~Not Applicable~~
Appendix F:	**Public participation information: including a copy of the register of I&APs, the comments and responses Report, proof of notices, advertisements and any other public participation information as is required.**		
	• **Appendix F1:** Proof of Newspaper Publication • **Appendix F2:** List of Stakeholders / Authorities and Interested & Affected Parties • **Appendix F3:** Proof of Background Information Document Circulation • **Appendix F4:** Proof of Circulation of Pre-Consultation Draft Basic Assessment Report • **Appendix F5:** (1) Site Notices / Notice Boards and (2) Locality Map Depicting Site Notices Locations • **Appendix F6:** Comments Received • **Appendix F7:** Comments and Response Report		✓

Appendix G:	**Specialist Report(s)** • **Appendix G1: Ecological Compliance Statement** • **Appendix G2: Wetland Impact Assessment Report** • **Appendix G3: Heritage Impact Assessment Report** • **Appendix G4: Bulk Services Report** • **Appendix G5: Palaeontological Assessment Report** • **Appendix G6: Floodline Report** • **Appendix G7: Geotechnical Feasibility Report** • **Appendix G8: Stormwater Management Plan Report** • **Appendix G9: Traffic Impact Assessment Report**	✓
Appendix H:	**EMPr**	✓
Appendix I:	**Screening tool report**	✓
Appendix J:	**The impact and risk assessment for each alternative**	✓ **(Refer to Section H of this Report)**
Appendix K:	**Need and desirability for the proposed activity or development in terms of this Department's guideline on Need and Desirability (March 2013)/DEA Integrated Environmental Management Guideline**	✓
Appendix L	**Any other attachments must be included as subsequent appendices** • **Appendix L1:** Details and Expertise of the Environmental Assessment Practitioner • **Appendix L2:** NEMA Query Comments • **Appendix L3**_Pre Consultation Basic Assessment Report Comments • **Appendix L4**_Pre-Consultation Meeting Minutes	✓

SECTION A: ADMINISTRATIVE DETAILS

Highlight the Departmental Region in which the intended application will fall	CAPE TOWN OFFICE: REGION 1		GEORGE OFFICE: BEGION 3
		(Cape Winelands District & Overberg District)	

Duplicate this section where there is more than one Proponent Name of Applicant/Proponent:	Stellenbosch Municipality	
Name of contact person for Applicant/Proponent (if other):	Lester van Stavel	
Company/ Trading name/State Department/Organ of State:	Stellenbosch Municipality	
Company Registration Number:	N/A	
Postal address:	PO Box 17	
	Stellenbosch	Postal code: 7599
Telephone:	+27(0) 21 808 8462	Cell: 021 808 8462
E-mail:	Lester.vanstavel@stellenbosch.gov.za	Fax: N/A
Company of EAP:	Leago Environmental Solutions	
EAP name:	Mankaleme Martina Magoro	
Postal address:	Unit 18, King Fisher Building, Hazeldean Office Park	
	697 Silver Lakes Road, Pretoria	Postal code: 0054
Telephone:	+27(0) 12 941 8891	Cell: +27(0) 81 428 6116
E-mail:	info@leagoenviro.co.za	Fax: N/A
Qualifications:	Bachelor of Earth Sciences in Mining and Environmental Geology	
EAP registration no:	2020/2254	
Duplicate this section where there is more than one landowner Name of landowner:	Stellenbosch Municipality	
Name of contact person for landowner (if other):	Lester van Stavel	
Postal address:	PO Box 17, Stellenbosch	
		Postal code: 7599
Telephone:	+27(0) 21 808 8462	Cell: 021 808 8462
E-mail:	Lester.vanstavel@stellenbosch.gov.za	Fax: N/A
Name of Person in control of the land:	Stellenbosch Municipality	
Name of contact person for person in control of the land:	Municipal Manager - Geraldine Metler	
Postal address:	PO Box 17	
	Stellenbosch	Postal code: 7599
Telephone:	+27(0) 21 808 8025	Cell: 021 808 8025
E-mail:	Municipal.Manager@stellenbosch.gov.za	Fax: N/A

Duplicate this section where there is more than one Municipal Jurisdiction Municipality in whose area of jurisdiction the proposed activity will fall:	Stellenbosch Municipality	
Contact person:	Lester van Stavel	
Postal address:	PO Box 17	
	Stellenbosch	Postal code: 7599
Telephone	+27(0) 21 808 8462	Cell: 021 808 8462
E-mail:	Lester.vanstavel@stellenbosch.gov.za	Fax: N/A

SECTION B: CONFIRMATION OF SPECIFIC PROJECT DETAILS AS INLCUDED IN THE APPLICATION FORM

1.	Is the proposed development (please tick):	New	✓	Expansion	
2.	Is the proposed site(s) a brownfield of greenfield site Please explain?				
The project area is regarded as a greenfield, as it has not been developed.					
3.	**For Linear activities or developments**				
3.1.	Provide the Farm(s)/Farm Portion(s)/Erf number(s) for all routes: The proposed development is not a linear development				
3.2.	Development footprint of the proposed development for all alternatives.				
3.3.	Provide a description of the proposed development (e.g. for roads the length, width and width of the road reserve in the case of pipelines indicate the length and diameter) for all alternatives.				
3.4.	Indicate how access to the proposed routes will be obtained for all alternatives.				
3.5.	SG Digit codes of the Farms/Farm Portions/Erf numbers for all alternatives				
3.6.	**Starting point co-ordinates for all alternatives**				
	Latitude (S)				
	Longitude (E)				
	Middle point co-ordinates for all alternatives				
	Latitude (S)				
	Longitude (E)				
	End point co-ordinates for all alternatives				
	Latitude (S)				
	Longitude (E)				
Note: For Linear activities or developments longer than 500m, a map indicating the co-ordinates for every 100m along the route must be attached to this BAR as Appendix A3.					
4.	**Other developments**				
4.1.	Property size(s) of all proposed site(s):				65 100m²
4.2.	Developed footprint of the existing facility and associated infrastructure (if applicable):				Approximately 4.94 hectares
4.3.	Development footprint of the proposed development and associated infrastructure size(s) for all alternatives:				65 100m²
4.4.	Provide a detailed description of the proposed development and its associated infrastructure (This must include details of e.g. buildings, structures, infrastructure, storage facilities, sewage/effluent treatment and holding facilities).				

Project Background

The Western Cape Provincial Spatial Development Framework (2014) in discussing the challenges that the province is currently facing highlights that the 2008 global financial crisis led to a widespread job shedding and with the economy struggling to recover, unemployment is rapidly increasing especially amongst the youth. Furthermore, the economic situation of the province and country at large has made the formal urban land market unaffordable for many Western Cape households, this has placed pressure on the government's housing programmes and has given rise to informal housing developments. The proposed development is in line with the PSDF as it will provide employment to the youth as well as adequate, affordable and sustainable housing and will also lift some pressure of the government's housing programmes.

The Stellenbosch Municipality Spatial Development Framework (MSDF) of 2023 encourages the building of inclusive infill on unoccupied public land in Jamestown, Cloetesville, Idas Valley and Central Stellenbosch. The municipality identified that Restructuring Zones would help achieve the aim of providing social housing, and bring lower income inhabitants closer to the urban economic opportunities. Thus

the area to be developed/rezoned falls under the identified sites that are to be restructured / zoned along the R304.The proposed development therefore aligns with the Spatial Development Framework of the municipality.

Development Proposal:

The proposed activity is the clearance of vegetation on Portion 9 and the Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD. The applicant; Stellenbosch Municipality intends to rezone the subject properties in order to develop a social housing of 1 to 4 storey walk up buildings. It must be noted that the project area measures approximately 17.47 hectares, however only 6.51 hectares will be cleared for the proposed development. The proposed social housing development will entail the below land uses:

- 815 Residential units
- 1 Retail Area
- 1 Creche
- Drying Yards
- Corridors
- 2 Gaurdhouses
- 1 Clubhouse
- Electrical minisub rooms
- Parking Bays

The Concept Plan and Site Development Plan of the proposed development are depicted on Figure 1 and 2 below

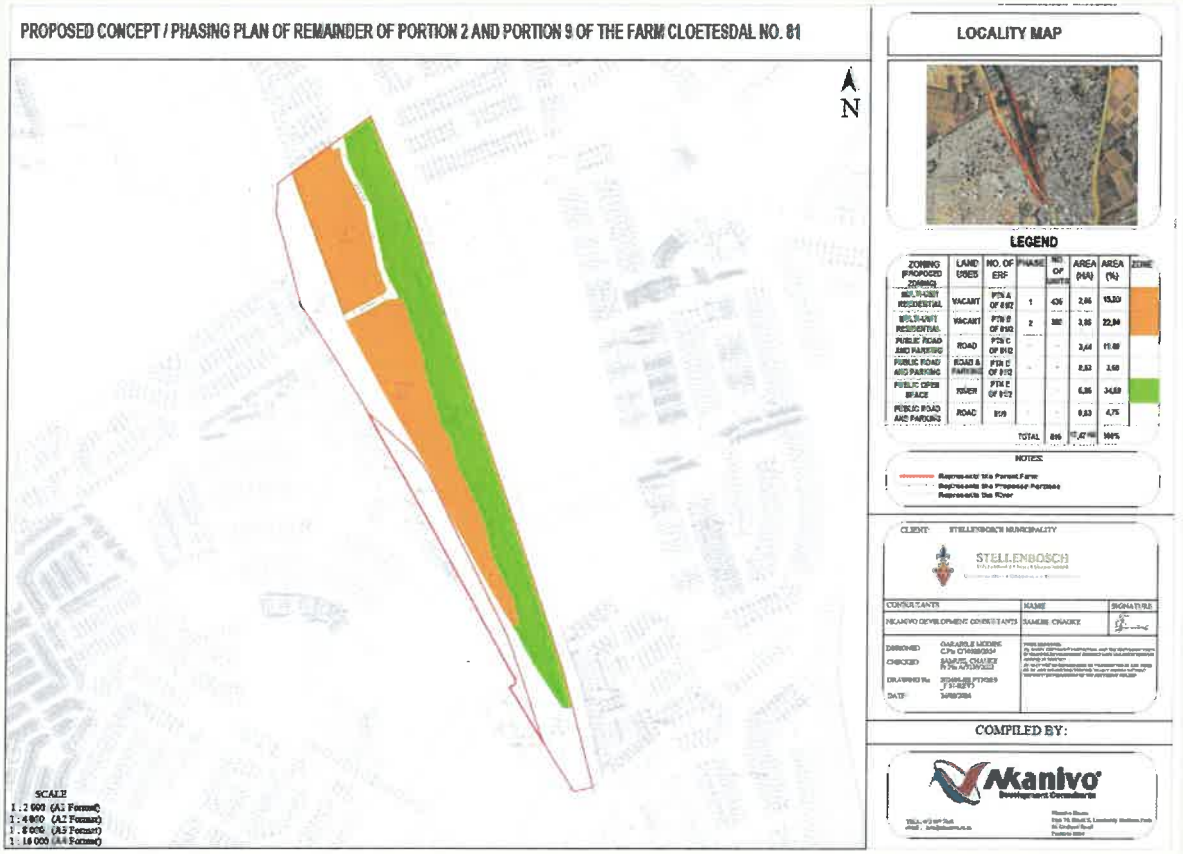


Figure 1: Concept Plan

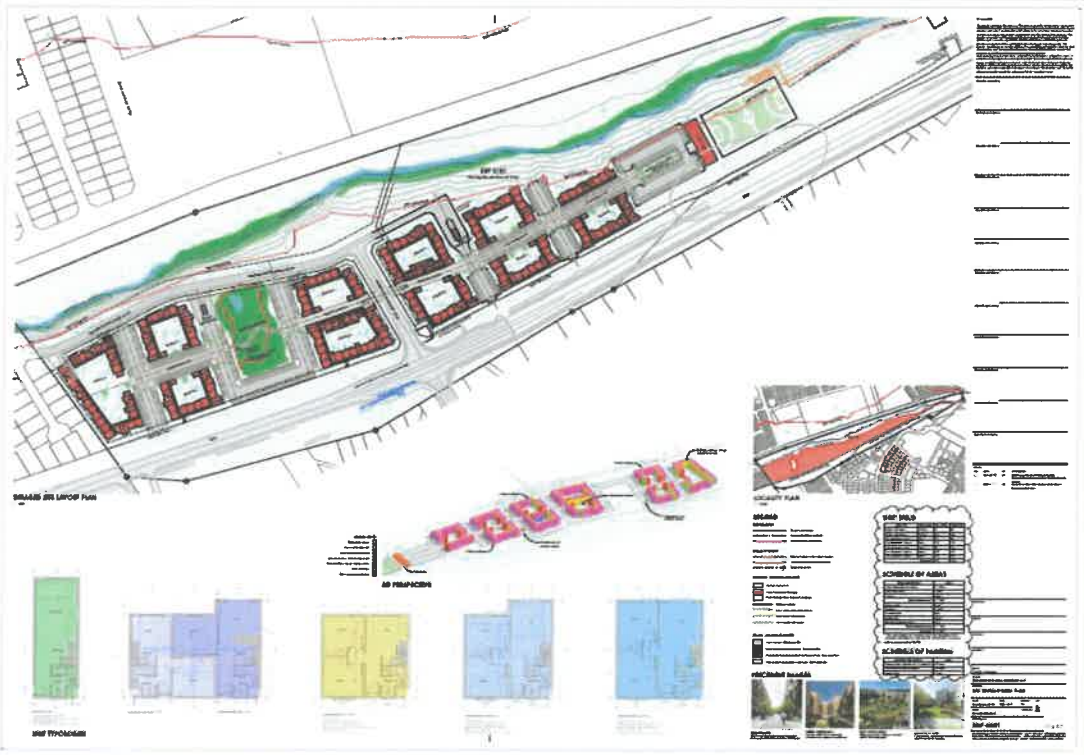


Figure 2: Proposed Site Development Plan

- **Water Supply**

The proposed development is located within the water supply area of the Stellenbosch Municipality.

- **Sewerage**

According to the findings of the Bulk Services Report, it is proposed that a sewerage pump station and sump be constructed inside the eastern boundary of the proposed development above the 1:100-year flood line of the Plankenburg River.

- **Power Supply Water**

The proposed development will be supplied with electricity from the Stellenbosch Local Municipality Power Supply Network.

- **Roads**

The project area be accessed through the existing road i.e., Mount Simon Drive.

- **Solid Waste**

According to the findings of the Bulk Services Report, the uncompressed solid waste in the proposed development will be carried out by the Stellenbosch Local Municipality. The residual solid waste will be collected and transported from the proposed development site to the waste disposal site of the municipality.

- **Stormwater Infrastructure**

The confirmation of the bulk infrastructure services letters from the Stellenbosch Municipality are included in this Draft Basic Assessment report as Appendix E16.

4.5.	Indicate how access to the proposed site(s) will be obtained for all alternatives.																					
The project area is located along the regional route (R304) and a street / road namely, Mount Simon Dr. Access to the proposed development will be provided via the Mount Simon Drive (N-S bound).																						
4.6.	SG Digit code(s) of the proposed site(s) for all alternatives:	C	0	6	7	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0
		C	0	6	7	0	0	2	5	0	0	0	0	0	9	6	1	0	0	0	0	0

4.7.	Coordinates of the proposed site(s) for all alternatives:			
	Latitude (S)	33°	54'	54.51"
	Longitude (E)	18°	51'	2.50"

SECTION C: LEGISLATION/POLICIES AND/OR GUIDELINES/PROTOCOLS

1. Exemption applied for in terms of the NEMA and the NEMA EIA Regulations

Has exemption been applied for in terms of the NEMA and the NEMA EIA Regulations. If yes, include a copy of the exemption notice in Appendix E18.		NO

2. Is the following legislation applicable to the proposed activity or development.

The National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) ("ICMA"). If yes, attach a copy of the comment from the relevant competent authority as Appendix E4 and the pre-approval for the reclamation of land as Appendix E19.		NO
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) ("NHRA"). If yes, attach a copy of the comment from Heritage Western Cape as Appendix E1.	YES	
The National Water Act, 1998 (Act No. 36 of 1998) ("NWA"). If yes, attach a copy of the comment from the DWS as Appendix E3.	YES	
The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) ("NEM:AQA"). If yes, attach a copy of the comment from the relevant authorities as Appendix E13.		NO
The National Environmental Management Waste Act (Act No. 59 of 2008) ("NEM:WA")		NO
The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004 ("NEMBA").		NO
The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) ("NEMPAA").		NO
The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). If yes, attach comment from the relevant competent authority as Appendix E5.		NO

3. Other legislation

List any other legislation that is applicable to the proposed activity or development.

Legislation, Policies and Guidelines	Administering Authority	Date
The Constitution of South Africa, 1996 (Act No. 108 of 1996)	National Government	18 December 1996
National Environmental Management Act, 1998 (Act No. 107 of 1998)	Department of Forestry, Fisheries and the Environment	27 November 1998
Environmental Impact Assessment Regulations, 2017	Department Environmental Affairs	07 April 2017
Stellenbosch Local Municipality Integrated Development Plan (IDP) 2022 – 2027	Stellenbosch Local Municipality	March 2024
Stellenbosch Municipality Amended Spatial Development Framework (SDF)	Stellenbosch Local Municipality	June 2023

4. Policies

Explain which policies were considered and how the proposed activity or development complies and responds to these policies.

- **Western Cape Provincial Spatial Development Framework (WC PSDF), 2014**

The framework states that the economic situation of the province and country at large has made the formal urban land market unaffordable for many Western Cape households, this has then placed pressure on the government's housing programmes and has given rise to informal housing development i.e. shacks to rent in the backyards of formal townships and in informal settlements and overcrowded conditions in the formal housing stock. Housing backlogs are not being reduced, given immigration into the province and the State's emphasis on delivering complete and relatively expensive single family houses with subsidies available. The proposed development is in line with the PSDF as it will provide, affordable and sustainable housing. This will also lift some pressure of the government's housing programmes.

- **Western Cape Biodiversity Spatial Plan and Guidelines, 2023**

The main objective of this plan is to help inform spatial planning. The plan provides guidelines that set out desired management objectives for land and resource use in each category of biodiversity priority area. This plan has been reviewed and it has also been taken into consideration when designing the proposed Site Development Plan.

- **Stellenbosch Municipality Amended Spatial Development Framework, 2023**

The framework encourages building of inclusive infill on unoccupied public land in Jamestown, Cloetesville, Idas Valley and Central Stellenbosch. The municipality identified that Restructuring Zones would help achieve the aim of providing social housing, and bring lower income inhabitants closer to the urban economic opportunities. Thus the area to be developed/rezoned falls under the identified sites that are to be restructured / zoned along the R304. The proposed development therefore aligns with the objectives of the Spatial Development Framework of the municipality.

- **Stellenbosch Local Municipality Integrated Development Plan, 2024**

The Stellenbosch Municipality's Integrated Development Plan (IDP), 2024 the National Minister of Human Settlements gave Stellenbosch Municipality approval to become a Restructuring Town in March 2017. The various restructuring zones within the municipality were confirmed by this approval, and the latter resulted in a Council decision giving the administration instructions to recruit Other Development Agencies (ODAs) and/or Social Housing Institutions (SHIs) to carry out the municipality's social housing program. The proposed development aligns with the objectives of the IDP as the project area is located within a restructuring zone.

5. Guidelines

List the guidelines which have been considered relevant to the proposed activity or development and explain how they have influenced the development proposal.
• **Department of Environmental Affairs (2017), Public Participation Guideline in terms of NEMA EIA Regulations** The guidelines on public participation, under the 2017 EIA Regulations, have been considered to and will be adhered to. • **Need and Desirability Guideline, 2017** The needs & desirability has been prepared in accordance with the guidelines. • **Guideline on Alternatives, 2013** The EIA Regulations stipulate that a requirement of the Environmental Impact Assessment Process is to investigate feasible and reasonable alternatives to the project proposal. The EIA Regulations define "alternatives", in relation to a proposed activity, as "different means of meeting the general purpose and requirements of the activity. Alternatives that were considered for the proposed project are discussed in this Basic Assessment Report. • **Western Cape Biodiversity Spatial Plan and Guidelines, 2023** This plan / guideline has been reviewed and it has also been taken into consideration when designing the proposed Site Development Plan.

6. Protocols

Explain how the proposed activity or development complies with the requirements of the protocols referred to in the NOI and/or application form
The assessment protocols identified in the Department of Forestry, Fisheries and the Environment' s Screening Tool Report, specifically in relation to the Archaeological & Cultural Heritage Impact Assessment, Palaeontological Impact Assessment, Terrestrial Biodiversity Impact Assessment, Aquatic Biodiversity Impact Assessment, Plant and Animal Impact Assessment have been considered. The Ecology / Biodiversity Compliance Statement, Floodline Study, Wetland, Archaeological & Cultural Heritage and Paleontological Impact Assessments have been undertaken for the proposed development.

SECTION D: APPLICABLE LISTED ACTIVITIES

List the applicable activities in terms of the NEMA EIA Regulations

Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1**	Describe the portion of the proposed development to which the applicable listed activity relates.
Activity 27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan	The project area measures approximately 17.47 hectares in extent, however, only about 6.51 hectares of indigenous vegetation will be cleared for the proposed development
Activity 12(ii)c	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint	The proposed development is located within the 32m of the watercourse i.e., Plakenburg River.

	of 100 square metres or more; where such development occurs — (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding — (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour, (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 3**	Describe the portion of the proposed development to which the applicable listed activity relates.
Activity 12i(i)(ii)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan i. Western Cape (i) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004 (ii) within critical biodiversity areas identified in bioregional plans (iii) within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas (iv) on land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or (v) on land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	Approximately 6.51 hectares of vegetation will be cleared within a Critical Biodiversity Area: 1(River & Terrestrial) and Critical Biodiversity Area 2: Terrestrial. The area is also covered by the Swartland Shale Renosterveld vegetation, which is an endangered vegetation.

Note:

- The listed activities specified above must reconcile with activities applied for in the application form. The onus is on the Applicant to ensure that all applicable listed activities are included in the application. If a specific listed activity is not included in an Environmental Authorisation, a new application for Environmental Authorisation will have to be submitted.
- Where additional listed activities have been identified, that have not been included in the application form, and amended application form must be submitted to the competent authority.

List the applicable waste management listed activities in terms of the NEM:WA

Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Category A**	Describe the portion of the proposed development to which the applicable listed activity relates.

List the applicable listed activities in terms of the NEM:AQA

Activity No(s):	Provide the relevant **Listed Activity(ies)**	Describe the portion of the proposed development to which the applicable listed activity relates.

SECTION E: PLANNING CONTEXT AND NEED AND DESIRABILITY

1.	Provide a description of the preferred alternative.
The proposed activity entails the clearance of indigenous vegetation for the purpose of developing the social housing. The applicant, Stellenbosch Municipality intends to rezone Portion 9 and the Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD for the purposes of developing a social housing of 1 to 4 storey walk up buildings. It must be noted that the project area measures approximately 17.47 hectares however only about 6.51 hectares of indigenous vegetation will be cleared for the proposed development.	
2.	Explain how the proposed development is in line with the existing land use rights of the property as you have indicated in the NOI and application form? Include the proof of the existing land use rights granted in Appendix E21.
The current zonings of both Portion 9 and Remainder of Portion 2 of the Farm Cloetesdal 81 currently do not permit the development of the proposed social housing, therefore the applicant intends to rezone the subject properties in order to accommodate the proposed social housing of 1 to 4 storey walk up buildings.	
3.	Explain how potential conflict with respect to existing approvals for the proposed site (as indicated in the NOI/and or application form) and the proposed development have been resolved.
Not applicable, there are no known existing approvals for the proposed activity on the proposed development site.	
4.	Explain how the proposed development will be in line with the following?
4.1	The Provincial Spatial Development Framework.
The Western Cape Provincial Spatial Development Framework (2014) in discussing the challenges that the province is currently facing highlights that the 2008 global financial crisis led to a widespread job shedding and with the economy struggling to recover, unemployment is rapidly increasing especially amongst the youth. Additionally, the economic situation of the province and country at large has made the formal urban land market unaffordable for many western cape households, this has placed pressure on the government's housing programmes and has given rise to informal housing developments. The proposed development is in line with the PSDF as it will provide employment to the youth as well as adequate, affordable and sustainable housing and will also lift some pressure of the government's housing programmes.	
4.2	The Integrated Development Plan of the Local Municipality.
The Stellenbosch Municipality's Integrated Development Plan, 2024, the National minister of Human settlements gave Stellenbosch Municipality approval to become a restructuring town in March 2017. The various restructuring zones within the municipality were confirmed by this approval, and the latter resulted in a council decision giving the administration instructions to recruit other development agencies (ODAs) and/or social housing institutions (SHIs) to carry out the municipality's social housing program. The proposed development therefore aligns with the objectives of the IDP.	
4.3.	The Spatial Development Framework of the local municipality.
The Stellenbosch Municipal Spatial Development Framework (MSDF) of 2023 encourages the building of inclusive infill on unoccupied public land in Jamestown, Cloetesville, Idas Valley and Central Stellenbosch. The municipality identified that restructuring zones would help achieve the aim of providing social housing, and bring lower income inhabitants closer to the urban economic opportunities. The area to be developed/rezoned falls under the identified sites that are to be restructured / zoned along the R304.	
4.4.	The Environmental Management Framework applicable to the area.
The Stellenbosch Environmental Management Framework (SEMF) Composite Spatial Planning Category map indicates that the project area falls within category D.b: Urban Related, of which one of the key policy focus for the SPC's SEMF is to densify urban settlements, especially along the main transport routes and nodal interchanges. The proposed development site is located along one of the main transport route i.e., R304, in that regard, the proposed development aligns with the Environmental Management Framework.	
5.	Explain how comments from the relevant authorities and/or specialist(s) with respect to biodiversity have influenced the proposed development.
The findings of the Ecologist indicated that only one vegetation type i.e., Swartland Shale Renosterveld will be impacted by the proposed development. Additionally, the specialist / ecologist also indicated that although the screening tool shows that the site is rated as Medium for Plant and Animal themes, the results from groundtruthing revealed that the study area is of Low Sensitivity due to continuous disturbance and can accommodate the proposed development due to the low	

ecological importance of majority of the terrestrial habitats. The specialist also identified a river i.e., Plakenburg river located on the eastern side of the project area as a "No-go area".

In addition, comments from Cape Nature indicated that the construction footprint must be demarcated prior to vegetation clearing to ensure that no unnecessary loss of vegetation takes place and vegetation clearing should be undertaken in such a manner that, as far as practicable possible, topsoil is left in place. It was further recommended that an appropriate buffer be placed around the Plankenburg River, and that the area be demarcated as a No-Go area, to avoid any further disturbance or degradation of the ecological health and water quality of the river due to the development.

It must be noted that this is a draft report, once all the comments have been received from the relevant authorities / stakeholders, the comments will also be used to inform the final Site Development Plan of the proposed development so that it has the least environmental impacts.

6.	Explain how the Western Cape Biodiversity Spatial Plan (including the guidelines in the handbook) has influenced the proposed development

The Western Cape Biodiversity Spatial Plan (WCBSP), 2023 is a provincial plan that is developed to inform the Provincial Protected Area Expansion Strategy, the Provincial Biodiversity Strategy and Action Plan (PBSAP) and policy and guideline development in terms of environmental legislation. The primary focus of the plan is to guide land-use planning and decision making. The plan also provides guidelines that set out desired management objectives for land and resource use in each category of biodiversity priority area.

A major portion of the project area is located on a Critical Biodiversity Area 2: Terrestrial and the eastern portion of the area is located on a Critical Biodiversity Area: River. According to the Western Cape Biodiversity Spatial Plan, Terrestrial & River Critical Biodiversity Areas' management objective states that the areas must be maintained in a natural or near natural state, with no further loss of habitat and that the degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.

Relevance to the Project Proposal:

Although the project is located within the CBAs, it must be noted that that the vegetation on site is highly transformed and portions of the area are also used for dumping waste (by the local communities). In addition, the ecological compliance assessment revealed that there is one natural channelled-valley bottom wetland within the site, located on the eastern part of the site, and also an artificial hillslope wetland that has resulted from stormwater input from the nearby township. These wetlands were found to be of low ecological importance due to their condition and disturbances around them. Although the wetland provided limited ecosystem services, it warrants protection and conservation. As a result, a relevant buffer of 15m was applied to the wetland systems. The watercourses i.e., wetland and plakenburg river will be demarcated as no go areas.

7.	Explain how the proposed development is in line with the intention/purpose of the relevant zones as defined in the ICMA.

Not applicable as the project area is not located within any coastal public property, coastal protection zone or coastal access land.

8.	Explain whether the screening report has changed from the one submitted together with the application form. The screening report must be attached as Appendix I.

It must be noted that the Environmental Authorisation Application form is being submitted together with this draft Basic Assessment Report. However, the initial screening report that was submitted as part of the Notice of Intent to apply / pre-application has changed, please see the extracts from the screening tool reports below:

Sensitivity	Feature(s)
Very High	ESA 2: Restore from other land use
Very High	CBA 1: Terrestrial
Very High	SWSA (SW) _Boland
Very High	CR_Swartland Shale Renosterveld

Table 1: Terrestrial Biodiversity Sensitivity Theme – February 2025

Sensitivity	Feature(s)
Very High	CBA: Terrestrial
Very High	CBA2: Terrestrial
Very High	SWSA (sw)_Boland
Very High	CR_Swartland Shale Renosterveld

Table 2: Terrestrial Biodiversity Sensitivity Theme – February 2026

9.	Explain how the proposed development will optimise vacant land available within an urban area.
The social housing development will optimise vacant land within an urban area by transforming underutilized spaces into assets that address critical housing shortages while fostering socio-economic benefits in the area. This development will maximise land use efficiency by converting a vacant land into social housing that accommodate a significant number of households while reducing informal settlements.	
10.	Explain how the proposed development will optimise the use of existing resources and infrastructure.
The proposed development leverages underutilized urban spaces, including vacant lands, transforming it into a sustainable residential area. The integration of social housing within established neighbourhoods maximizes the utility of pre-existing public services and amenities such as schools, healthcare facilities, public transportation networks, and retail establishments. The proposed social housing development will serve as an efficient model that amplifies the effectiveness of current resources and infrastructure, promoting economic efficiency and environmental sustainability while addressing critical housing needs.	
11.	Explain whether the necessary services are available and whether the local authority has confirmed sufficient, spare, unallocated service capacity. (Confirmation of all services must be included in Appendix E16).
Taking into consideration that the proposed social housing is within / surrounded by serviced estates and townships / settlements, it is assumed that most of the required bulk infrastructure services are already in place, however, the confirmation of bulk infrastructure services letter from the Local Municipality i.e., Stellenbosch Municipality are attached as Appendix E16 of this Draft Basic Assessment Report.	
12.	In addition to the above, explain the need and desirability of the proposed activity or development in terms of this Department's guideline on Need and Desirability (March 2013) or the DEA's Integrated Environmental Management Guideline on Need and Desirability. This may be attached to this BAR as Appendix K.
The Need and Desirability is included as Appendix K of this report.	

SECTION F: PUBLIC PARTICIPATION

The Public Participation Process ("PPP") must fulfil the requirements as outlined in the NEMA EIA Regulations and must be attached as Appendix F. Please note that if the NEM: WA and/or the NEM: AQA is applicable to the proposed development, an advertisement must be placed in at least two newspapers.

1. Exclusively for linear activities: Indicate what PPP was agreed to by the competent authority. Include proof of this agreement in Appendix E22.

Not Applicable as the proposed development is not a linear activity.

2. Confirm that the PPP as indicated in the application form has been complied with. All the PPP must be included in Appendix F.

Public Participation Process

It must be noted that the public participation process was undertaken prior to the submission of this report as part of the pre-consultation process.

The public participation process was undertaken in terms of provisions of the Department of Environmental Affairs Public Participation Guidelines in terms of the EIA Regulations, 2017 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended. The key objectives of the public participation process are to:

- Identify a broad range of stakeholders and I&APs, inform them about the proposed project.
- Provide sufficient background information regarding the proposed development to ensure informed participation.
- Understand and clearly document all issues, underlying concerns and suggestions raised by the stakeholders and I&APs.

Proposed Methodology:

- **List of Stakeholders and Interested & Affected Parties/ Database**

A list of stakeholders and Interested & Affected Parties (I&APs) was compiled and will be updated as the process progresses, please refer to Appendix F2 to see the list of stakeholders identified to date.

- **Newspaper Advertisement / Publication**

The proposed development was advertised in the local newspaper on the 06th of March 2025 to inform people about the development and request them to register their names and comment on the proposed development. The copy of the newspaper advert is attached as Appendix F1 of this report.

- **Site Notices**

Site notices were placed at various points on and around the proposed development site on the 20th of March 2025. A site notice was also placed at the Kayamandi Library. Notices / Background Information Documents (BID) regarding the proposed development were also sent via registered mail to the landowners and occupiers of land adjacent to the proposed development site.

- **Consultation with Stakeholders / Interested & Affected Parties**

Consultations with other stakeholders and interested & affected parties was done through emails during the pre-consultation phase.

- **Reports Circulation:**

The Pre-Consultation Basic Assessment report was circulated via email and the hardcopy of the report was also made accessible at the Kayamandi Library during the pre-consultation phase. Background Information Document (BID) [inclusive of a Quick Response (QR) code access the pre-consultation BAR] was also circulated to adjacent landowners and occupiers of land adjacent to the project area via registered mails.

It must be noted that this Draft Basic Assessment report will also be circulated to stakeholders and interested & affected parties for observation and comments for a period of 30 days.

3. Confirm which of the State Departments and Organs of State indicated in the Notice of Intent/application form were consulted with.

Please take note that during the pre-consultation draft report the below state departments and organs were consulted, please refer to Appendix F4 of this report. It must also be noted that these state departments will also be consulted with during this draft basic assessment reporting phase:

- Heritage Western Cape (HWC)
- Cape Nature
- South African Heritage Resources Agency (SAHRA)
- Cape Winelands District Municipality
- Department of Water and Sanitation (DWS)
- Department of Environmental Affairs: Oceans and Coast
- Department of Agriculture, Fisheries and Forestry (DAFF)
- Western Cape Government Department of Transport and Public Works
- Western Cape Government Transport and Public Works
- Department of Agriculture (DoA)
- Department of Human Settlements (DHS)
- Department of Environmental Affairs and Development Planning (DEA&DP) Pollution Management and Chemicals Management
- Department of Environmental Affairs and Development Planning (DEA&DP): Waste Management
- Department of Environmental Affairs and Development Planning (DEA&DP): Biodiversity Section
- Department of Environmental Affairs and Development Planning (DEA&DP): Air Quality Section
- Department of Environmental Affairs and Development Planning (DEA&DP): Coastal Management
- Stellenbosch Local Municipality
- Ward Councillor (Ward 13)

4. If any of the State Departments and Organs of State were not consulted, indicate which and why.

All the state departments listed as part of the stakeholders were consulted with.

5. If any of the State Departments and Organs of State did not respond, indicate which.

During the pre-consultation phase, these are the state departments that were consulted, however did not respond:

- South African Heritage Resources Agency (SAHRA)
- Cape Winelands District Municipality
- Department of Agriculture, Fisheries and Forestry (DAFF)
- Western Cape Government Department of Transport and Public Works
- Western Cape Government Transport and Public Works
- Department of Agriculture (DoA)
- Department of Human Settlements (DHS)
- Department of Environmental Affairs and Development Planning (DEA&DP) Pollution Management and Chemicals Management
- Department of Environmental Affairs and Development Planning (DEA&DP): Waste Management
- Department of Environmental Affairs and Development Planning (DEA&DP): Biodiversity Section
- Department of Environmental Affairs and Development Planning (DEA&DP): Air Quality Section
- Department of Environmental Affairs and Development Planning (DEA&DP): Coastal Management
- Ward Councillor (Ward 13)

6. Provide a summary of the issues raised by I&APs and an indication of the manner in which the issues were incorporated into the development proposal.

Below is the summary of comments / issues received from I&APs and how these have been incorporated into the development proposal:

Heritage Resources
Comments received indicated that the proposed rezoning and subdivision may impact heritage resources and that a Heritage Impact Assessment (HIA) is required in terms of Section 38(3) of the National Heritage Resources Act. The HIA must identify and map all heritage resources within the affected area, assess their significance, evaluate potential impacts, consider alternatives where adverse impacts are anticipated, and propose appropriate mitigation measures. The inclusion of an Archaeological Impact Assessment was specifically required. It was further noted that consultation with affected communities, conservation bodies, and the relevant Municipality must be undertaken and documented, and that an integrated set of recommendations must form part of the HIA.

Biodiversity and Ecological Sensitivity
Comments raised concerns regarding the ecological sensitivity of the site, noting that the property supports a Critically Endangered vegetation type and falls within areas identified in biodiversity planning instruments as Ecological Support Areas and Critical Biodiversity Areas. The proximity of the Plankenburg River was highlighted as a key ecological feature requiring protection. Concerns were expressed regarding the potential loss of natural vegetation, impacts on ecological processes, erosion and sedimentation, and stormwater management. Recommendations included the demarcation of the construction footprint prior to vegetation clearing, the protection and appropriate handling of topsoil, the implementation of erosion and sediment control measures, and the establishment of a buffer area along the river to be managed as a No-Go Area. The inclusion of a River Maintenance and Management Plan was also suggested.

Water Resources
Comments indicated that development within specified distances of a watercourse, wetland, or floodline may trigger water uses in terms of Sections 21(c) and 21(i) of the National Water Act. It was noted that a Water Use Authorisation may be required prior to the commencement of certain activities. Requirements relating to the submission of a Risk Assessment Matrix and confirmation of municipal water and sanitation capacity were highlighted.
Additional concerns were raised regarding the potential abstraction of water from the Plankenburg River during construction and the need to prevent pollution of surface water, groundwater, and stormwater resources. Clarification was requested regarding safeguards to ensure compliance with applicable water legislation.

Wetland Delineation
A discrepancy was noted between the proposed site layout plan, which depicts a wetland in the northern portion of the site, and the findings of the wetland assessment, which primarily addressed the river system. Clarification was requested regarding the existence and extent of the wetland and whether development within 500 metres of such a feature would trigger additional regulatory requirements.

Visual and Sense of Place
Concerns were raised regarding the potential visual impact of the proposed multi-storey residential buildings at the R304 gateway to Stellenbosch. It was indicated that the proposed height and bulk of the development may negatively affect the scenic rural character, heritage context, and sense of place at one of the main entrances to the town. It was further noted that the Basic Assessment documentation did not include a Visual Impact Assessment. Alternative housing typologies were suggested for consideration in order to better align with the existing scale and character of the surrounding area.

The comments received during the consultation process have been carefully considered and have informed revisions, clarifications, and additional inputs in the Draft Basic Assessment Report.

With regard to heritage resources, a Heritage Impact Assessment (HIA) has been undertaken in compliance with the requirements of Section 38(3) of the National Heritage Resources Act. The HIA has subsequently been revised to address comments received and includes the identification and mapping of heritage resources, an assessment of their significance, an evaluation of potential impacts, consideration of alternatives where applicable, and integrated mitigation recommendations. The findings and recommendations of the revised HIA have been incorporated into the impact assessment and Environmental Management Programme (EMPr) to ensure that heritage resources are appropriately safeguarded.

In response to biodiversity and ecological concerns, the Site Development Plan and Biodiversity Sensitivity / Overlay Map have been updated to clearly reflect the buffer along the Plankenburg River, as recommended by the relevant specialist. The Draft Basic Assessment Report explicitly confirms that no development will occur within the watercourse. Portions of the buffer are secured through building line restrictions, while areas designated for landscaping purposes are designed to maintain ecological functioning and avoid disturbance to the river system. The EMPr has been strengthened to include detailed mitigation measures relating to vegetation management, erosion and sediment control, stormwater management, and pollution prevention. All specialist recommendations, inputs and comments from the relevant stakeholders and interested & affected parties were taken into consideration when compiling this report.

In relation to aquatic and water resource considerations, a revised Wetland Assessment was undertaken to address concerns regarding the delineation and status of the area identified on the initial layout plan. The findings of the updated assessment have been incorporated into the aquatic impact assessment section of the Draft Basic Assessment Report and reflected in the revised mapping. Furthermore, a Water Use Licence Application (WULA) has been submitted in terms of the National Water Act under reference number **CT34718.** The outcome of the WULA process will inform any final authorisation conditions prior to the commencement of regulated water uses. The report further confirms that no abstraction of water from the Plankenburg River will occur during any phase of the development and that water supply will be provided by Stellenbosch Municipality.

Concerns relating to visual character and sense of place at the R304 gateway have been recorded in the Public Participation Process section (Appendix F) of the Draft Basic Assessment Report. The issues raised regarding building height and potential visual impacts have been considered in the assessment of impacts and project design, i.e. site development plan.

Note:

A register of all the I&AP's notified, including the Organs of State, and all the registered I&APs must be included in Appendix F. The register must be maintained and made available to any person requesting access to the register in writing.

The EAP must notify I&AP's that all information submitted by I&AP's becomes public information.

Your attention is drawn to Regulation 40 (3) of the NEMA EIA Regulations which states that *"Potential or registered interested and affected parties, including the competent authority, may be provided with an opportunity to comment on reports and plans contemplated in subregulation (1) prior to submission of an application but **must** be provided with an opportunity to comment on such reports once an application has been submitted to the competent authority."*

All the comments received from I&APs on the pre -application BAR (if applicable and the draft BAR must be recorded, responded to and included in the Comments and Responses Report and must be included in Appendix F.

All information obtained during the PPP (the minutes of any meetings held by the EAP with I&APs and other role players wherein the views of the participants are recorded) and must be included in Appendix F.

Please note that proof of the PPP conducted must be included in Appendix F. In terms of the required "proof" the following is required:

- a site map showing where the site notice was displayed, dated photographs showing the notice displayed on site and a copy of the text displayed on the notice;
- in terms of the written notices given, a copy of the written notice sent, as well as:

- if registered mail was sent, a list of the registered mail sent (showing the registered mail number, the name of the person the mail was sent to, the address of the person and the date the registered mail was sent);
- if normal mail was sent, a list of the mail sent (showing the name of the person the mail was sent to, the address of the person, the date the mail was sent, and the signature of the post office worker or the post office stamp indicating that the letter was sent);
- if a facsimile was sent, a copy of the facsimile Report;
- if an electronic mail was sent, a copy of the electronic mail sent; and
- if a "mail drop" was done, a signed register of "mail drops" received (showing the name of the person the notice was handed to, the address of the person, the date, and the signature of the person); and

- a copy of the newspaper advertisement ("newspaper clipping") that was placed, indicating the name of the newspaper and date of publication (of such quality that the wording in the advertisement is legible).

SECTION G: DESCRIPTION OF THE RECEIVING ENVIRONMENT

All specialist studies must be attached as Appendix G.

1. Groundwater

1.1.	Was a specialist study conducted?		NO
1.2.	Provide the name and or company who conducted the specialist study.		
A Geotechnical Study was undertaken by the BVi Consulting Engineers Western Cape (Pty) Ltd and the groundwater aspect was also covered as part of the investigations. The report is attached as Appendix G7.			
1.3.	Indicate above which aquifer your proposed development will be located and explain how this has influenced your proposed development.		
A Geotechnical Investigation was undertaken and categorised the groundwater into perched and permanent groundwater. Test pit investigations indicated that there was no perched groundwater encountered.			
1.4.	Indicate the depth of groundwater and explain how the depth of groundwater and type of aquifer (if present) has influenced your proposed development.		
There was no perched groundwater encountered on site and conditions are such that perched will generally occur in the area during the rainy season. Groundwater is expected to occur at depths exceeding 25 meters in widely spaced fractures below ground water level. Groundwater is expected to occur at depths between 20 meters and 30 meters in fractures restricted to a zone directly below the water table. The presence of permanent water has no influence on the geotechnical conditions on site.			

2. Surface water

2.1.	Was a specialist study conducted?		NO
2.2.	Provide the name and/or company who conducted the specialist study.		

A Wetland Impact Assessment was undertaken by Mora Ecological Services and the findings of the assessment revealed that there are waterbodies i.e., Plankeburg River and a wetland noted on the northern section of the project area i.e., on the Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD, see the image below for reference.

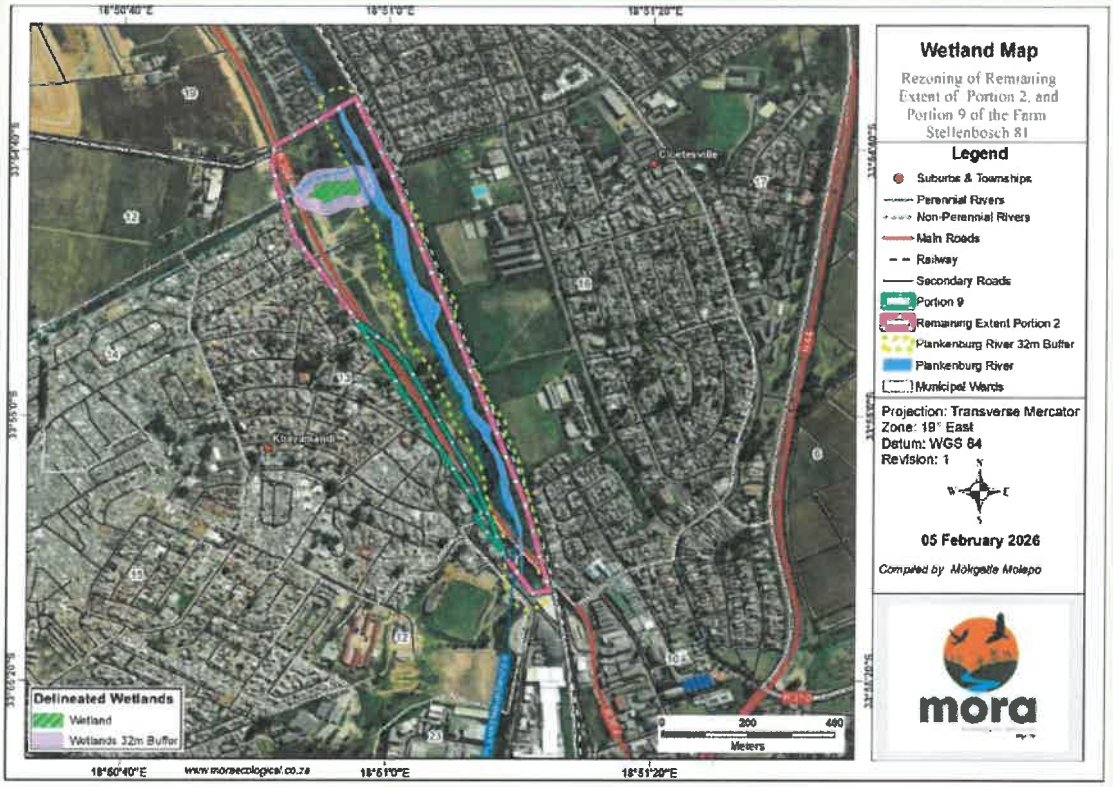


Figure 2: Delineated wetland at the project site.

2.3.	Explain how the presence of watercourse(s) and/or wetlands on the property(ies) has influenced your proposed development.
The waterbody i.e., river (including the wetland) have been earmarked as a "no-go zone /area". The areas that have been earmarked as no-go zones will not be developed instead they will be left as public open spaces and used for landscaping purposes. It must however be noted that certain areas of the buffer will be protected by the building line restrictions.	

3. Coastal Environment

3.1.	Was a specialist study conducted?		NO
3.2.	Provide the name and/or company who conducted the specialist study.		
Not applicable			
3.3.	Explain how the relevant considerations of Section 63 of the ICMA were taken into account and explain how this influenced your proposed development.		
Not applicable as the proposed site is not located within the coastal public property or protection zone.			
3.4.	Explain how estuary management plans (if applicable) has influenced the proposed development.		
3.5.	Explain how the modelled coastal risk zones, the coastal protection zone, littoral active zone and estuarine functional zones, have influenced the proposed development.		

4. Biodiversity

4.1.	Were specialist studies conducted?	YES *(The Ecology / Biodiversity Compliance Statement was prepared)*	
4.2.	Provide the name and/or company who conducted the specialist studies.		
•	Mora Ecological Services (Pty) Ltd		

4.3.	Explain which systematic conservation planning and other biodiversity informants such as vegetation maps, NFEPA, NSBA etc. have been used and how has this influenced your proposed development.

Vegetation

The proposed development footprint falls on the Fynbos Biome is considered by many to be synonymous with the Cape Floristic Region or Cape Floral Kingdom. However, the "biome" refers only to the two key vegetation groups (Fynbos and Renosterveld) within the region, whereas both the "region" and the "kingdom" refer to the general geographical area and include other vegetation types in the Forest, Nama Karoo, Succulent Karoo and Thicket Biomes, but exclude peripheral outliers of the Fynbos Biome such as the Kamiesberg, North-western and Escarpment Mountain Renosterveld (59,60) and Grassy Fynbos (65) east of Port Elizabeth. However, the contribution of Fynbos vegetation to the species richness, endemicity and fame of the region is so overwhelming, that the Cape Floristic Region and Cape Floral Kingdom can be considered to be "essentially Fynbos." Only one vegetation type as shown in Figure 4 will be impacted by the proposed activities. However, this vegetation has been severely transformed.



Figure 4: Vegetation map of the project area

It was noted that although the screening tool shows that the site is rated as Medium for Plant and Animal themes, the results from groundtruthing revealed that the study area is of Low Sensitivity due to continuous disturbance and can accommodate the proposed development due to the low ecological importance of majority of the terrestrial habitats. The list of recorded plant species on site are listed on the table below, it must be noted that none of these species are of conservation concern.

Species	Common Name	Growth Form	IUCN Conservation Status
Glebionis coronaria	Garland Daisy	Herb	LC
Echium plantagineum	Partterson's curse	Herb	LC
Sisymbrium thellungii	African turnip	Herb	LC
Plantago lanceolata	Ribwort plantain	Herb	LC
Oxalis pes-caprae	Bermuda buttercup	Herb	LC
Vicia sativa	Common vetch	Herb	LC
Hyparrhenia hirta	Thatching grass	Grass	LC
Cynodon dactylon	Quick grass	Grass	LC
Ricinus comunis	Castor oil plant	Shrub	LC (Alien)
Acacia saligna	Port Jackson Willow	Tree	LC (Alien)
Pinus pinae	Stone pine	Tree	LC (Alien)

Table 1: Recorded plant species on site

The study has informed the proposal in the following ways: • The suitability of the Site Development Plan in relation to the identified aquatic features on site. • The identification of appropriate mitigation measures for the identified water bodies (river & wetland). • Determination of appropriate timing in terms of construction activities and mitigation measures for construction-related activities.	
4.4.	Explain how the objectives and management guidelines of the Biodiversity Spatial Plan have been used and how has this influenced your proposed development.
Although the project is located within the CBAs, it must be noted that that the vegetation on site is highly transformed and portions of the area are also used for dumping waste (by the local communities). In addition, the ecological compliance assessment revealed that there is one natural channelled-valley bottom wetland within the site, located on the eastern part of the site, and also an artificial hillslope wetland that has resulted from stormwater input from the nearby township. These wetlands were found to be of low ecological importance due to their condition and disturbances around them. Although the wetland provided limited ecosystem services, it warrants protection and conservation. As a result, a relevant buffer of 15m was applied to the wetland systems. It must be noted that the areas that have been earmarked as no-go zones / no go areas will not be developed.	
4.5.	Explain what impact the proposed development will have on the site specific features and/or function of the Biodiversity Spatial Plan category and how has this influenced the proposed development.
The site-specific features are mainly pertaining to the aquatic features i.e., plakenburg river (including the wetland) found within the project area. In addition, the project area is located on a CBA: River & Terrestrial and CBA2: Terrestrial. It must also be noted the vegetation on site has been severely transformed and the relevant buffers will be applied in order to protect the watercourses found on site.	
4.6.	If your proposed development is located in a protected area, explain how the proposed development is in line with the protected area management plan.
Not applicable, the proposed development is not located within a protected area.	
4.7.	Explain how the presence of fauna on and adjacent to the proposed development has influenced your proposed development.
The results of the Ecologist from groundtruthing revealed that the study area is of Low Sensitivity due to continuous disturbance and can accommodate the proposed development due to the low ecological importance of majority of the terrestrial habitats. Additionally, it must also be noted that the project area is located within an area that is transformed due to urban development. Therefore, taking into consideration the current state of the project area and the surrounding area, the site is not expected to support any faunal species.	

5. Geographical Aspects

Explain whether any geographical aspects will be affected and how has this influenced the proposed activity or development.
The project area has a river i.e., Plankenburgrivier running from the north to south on the eastern side of the project area. The waterbodies i.e., river and wetland have been earmarked as a "no-go zone /areas". These areas will therefore not be developed instead they will be used for landscaping purposes and other portions will be left as public open spaces. Certain areas of the buffer will be protected by the building line restrictions.

6. Heritage Resources

6.1.	Was a specialist study conducted?	YES	
6.2.	Provide the name and/or company who conducted the specialist study.		
Umlando Archaeological Surveys			
6.3.	Explain how areas that contain sensitive heritage resources have influenced the proposed development.		

	The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. The area has high heritage sensitivity due to its proximity to several heritage buildings. Cloetesdal itself dates to 1692 and is 500m from the development footprint. The footprint was considered sensitive as it was near a stream and had been used as a footpath for most of the 20th century. The proximity of a flat area near a running stream also made the area potentially sensitive. The field survey however did not locate any middens or isolated historical artefacts. There are no known heritage surveys near the study area. In terms of the paleontology, it is indicated that the project area has Quaternary aged soils and alluvium with a moderate sensitivity for paleontological heritage. However, it is unlikely that significant fossil would be found. A Chance Find Protocol will be initiated for the construction phase. It must be noted that the Notification of Intent to Develop in terms of Section 38 of the National Heritage Resources Act, was compiled and submitted to HWC by the Heritage Specialist, Gavin Anderson of Umlando Archaeological Surveys.

7. Historical and Cultural Aspects

Explain whether there are any culturally or historically significant elements as defined in Section 2 of the NHRA that will be affected and how has this influenced the proposed development.
The area was surveyed for potential historical middens and isolated artefacts and no middens, historical artefacts were observed, and only late 20th and early 21st century building rubble was noted.

8. Socio/Economic Aspects

8.1.	Describe the existing social and economic characteristics of the community in the vicinity of the proposed site.
	The site is located in a suburb of Stellenbosch within the Cape Winelands District with a population of 178 919 and 59626 households. The Cloetesville community in Stellenbosch, is predominantly populated by historically disadvantaged groups, the area exhibits significant socio-economic challenges including high unemployment rates and limited access to quality education and healthcare. Economic activities are often informal with many residents engaged in small-scale trading or intermittent labour opportunities. Socially, the community faces with issues such as substance abuse and crime, which are expected inequalities and inadequate social services. Cloetesville is marked by vibrant community and resilience among its residents.
8.2.	Explain the socio-economic value/contribution of the proposed development.
The proposed social housing development will address the critical issue of affordability by providing secure, stable housing options to low-income families and vulnerable populations, thereby reducing homelessness and housing insecurity. This allows residents to allocate more resources towards other essential needs such as healthcare, education, and nutrition. Economically, the development of this social housing project will benefit local economies through job creation in construction phases. This economic boost can lead to increased demand for local goods and services and further increasing community growth.	
8.3.	Explain what social initiatives will be implemented by applicant to address the needs of the community and to uplift the area.
The proposed development will prevent land invasions and also eliminate the scarcity of accommodation by provide housing and related services for the local communities. The proposed development will also provide short term community upliftment through creation of jobs during construction phase. The implementation of this activity will also contribute greatly on the socio-economic transformation and growth of the municipality	
8.4.	Explain whether the proposed development will impact on people's health and well-being (e.g. in terms of noise, odours, visual character and sense of place etc.) and how has this influenced the proposed development.
The Constitution of South Africa states that "Everyone shall have the right of access to adequate housing", the proposed development will most definitely have a positive impact on people's health and well-being. The provision of a house with basic services and safety will drastically improve people's health and well-being. It is however not anticipated that the proposed development will have any negative or adverse impacts on the health and well-being of the surrounding communities. Taking into consideration the nature of the development, most impacts such as dust, noise, odours etc. will only be limited to the construction phase. The impacts are short term / temporary and the mitigation measures in relation to this impacts will also be provided in the Environmental Management Plan report which is attached as Appendix H of this report. Visual environment will be in line with the developments in the surrounding area as the proposed development site will be located next to the boundaries of the existing settlements / estate i.e.., Kayamandi, Mount Simon Estate and Cloetesville.	

SECTION H: ALTERNATIVES, METHODOLOGY AND ASSESSMENT OF ALTERNATIVES

1. Details of the alternatives identified and considered

1.1.	Property and site alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts.

Provide a description of the preferred property and site alternative.

The preferred site is Portion 9 and Remainder of Portion 2 of the Farm Cloetesdal 81, Stellenbosch RD, within Stellenbosch Municipality, in the Western Cape Province. No other site alternatives were considered for this development.

Provide a description of any other property and site alternatives investigated.

There were no other property or site alternatives that were considered in this assessment because of the already-determined suitability of the site in terms of spatial planning. It must be noted that the Stellenbosch Municipal Spatial Development Framework of 2023 encourages the building of inclusive infill on unoccupied public land in Jamestown, Cloetesville, Idas Valley and Central Stellenbosch. The municipality identified that Restructuring Zones would help achieve the aim of providing social housing, and bring lower income inhabitants closer to the urban economic opportunities. Thus the area to be developed/rezoned falls under the identified sites that are to be restructured / zoned along the R304.

Provide a motivation for the preferred property and site alternative including the outcome of the site selectin matrix.

The Stellenbosch Municipal Spatial Development Framework (MSDF) of 2023 encourages the building of inclusive infill on unoccupied public land in Jamestown, Cloetesville, Idas Valley and Central Stellenbosch. The municipality identified that Restructuring Zones would help achieve the aim of providing social housing, and bring lower income inhabitants closer to the urban economic opportunities.

The alternative / preferred site has been identified as suitable because:

- The site / project area aligns with the objectives of the MSDF as it is located along the restructuring zone i.e., R304
- The site is owned by the applicant i.e., Stellenbosch Local Municipality.
- The local municipality has the capacity to service the proposed project area

Provide a full description of the process followed to reach the preferred alternative within the site.

The Stellenbosch Municipality's Integrated Development Plan (IDP), the National minister of Human settlements gave Stellenbosch Municipality approval to become a restructuring town in March 2017. The various restructuring zones within the municipality were confirmed by this approval, and the latter resulted in a council decision giving the administration instructions to recruit other development agencies (ODAs) and/or social housing institutions (SHIs) to carry out the municipality's social housing program. The project area is located within a restructuring zone. There were no other property or site alternatives that were considered in this assessment because of the already-determined suitability of the site in terms of the spatial planning. The map below indicates the areas that have been earmarked as restructuring zones.



Figure 5: Map showing the restructuring zones

Provide a detailed motivation if no property and site alternatives were considered.

Only one site was considered for the proposed development. Please refer to the motivation provided above.

List the positive and negative impacts that the property and site alternatives will have on the environment.

Positive Impacts

- Temporary employment opportunities will be created during the construction phase.
- The implementation of this activity will contribute greatly on the socio-economic transformation and growth of the municipality.
- The implementation of the proposed development will make provision of affordable housing which is close to public transportation routes and economic opportunities.
- The establishment of this housing development will help prevent land invasions.
- The implementation of this development will help reduce the housing backlog of the municipality.

Negative Impacts

- Water use, waste, sanitation and other impacts will be impacted should they not be managed correctly.
- There will be negative visual impact during construction phase of the development
- Nuisance caused by noise, dust and vibrations during construction
- There will be negative traffic impact during construction
- The cumulative impacts that the development will have in terms of pollution and other impacts can lead to extra environmental degradation, especially if not managed correctly.

1.2.	Activity alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts.

Provide a description of the preferred activity alternative.

The preferred activity alternative is the clearance of vegetation on Portion 9 and Remainder of Portion 2 of the Farm Cloetesdal 81, for the purpose of developing social housing of 1 to 4 storey walk up buildings.

Provide a description of any other activity alternatives investigated.

The economic situation of the Western Cape Province and country at large has made the formal urban land market unaffordable for many Western Cape households, this has thus put pressure on the government's housing programmes and has given rise to informal housing developments. The current preferred activity is therefore deemed to be the only feasible activity alternative as the proposed development will provide access to housing. No other activities were considered in this application due to the assessed need and feasibility of the proposed development.

Provide a motivation for the preferred activity alternative.

The preferred activity is aligned with the existing built environment in the area, which is in the edge of built up characterised by buildings and residential dwellings. It is also aligned spatial planning goals relevant to the area such as densification within urban areas. While the current zonings of both Portion 9 and Remainder of Portion 2 of the Farm Cloetesdal 81 currently does not permit the development of social housing, the applicant intends to rezone the subject properties in order to accommodate the proposed social housing of 1 to 4 storey walk up buildings.

Provide a detailed motivation if no activity alternatives exist.

Activity alternative have not been assessed due to the assessed need and feasibility of the proposed development. The economic situation of the Western Cape Province and country at large has made the formal urban land market unaffordable for many Western Cape households, this has thus put pressure on the government's housing programmes and has given rise to informal housing developments. The current preferred activity is therefore deemed to be the only feasible activity alternative as the proposed development will provide access to housing.

List the positive and negative impacts that the activity alternatives will have on the environment.

No activity alternatives have been formally assessed. Therefore, the impacts are equivalent to the preferred "development alternative".

1.3.	Design or layout alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts

Provide a description of the preferred design or layout alternative.

The unique character and appeal of Cloetesville were taken into consideration with the design philosophy. The environmental constraints of the area were also taken into account, hence the current Site Development Plan being the result, however there is still a possibility of a layout alternative that will still meet the objective of the project scope.

Provide a description of any other design or layout alternatives investigated.

Only one proposed Site Development Plan alternative was assessed in this process, which is the preferred design / layout alternative as discussed throughout this report.

Provide a motivation for the preferred design or layout alternative.

Currently, there is only one Site Development Plan alternative, which is the preferred design / layout alternative as described above and assessed throughout this draft BAR.

Provide a detailed motivation if no design or layout alternatives exist.

Comments from the stakeholders, interested & affected parties and competent authority on the subject Site Development Plan will also be used to inform the final plan of the proposed development.

List the positive and negative impacts that the design alternatives will have on the environment.

The positive and negative impacts of the preferred alternative (the "development alternative") would include:

Positive Impacts:

- The use of strategically located land parcel for affordable housing
- Job creation during the construction phase of the development (people in the planning, design, and construction)
- Improvement in river condition, connectivity and resilience
- Provision of affordable housing close to public transport routes / roads and other social amenities i.e., schools and health facilities.
- The proposed development will eventually be integrated with the environment, have proper service provision and it will be well planned.

Negative Impacts:

- There will be a negative visual impact during the construction phase
- Public nuisances: noise, dust and vibrations during construction
- Increased traffic impact during construction

1.4.	Technology alternatives (e.g., to reduce resource demand and increase resource use efficiency) to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts.

Provide a description of the preferred technology alternative:

As the preferred use is for predominantly a residential development, there are limited technology alternatives that can be considered for these uses, however, individual components of the development could utilise diverse technological alternatives.

Provide a description of any other technology alternatives investigated.

No other technology alternatives have been investigated for this proposed development.

Provide a motivation for the preferred technology alternative.

As the preferred activity is predominantly for residential development, there are limited technology alternatives that can be considered for these uses, however, individual components of the development could utilise diverse technological alternatives

Provide a detailed motivation if no alternatives exist.

The preferred activity is predominantly for residential development, there are limited technology alternatives that can be considered for these uses, however, individual components of the development could utilise diverse technological alternatives

List the positive and negative impacts that the technology alternatives will have on the environment.

Not applicable, no formal technology alternatives have been assessed, however the best practice measures included in the EMPr would serve to mitigate adverse impacts.

1.5.	Operational alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts.

Provide a description of the preferred operational alternative.

The preferred operational alternative is the clearance of vegetation for the purpose of developing the social housing.

Provide a description of any other operational alternatives investigated.

The operational aspects of the activity relate to provision of housing for the local communities. No other alternatives were deemed feasible other than the proposed activity.

Provide a motivation for the preferred operational alternative.

The Western Cape Provincial Spatial Development Framework (2014) in discussing the challenges that the province is currently facing highlights that the 2008 global financial crisis led to a widespread job shedding and with the economy struggling to recover, unemployment is rapidly increasing especially amongst the youth. Furthermore, the economic situation of the province and country at large has made the formal urban land market unaffordable for many Western Cape households, this has placed pressure on the government's housing programmes and has given rise to informal housing developments. No other activity was deemed feasible other than the proposed activity.

Provide a detailed motivation if no alternatives exist.

The Western Cape Provincial Spatial Development Framework (2014) in discussing the challenges that the province is currently facing highlights that the 2008 global financial crisis led to a widespread job shedding and with the economy struggling to recover, unemployment is rapidly increasing especially amongst the youth. Furthermore, the economic situation of the province and country at large has made the formal urban land market unaffordable for many Western Cape households, this has placed pressure on the government's housing programmes and has given rise to informal housing developments. No other activity was deemed feasible other than the proposed activity.

List the positive and negative impacts that the operational alternatives will have on the environment.

Positive Impacts

- Provision of housing development on a strategic land parcel
- Public spaces and safety
- Economic growth of the local area

Negative Impacts

- Traffic impacts – increased traffic & commuter delays

1.6.	The option of not implementing the activity (the 'No-Go' Option).

Provide an explanation as to why the 'No-Go' Option is not preferred.	
This option would come into effect if this assessment reveals fatal flaws in the process. To date no fatal flaws have been revealed. The no-go alternative of not developing the proposed site would leave the environment in the current state.	
1.7.	Provide and explanation as to whether any other alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist.
No further alternatives have been considered.	
1.8.	Provide a concluding statement indicating the preferred alternatives, including the preferred location of the activity.
The Stellenbosch Municipality's Integrated Development Plan (IDP) 2022-2027, the National Minister of Human Settlements gave Stellenbosch Municipality approval to become a Restructuring Town in March 2017. The various restructuring zones within the municipality were confirmed by this approval, and the latter resulted in a Council decision giving the administration instructions to recruit Other Development Agencies (ODAs) and/or Social Housing Institutions (SHIs) to carry out the municipality's social housing program. The Stellenbosch Municipal Spatial Development Framework of 2023 encourages the building of inclusive infill on unoccupied public land in Jamestown, Cloetesville, Idas Valley and Central Stellenbosch. The municipality identified that Restructuring Zones would help achieve the aim of providing social housing, and bring lower income inhabitants closer to the urban economic opportunities. It must be noted that the proposed development is located within an area that is designated as "restructuring zone" and the proposed activity. No other location and activity alternatives were deemed feasible due to the assessed need of the activity i.e., housing and suitability of the site in terms of the spatial planning (restructuring zone.)	

2. "No-Go" areas

Explain what "no-go" area(s) have been identified during identification of the alternatives and provide the co-ordinates of the "no-go" area(s).
This option would come into effect if this assessment reveals fatal flaws in the process. To date no fatal flaws have been revealed. The no-go alternative of not developing the proposed site would leave the environment in the current state. Although this assessment revealed no fatal flaws, it must be noted that no-go areas have been identified with respect to sensitive areas found on site i.e., river, wetland & buffer. The Ecologist highly recommended that the river and buffer be marked as a no go zone during all phases of construction, as most of the impacts are likely to be during this stage. From an operational perspective, the development footprint as depicted on the Site Development Plan and Concept Plan would need to be respected and no encroachment/ development beyond those limits would be permitted (unless otherwise authorised through the necessary processes).

3. Methodology to determine the significance ratings of the potential environmental impacts and risks associated with the alternatives.

Describe the methodology to be used in determining and ranking the nature, significance, consequences, extent, duration of the potential environmental impacts and risks associated with the proposed activity or development and alternatives, the degree to which the impact or risk can be reversed and the degree to which the impact and risk may cause irreplaceable loss of resources.
To assess the impacts on the environment, the process has been divided into two main phases namely the construction and operational phases. The activities present in these two phases have been studied to identify and predict all possible impacts. In any process of identifying and recognising impacts, one must recognise that the determination of impact significance is inherently an anthropocentric concept. Duinker and Beanlands, (1986) in DEAT 2002, Thompson (1988), (1990) in DEAT 2002 stated that the significance of an impact is an expression of the cost or value of an impact to society. However, the tendency is always towards a system of quantifying the significance of the impacts so that it is a true representation of the existing situation on site. This has been done by using wherever possible, legal and scientific standards which are applicable. The significance of the aspects/impacts of the process have been rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts. The consequence matrix use parameters like severity, duration and extent of impact as well as compliance to standards. Values of 1-5 are assigned to the parameters that are added and averaged to determine the overall consequence. The same process is followed with the likelihood that consists of two parameters namely frequency and probability. The overall consequence and the overall likelihood are then multiplied to give values ranging from 1 to 25. These values as shown in the following table are then used to rank the significance.

Significance	Low	Low-Medium	Medium	Medium-High	High
Overall Consequence X	1-4.9	5-9.9	10-14.9	15-19.9	20-25

Overall Likelihood					

SEVERITY	
Low	Low cost/high potential to mitigate. Impacts easily reversible, non – harmful insignificant change/deterioration or disturbance to natural environments.
Low-medium	Low cost to mitigate small/ potentially harmful moderate change/deterioration or disturbance to natural environment.
Medium	Substantial cost to mitigate. Potential to mitigate and potential to reverse impact. Harmful Significant change/ deterioration or disturbance to natural environment.
Medium-high	High cost to mitigate. Possible to mitigate great/very harmful, very significant change/deterioration or disturbance to natural environment.
High	Prohibitive cost to mitigate. Little or no mechanism to mitigate. Irreversible. Extremely harmful Disastrous change/deterioration or disturbance to natural environment.
DURATION	
Low	Up to one month
Low-medium	One month to three months
Medium	Three months to one year
Medium-high	One to ten years
High	Beyond ten years
EXTENT	
Low	Project area
Low-medium	Surrounding area
Medium	Within Stellenbosch Local Municipality
Medium-high	Within Cape Winelands District Municipality
High	Regional, National and International
FREQUENCY	
Low	Once a year or once during operation
Low-medium	Once in 6 months
Medium	Once a month
Medium-high	Once a week
High	Daily
PROBABILITY	
Low	Almost never/ almost impossible
Low-medium	Very seldom/ highly unlikely
Medium	Infrequent/ unlikely/ seldom
Medium-high	Often/ Regularly/ Likely/ Possible
High	Daily/ Highly likely/ definitely
COMPLIANCE **The following criteria are used during the rating of possible impacts.**	
Low	Best practise
Low-medium	Compliance
Medium	Non-compliance/ conformance to Policies etc. – Internal
Medium-high	Non-compliance/ conformance to Legislation etc. – External
High	Directive, prosecution of closure or potential for non-renewal of licences or rights

4. Assessment of each impact and risk identified for each alternative

Note: The following table serves as a guide for summarising each alternative. The table should be repeated for each alternative to ensure a comparative assessment. The EAP may decide to include this section as Appendix J to this BAR.

ALTERNATIVE: PREFERRED ALTERNATIVE	
PLANNING, DESIGN AND DEVELOPMENT PHASE	
Potential Impact and Risk:	**Soil Contamination and Land Degradation**
Nature of impact:	Contamination and land degradation that might be caused by spillages of oil, chemicals from machinery & vehicles, removal of vegetation / site clearing during construction and increased erosion of drainage channels
Extent and duration of impact:	Medium-High
Consequence of impact or risk:	• Soil contamination &land degradation • Loss of topsoil • Dust formation • Erosion

Degree to which the impact may cause irreplaceable loss of resources:	Medium-High
Degree to which the impact can be reversed	Medium
Cumulative impact prior to mitigation:	High (spillages of oil, lubricants and fuel from construction vehicles, plant and machinery has the potential to contaminate soil and underground water)
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High
Degree to which the impact can be avoided	Can be avoided
Degree to which the impact can be managed:	Can be managed
Degree to which the impact can be mitigated:	Can be managed
Proposed mitigation:	• Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/ hazardous waste facilities. • Any contaminated soil must be removed and the affected area rehabilitated. • Ensure that the provision of all services (sewer) are in accordance with relevant Council requirements • No vehicles, machinery or equipment with leaks or causing spills may be allowed to operate on the construction site • Removal of vegetation should be restricted to areas identified on the project description / footprint.
Residual impacts:	Low - Medium
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Potential Impact and Risk:	**Noise Pollution**
Nature of impact:	The construction phase of the development will produce noise. Noise will likely be generated by construction machinery and plant.
Extent and duration of impact:	Medium-High and Medium
Consequence of impact or risk:	Noise pollution / nuisance
Degree to which the impact may cause irreplaceable loss of resources:	Not applicable, there will be no loss of resources
Degree to which the impact can be reversed	Reversible
Indirect impacts:	There are no indirect impacts
Cumulative impact prior to mitigation:	Low-Negative
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be avoided	High, cannot be avoided.
Degree to which the impact can be managed:	Medium, can be managed.
Degree to which the impact can be mitigated:	Medium-High, can be mitigated.
Proposed mitigation:	• Limit construction activities to day time hours • Construction personnel must wear personal protective equipment where appropriate i.e., ear plugs. • All machineries to be utilised on the site must be fitted with mufflers and must be maintained in good working conditions in order to minimize noise. • The contractor shall warn all local community that could be affected by the noise generation from construction activities • Noise complaints register will be opened. • Due to the proximity of the proposed development • site to residents, noise levels must be kept to a • minimum at all times. • Noise levels must comply with the relevant health & safety regulations and SANS codes and should be monitored by the Health & Safety Officer as necessary and appropriate
Residual impacts:	Possible noise nuisance for during construction

Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Potential Impact and Risk:	**Socio-Economic Impact**
Nature of impact:	Socio-economic impact: the community will benefit from the proposed development in the form of the provision of jobs in the construction phase of the development
Extent and duration of impact:	Low -medium
Consequence of impact or risk:	High (+) Temporary jobs during construction phase and new housing
Degree to which the impact may cause irreplaceable loss of resources:	None
Degree to which the impact can be reversed	Reversible
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be avoided:	Not Applicable
Degree to which the impact can be managed:	Not Applicable
Degree to which the impact can be mitigated	Not Applicable
Proposed mitigation / recommendations	• Ensure that local industries are utilised as suppliers, where applicable/practical. • Enhance the use of local labour and local skills as far as reasonably possible. • Ensure that an equitable percentage allocation is provided for local labour employment.
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium - High
Cumulative impact post mitigation	Skills Development
Potential Impact and Risk:	**Traffic Impact**
Nature of impact:	High traffic impacts are anticipated as construction vehicles as they will have to access the site.
Extent and duration of impact:	Local & Medium Term
Consequence of impact or risk:	Low-medium- increased traffic congestion and damage to roads
Degree to which the impact may cause irreplaceable loss of resources:	Not applicable (no loss of resource)
Degree to which the impact can be reversed	Reversible
Indirect impacts:	There are no anticipated indirect impacts
Cumulative impact prior to mitigation:	Low-Medium
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low-Medium
Degree to which the impact can be avoided	Low
Degree to which the impact can be managed:	Medium
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	• Implement a traffic management plan during construction, which can include the selection of appropriate routes for construction vehicles, the use of detours and alternative routes as required, and the use of flag persons to direct traffic • Provide relevant signage and ensure that is visible
Residual impacts:	Low
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Potential Impact And Risk:	**Visual Impact**
Nature of impact:	Impact of the proposed development of sense of place. The physical existence of the development.
Extent and duration of impact:	Low-medium

Consequence of impact or risk:	Obstruction, visual intrusion, public nuisance and negative impact on sense of place.
Degree to which the impact may cause irreplaceable loss of resources:	There will be no irreplaceable loss of resources
Degree to which the impact can be reversed	Reversible
Indirect impacts:	Not applicable, no indirect impacts
Cumulative impact prior to mitigation:	Cumulative impacts for short-term construction impacts
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be avoided	Can be avoided
Degree to which the impact can be managed:	Can be managed
Degree to which the impact can be mitigated:	Can be mitigated
Proposed mitigation:	The EMPr, which is attached as Appendix includes mitigation measures
Residual impacts:	Temporary visual impacts will be limited to the construction phase.
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very low
Potential Impact and Risk:	**Loss of Biodiversity / Habitat (Terrestrial & Aquatic)**
Nature of impact:	Loss of habitat due to establishment of development / site clearing
Extent and duration of impact:	Low and Medium High
Consequence of impact or risk:	• Loss of biodiversity. • Loss of habitat.
Degree to which the impact may cause irreplaceable loss of resources:	Low - medium, loss of habitat will be lost during construction phase of the development
Degree to which the impact can be reversed	Cannot entirely be reversible
Indirect impacts:	Low
Cumulative impact prior to mitigation:	Low
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low – medium
Degree to which the impact can be avoided	Cannot be avoided
Degree to which the impact can be managed:	Can be managed
Degree to which the impact can be mitigated:	Can be mitigated
Proposed mitigation:	The Ecology and Wetland Impact specialist recommends that the following be adhered to: • Minimise the development footprint and reserve indigenous vegetation wherever possible. • All vegetation not required to be removed should be protected against damage. • Sensitive areas such as Plankeburg river must be avoided during all phase of the development. • Existing roads must be used where possible during construction of the project. • Rehabilitate area with indigenous flora. • Have a biodiversity protocol and rehabilitation plan that will be implemented following the construction phase. • Invasive plant material should be disposed by incineration, or alternatively, composting to break down seeds. If seedbank persists, invasive alien plant management and eradication measures should be implemented. • all areas impacted by the proposed development must be rehabilitated by undertaking the following general tasks: • All foreign material must be removed from site. • Land must be regraded / re-shaped and topsoils must be reinstated. • Compacted soils must be adequately ripped/loosened where compacted, as informed by the Environmental Control Officer. • Re-vegetation should take place as follows:

	• For any permanently and seasonally saturated areas - via translocation/ transplanting of rescued sods and, where there are not enough rescued sods, via the translocation/ transplanting of sods from the surrounding wetland as advised by a wetland ecologist
Residual impacts:	Pollution of surface & groundwater, lower water quality, soil / land degradation, erosion and siltation.
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Potential Impact and Risk:	**Stormwater Impacts**
Nature of impact:	Impacts of contaminated stormwater by surface runoff to the river during construction.
Extent and duration of impact:	Medium-high
Consequence of impact or risk:	Stormwater runoff may become contaminated in areas where surface runoff may come into contact with areas designated for the handling or storage of material such as cement. This may result to the release of polluted stormwater runoff into the stream.
Degree to which the impact may cause irreplaceable loss of resources:	There will be no loss of resources if mitigation measures are adhered to.
Degree to which the impact can be reversed	Reversible
Indirect impacts:	There are no indirect impacts
Cumulative impact prior to mitigation:	Low – medium
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be avoided	Can be avoided
Degree to which the impact can be managed:	Can be managed
Degree to which the impact can be mitigated:	Can be mitigated
Proposed mitigation:	• Waste / litter generated by construction activities must be regularly removed. • Separate stormwater runoff from areas where hazardous materials are handled. • All solid waste generated during the construction process (including plastic, rubble, cut plant material, waste metals etc.) must be placed in the waste collection area in the construction camp. • The contractor shall ensure that all site personnel are instructed on the proper disposal of all waste material. • Refuelling of construction machinery and /or vehicles must be done on bunded areas in designated areas to avoid accidental spills and leaks associated with construction machinery and spillages during refuelling. • Construction material should be stored properly in designated areas • No activities should take place within the 32m buffer as per the Ecologist's recommendations.
Residual impacts:	Decline in water quality , surface & underground water pollution
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium
Potential Impact and Risk:	**Air Quality, Smoke, Fumes & Dust Pollution**
Nature of impact:	Smoke - vehicle emissions. Dust - During construction, construction vehicle and vegetation clearing Fumes -machinery & vehicles
Extent and duration of impact:	Low-medium
Consequence of impact or risk:	Nuisance dust, emissions and fumes
Probability of occurrence:	Medium
Degree to which the impact may cause irreplaceable loss of resources:	Low, there will be no loss of resources

Degree to which the impact can be reversed:	Very high – reversible
Indirect impacts:	Not Applicable
Cumulative impact prior to mitigation:	Not Applicable
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium
Degree to which the impact can be avoided:	Cannot be avoided
Degree to which the impact can be managed:	Can be managed
Degree to which the impact can be mitigated:	Can be mitigated
Proposed mitigation:	• Only approved soil stabilizers may be utilised to limit dust generation. • Ensure that construction vehicles travelling on unpaved roads do not exceed a speed limit of 40 km/hour • Adequate dust control strategies should be applied to minimise dust deposition, for example: Periodic spraying of the entrance road and environmentally friendly dust control measures (e.g. mulching and wetting) where and when dust is problematic. • All vehicles and equipment/ machinery must regularly be checked to ensure that they are in good working order to minimise pollution • The location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors. • Rehabilitate disturbed areas as soon as construction activities are finished in that area • Provide personal protective equipment (PPE), such as dust mask and goggles. • Limit construction activities to day time hours
Residual impacts:	Possible dust nuisance for short periods during high wind conditions.
Cumulative impact post mitigation:	Cumulative impacts are not anticipated once mitigation measures are implemented
OPERATIONAL PHASE	
Potential Impact and Risk:	**Traffic Impact**
Nature of impact:	The proposed development will impact on the surrounding road network. Additional traffic can be expected on the local road network due to additional trips generated by the proposed new development.
Extent and duration of impact:	Low-Medium
Consequence of impact or risk:	There will be increased travel time and commuter delays
Probability of occurrence:	Medium-High
Degree to which the impact may cause irreplaceable loss of resources:	There will be irreplaceable loss of resources
Degree to which the impact can be reversed:	Reversible
Indirect impacts:	Not applicable
Cumulative impact prior to mitigation:	Medium
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be avoided:	Cannot be avoided
Degree to which the impact can be managed:	Can be managed:
Degree to which the impact can be mitigated:	Can be mitigated
Proposed mitigation:	The recommendations of the Traffic Impact Assessment report are: • The intersection of R304 and Mount Simon Drive (E W bound) be signalised in order to accommodate the existing traffic volume and proposed development generated traffic volume. • It is proposed that a 2,0 m wide paved sidewalk be extended along Mount Simon Drive which will ease the movement of pedestrians between the site access and public transport facilities
Residual impacts:	Not applicable
Cumulative impact post mitigation:	Low

Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low
Potential Impact and Risk:	**Socio-Economic Impacts: Provision of Housing Opportunities**
Nature of impact:	Provision of affordable housing on a strategic project area which is close to public transport and other social amenities i.e., schools and health facilities.
Extent and duration of impact:	Medium-High
Consequence of impact or risk:	The proposed development will provide access to affordable housing close to public transportation roads, social amenities i.e., schools & health facilities and active economic nodes and employment opportunities.
Probability of occurrence:	High
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resources
Degree to which the impact can be reversed:	Reversible
Indirect impacts:	There might be an increase in utilisation of public transport which is beneficial for the environment and economic growth in the public transport sector.
Cumulative impact prior to mitigation:	Not applicable, there are cumulative expected impacts
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (positive)
Degree to which the impact can be avoided:	Not applicable
Degree to which the impact can be managed:	Not applicable
Degree to which the impact can be mitigated:	Not applicable
Proposed mitigation:	No mitigation required (this impact is positive)
Residual impacts:	Not applicable
Cumulative impact post mitigation:	There are no expected cumulative impacts
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very-High (this impact is positive)
DECOMMISSIONING AND CLOSURE PHASE	
Potential impact and risk:	**At this stage decommissioning is not foreseen in the near future. At the time it might become applicable, an Environmental Impact Assessment must be undertaken in terms of Listed Activity No 31 (i) of R326 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended; or else compliance with the environmental legislation requirements applicable at that time must take place.**
Nature of impact:	
Extent and duration of impact:	
Consequence of impact or risk:	
Probability of occurrence:	
Degree to which the impact may cause irreplaceable loss of resources:	
Degree to which the impact can be reversed:	
Indirect impacts:	
Cumulative impact prior to mitigation:	
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	
Degree to which the impact can be avoided:	
Degree to which the impact can be managed:	
Degree to which the impact can be mitigated:	
Proposed mitigation:	
Residual impacts:	
Cumulative impact post mitigation:	
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	

SECTION I: FINDINGS, IMPACT MANAGEMENT AND MITIGATION MEASURES

1.	Provide a summary of the findings and impact management measures identified by all Specialist and an indication of how these findings and recommendations have influenced the proposed development.

1.1. BULK SERVICE REPORT

This report is attached as **Appendix G4** of this report.

- **Solid Waste Disposal:**

The collection of the uncomposed solid waste will be done by the Stellenbosch Municipality. Additionally, waste production at all sources should be minimised and re-use, recycling should be maximised. Most of the materials thrown away (bottles, plastic, newspaper and aluminium cans) is recyclable.

- **Electricity:**

The proposed development will be supplied with electricity from the Stellenbosch Municipality Power Supply Network.

- **Water**

The proposed development falls within the water supply area of the Stellenbosch Municipality.

- **Sewerage**

According to the information provided by the Stellenbosch, an existing 300mm ⌀ sewer pipeline runs partially parallel to and inside the western boundary of the proposed development.

- **Stormwater**

The natural drainage pattern of the proposed development is to the east towards the plakenburg river.

Influence on development: the availability of bulk infrastructure services will also assist in making the proposed development sustainable.

1.2. STORMWATER MANAGEMENT

This report is attached as **Appendix G8** of this report.

Based on the findings of the study, the development falls within the G22G quaternary drainage region which is within the Stellenbosch Local Municipality and has a natural drainage pattern which moves east towards the Plankenburg river.

Impact Management Measures: A proposal of construction of three earth-lined attenuation ponds is made in order to accommodate the storm water run-off from the proposed development. The ponds will have an overflow structure to handle run-off after 1:100 years and will discharge into the plankenburg river. The outlet structures will be equipped with gabions and reno-mattresses to prevent erosion and will discharge above the 1:100-year flood line of the river.

Influence on development: Since there is no municipal storm water infrastructure, a proposal of a design criteria for storm water management is made and these suggestions and measures will be considered.

1.3. GEOTECHNICAL FEASIBILITY / INVESTIGATION REPORT

This report is attached as **Appendix G7** of this report.

The property is regarded as being of favourable to poor suitability for residential development. The factors that reduce the suitability of the land for development are: the extent of uncontrolled fill, the existing topography and soil corrosivity.

- **Site Geology**

Bedrock was not encountered during the present investigation. It is thus not possible to give an exact identification of the bedrock material underlying the site. Apart from the easily identifiable horizons of fill, alluvium and pedocretes, what is potentially regarded as the underlying residual soils, may have two sources of origin, namely: lacustrine deposits and residual soils.

- **Groundwater: Perched Water**

Perched groundwater was not encountered in any of the test pits during the investigation. However, from the investigations conducted at Klapmuts it was learnt that there is a significantly large difference between perched water conditions in summer when compared to conditions in winter.

- **Groundwater: Permanent Groundwater**

Groundwater is expected to occur at depths exceeding 25 meters in widely spaced fractures below ground water level.

Dolomite Stability

The area of investigation is not subject to dolomite related instabilities.

Foundation and Structural Design:

- **Geotechnical Zones I:** The development potential of this zone is regarded as favourable. It is therefore recommended that residential development in this zone proceed according to the requirements of the local authority. In this zone, where more than one foundation design alternative was provided, the property developer can base his choice on financial constraints.
- **Geotechnical Zone II:** The development potential of this zone is regarded as poor, requiring extensive and expensive measures to render it suitable for residential development. The local authority must base their decision on whether it is financially viable to rehabilitate the land or not for the purpose of residential development. Unless remedial measures are put in place to ensure that extensive settlement or differential settlement does not occur, no residential development shall take place. If not, the land must be considered for commercial development or reserved as public open space. If remedial measures can be applied successfully foundation design shall take place according to limitations emplaced by the properties of the rehabilitated fill.
- **Geotechnical Zone III:** The development potential of this zone is regarded as favourable to intermediate. Minimal foundation precautionary measures need to be provided to limit the influence of settlement and heave on future structures. In these zones, where more than one alternative for foundation design are provided, the property developer can base his choice on financial constraints.

Impact Management Measures: there must be a retaining wall along the eastern edge. Three- and four-story structures are not included in the report; one - and two-story buildings are more appropriate. Testing for plate loads and soil densification are required.

Influence on the development: The findings of the report will assist in determining the recommended foundation and structural designs in different geotechnical zones.

1.4. FLOODLINE STUDY

This report is attached as **Appendix G6** of this report.

According to the findings of the flood line report by WLM Coast Pty (Ltd), the Plankenburg and Klippies Rivers are the two main tributaries that make up the 77km² catchment area. The steep west-facing slopes of the Simonsberg and Kanonkop mountains are the source of both tributaries. They then flow through the foothills of wine growing and south to the investigation site.

Impact Management Measures: the majority of the land on the west side of the Plankenburg River is above flood level and would be appropriate for residential construction, as shown by the 1:100-year flood line. The lower ground around the tributary that pours in from the Watergang Dam to the north of Khayamandi, about 200 meters south of the Mount Simon residential estate, is the only location on the west side of the river that is impacted by the 1:100-year flood which is important when preparing when preparing for the development in this area.

Influence on the development: the majority of the land on the west side of the Plankenburg River is above flood level and would be appropriate for residential construction, as shown by the 1:100 year flood line but should also be taken into account the lower ground tributary that pours north of Khayamandi.

1.5. TRAFFIC IMPACT ASSESSMENT

This report is attached as **Appendix G9** of this report.

According to the Traffic Impact Assessment report provided by Chrisen Consulting, the proposed development is expected to generate approximately 136 trips during each of the AM and PM peak hours and access provided off of the Mount Simon Drive.

Impact Management Measures: in order to handle the volume of traffic that is currently present and that is anticipated to be generated by the proposed development, it is suggested that the junction of R304 and Mount Simon Drive (E W bound) be signalised and a 2,0 m wide paved side walk.

Influence on the development: the study has assisted in determining the appropriate access roads for the proposed development.

1.6. ECOLOGY COMPLIANCE STATEMENT

This report is attached as **Appendix G1** of this report.

- **Vegetation**

The proposed development footprint falls on the Fynbos Biome is considered by many to be synonymous with the Cape Floristic Region or Cape Floral Kingdom. However, the "biome" refers only to the two key vegetation groups (Fynbos and Renosterveld) within the region, whereas both the "region" and the "kingdom" refer to the general geographical area and include other vegetation types in the Forest, Nama Karoo, Succulent Karoo and Thicket Biomes, but exclude peripheral outliers of the Fynbos Biome such as the Kamiesberg, North-western and Escarpment Mountain Renosterveld (59,60) and Grassy Fynbos (65) east of Port Elizabeth. However, the contribution of Fynbos vegetation to the species richness, endemicity and fame of the region is so overwhelming, that the Cape Floristic Region and Cape Floral Kingdom can be considered to be "essentially Fynbos." Only one vegetation type i.e., Renosterveld will be impacted by the proposed activity. However, this vegetation has been severely transformed.

- **Invasive Alien Plants**

Category 1/1b under CARA and NEMBA invasive alien plant species were recorded on site. The recorded species, requiring control: Acacia saligna, Port Jackson Willow (Category 1/1b), Pinus pinae Stone pine (Not Listed) and Ricinus comunis Castor oil plant (Category 2).

- **Critical Biodiversity Areas and Ecological Support Areas**

About 85% of RE, Portion 2 falls within CBA, and Portion 9 does not fall within any conservation area.

Impact Management Measures:
The applicant should be responsible for the following mitigations throughout all stages of the proposed development.

- Minimise the development footprint and reserve indigenous vegetation wherever possible.
- All vegetation not required to be removed should be protected against damage.
- Sensitive areas such as Plankeburg river must be avoided during all phase of the development.
- Existing roads must be used where possible during construction of the project.
- Rehabilitate area with indigenous flora.
- Have a biodiversity protocol and rehabilitation plan that will be implemented following the construction phase.
- Invasive plant material should be disposed by incineration, or alternatively, composting to break down seeds. If seedbank persists, invasive alien plant management and eradication measures should be implemented.

Influence on the development: the study revealed the biodiversity priority areas that must be taken into consideration when designing in the layout / site development plan of the proposed development.

1.7. WETLAND IMPACT ASSESSMENT

This report is attached as **Appendix G2** of this report.

- **Vegetation Structure and Composition**

The proposed development footprint falls on the Fynbos Biome is considered by many to be synonymous with the Cape Floristic Region or Cape Floral Kingdom. The vegetation composition has been compromised due to anthropogenic activities.

- **Geology**

The area has Clay soils derived from Malmesbury Group shales (specifically the Porterville Formation in the north and east and the Moorreesburg Formation in the west). The soils contain prismacutanic and pedocutanic diagnostic horizons and Glenrosa and Mispah forms are predominant. Land types mainly Db, Fb and Da.

- **No-Go Areas, Buffers and Alternatives**

No-go area is the river that runs from north to south of the site.

- **Rivers**

The Plankeburg River which traverse the site, originates upstream as Kromrivier. These areas are of strategic important for future water management.

- **Vegetation Indicator**

DWAF (2005) states that vegetation is an important element in the delineation procedure for wetlands. Vegetation also plays a central role in the wetland definition according to the National Water Act (Act 36 of 1998). However, using vegetation as a primary wetland indicator requires undisturbed conditions (DWAF, 2005); The typical wetland vegetation observed on site was mainly the reeds and bulrush.

- **Wetland Delineation & Hydrogeomorphic (HGM) Classification**

The hydrogeomorphic classification system categorises wetland systems based on their geomorphological and hydromorphological characteristics. One wetland system was identified on the western section of the site. This wetland was categorised into a single hydrogeomorphic (HGM) unit, namely a Channelled valley-bottom wetland.

- **Present Ecological State (PES)**

One natural wetland system was identified on the western section of the site. This wetland was categorised into a single hydrogeomorphic (HGM) unit, namely a Channelled valley-bottom wetland. Additionally, an artificial hillslope wetland was observed near the R304. An HGM unit is a recognisable physiographic wetland unit based on the geomorphic setting, water source of the wetland and the water flow patterns.

The assessment found that there is one natural channelled-valley bottom wetland within the site, located on the eastern part of the site, and also an artificial hillslope wetland that has resulted from stormwater input from the nearby township. These wetlands were found to be of low ecological importance due to their condition and disturbances around them. Although the wetland provided limited ecosystem services, it warrants protection and conservation. As a result, a relevant buffer of 15m was applied to the wetland systems. This was based on the site conditions and proposed activities.

- **Ecological Importance and Sensitivity (EIS)**

The Ecological Importance and Sensitivity of the wetland has been recorded as being Moderate-Low.

Impact Management Measures:
it is recommended that all areas impacted by the proposed development must be rehabilitated by undertaking the following general tasks:

- All foreign material must be removed from site.
- Land must be regraded / re-shaped and topsoils must be reinstated.
- Compacted soils must be adequately ripped/loosened where compacted, as informed by the Environmental Control Officer.
- Re-vegetation should take place as follows:
    - For any permanently and seasonally saturated areas - via translocation/ transplanting of rescued sods and, where there are not enough rescued sods, via the translocation/ transplanting of sods from the surrounding wetland as advised by a wetland ecologist.

Influence on the development: the study revealed the sensitive areas that must be taken into consideration when designing in the layout / site development plan of the proposed development. The appropriate buffers were also recommended.

1.8. HERITAGE IMPACT ASSESSMENT

This report is attached as **Appendix G3** of this report.

- **Desktop Study**

The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. There are no known heritage surveys near the study area.

- **Field Survey**

A field survey was undertaken on the 8 November 2024. Ground surface varied from open areas to recently mowed grass. There is a large pipeline running adjacent to the R304 and a more recent road (Mt Simon Drive). A small river, wetlands and the Plankenburg River occur on the property.

The southern half of the properties appear to be very disturbed and partially used for dumping of material. The northern part of the property is less disturbed and consists of a wetland, pine trees (from 1940s and 1960s) and grassed area.

The Notification of Intent to Develop in terms of Section 38 of the National Heritage Resources Act, was undertaken and submitted to HWC by the Heritage Specialist, Gavin Anderson of Umlando Archaeological Surveys. The comments from HWC are included as Appendix E1 of this draft BAR.

1.9. PALEONTOLOGICAL IMPACT ASSESSMENT

This report is attached as **Appendix G5** of this report.

- **Geology**

The development site is underlain by very young, Quaternary aged geological units and alluvium.

- **Palaeontology**

The entire study area is underlain by deep soils as well as recent alluvium of the local streams. These deposits are allocated a moderate sensitivity for Palaeontological heritage.

Impact Management Measures:

- The project will require a formal "Chance Find Protocol"

- It is the professional opinion of Dr Gideon Groenewald, accredited palaeontologist, that **NO FURTHER MITIGATION IS NEEDED** for Palaeontological Heritage at this site. It is recommended that, should any fossils be recorded "by chance" during construction, a Phase 1 site inspection and report will be a minimum requirement for further excavation on this site. Compliance with the Chance Find Protocol (attached on the report) must be adhered to.
- Recommendations for palaeontological monitoring and mitigation will have to be incorporated into the EMPr for approval by HWC and SAHRA.

2.	List the impact management measures that were identified by all Specialist that will be included in the EMPr

All mitigation measures identified by specialists have been taken into consideration when compiling this report and will be implemented.

3.	List the specialist investigations and the impact management measures that will **not** be implemented and provide an explanation as to why these measures will not be implemented.

All mitigation measures identified by specialists have been taken into consideration when compiling this report and will be implemented.

4.	Explain how the proposed development will impact the surrounding communities.

Positive effects on the surrounding communities could result from the proposed development. This possibility results from the jobs that will be created when the planned development is built. During the proposed development's development phase, local construction companies and workers residing in the neighbouring villages have the chance to create revenue. During the operating period, the local community's population growth may provide further support for small enterprises, including retail establishments.

5.	Explain how the risk of climate change may influence the proposed activity or development and how has the potential impacts of climate change been considered and addressed.

In light of the removal of vegetation, surface hardening may lead to the loss of wind buffering, reduced groundwater recharge, loss of carbon storage, and urban heat islands. Green spaces can be provided by planting street trees, which will also help to mitigate the potential Urban heat island effect and loss of carbon storage. Incorporating comprehensive environmental impact assessments during the initial stages ensures that all potential risks are evaluated through strategic decisions aimed at creating resilience within communities. By addressing these aspects upfront, housing developments can not only minimise their ecological footprint but also safeguard resident's well-being in the middle of an increasing strained climate landscape.

6.	Explain whether there are any conflicting recommendations between the specialists. If so, explain how these have been addressed and resolved.

There are no conflicting recommendations between the specialists.

7.	Explain how the findings and recommendations of the different specialist studies have been integrated to inform the most appropriate mitigation measures that should be implemented to manage the potential impacts of the proposed activity or development.

Specialist findings and recommendations were taken into consideration when compiling this report to ensure that the proposed development i.e., social housing has the least environmental impacts.

8.	Explain how the mitigation hierarchy has been applied to arrive at the best practicable environmental option.

The mitigation hierarchy is a tool utilised through the lifecycle of a project which is aimed at minimising the environmental impacts, identifying and implementing the best practicable environmental practices. The systematic approach unfolds through the following stages: avoidance, minimisation, rectification, restoration, and offsetting.

The impacts in relation to the proposed activity cannot be entirely avoided and if they cannot be entirely avoided, the focus shifts to minimising harm through innovative designs and operational practices that reduce the intensity and extent of disturbances.

SECTION J: GENERAL

1. Environmental Impact Statement

1.1.	Provide a summary of the key findings of the EIA.

From the impact assessment of the biophysical and socio-economic aspects discussed in this report, it is evident that the proposed development of social housing is suitable for the site assessed. It should however be noted that this is only if the development is planned and managed in accordance with the mitigation measures described in this report, the specialist studies and in the Environmental Management Plan report (EMPr). Furthermore, this development will not only address the social housing need an urgent societal requirement for shelter and stability among vulnerable groups, but it will also create employment opportunities for local residents.

THE SOCIO-ECONOMIC ENVIRONMENT

During Construction Phase:

The proposed development will have a positive impact on the economy due to the employment opportunities more especially to the surrounding community. It will also be beneficial to the community as they will have access to proper housing with better infrastructure service provisions. The loss of vegetation is specific to the site and is long term however it has no lasting impacts.

During Operational Phase:
The main findings show a positive outlook for socio-economic growth. The proposed development offers several benefits from providing social housing. Local businesses may also get more support once the development is approved and functional.
THE BIOPHYSICAL ENVIRONMENT

During Construction Phase:

The biophysical environment will be affected by construction activities that could result in vegetation removal, noise and dust. However, there are mitigation measures put in place to prevent the impacts as indicated on the Environmental Management Plan and specialist studies reports.

During Operational Phase:
All negative impacts that are likely to occur in this phase are not of significance as there are mitigation measures that are already put in place to control and protect the environment.

Results of the impact assessment:
None of the impacts identified are regarded as adverse impacts that cannot be mitigated to acceptable levels and therefore Leago Environmental Solutions is of the opinion that there are no "permanent flaws" associated with the proposed development of social housing. Based on the results of the specialist reports, the impacts that are brought about can be mitigated.

1.2.	Provide a map that that superimposes the preferred activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. (Attach map to this BAR as Appendix B2)
	The map is attached as Appendix B2 & D of this report
1.3.	Provide a summary of the positive and negative impacts and risks that the proposed activity or development and alternatives will have on the environment and community.

The proposed activity has many effects on the environment and community, both good and bad. On the positive side, it helps with housing shortages, boost the economy, and improve local infrastructure. New homes can ease crowded neighbourhoods and create jobs during the construction phase of the project and better roads and utilities can improve life for residents. On the negative side environmentally, the development might destroy habitats, increase pollution, and raise carbon emissions from construction and more traffic. Loss of green spaces can harm local ecosystems and socially, there are risks such as gentrification. Rising property values might push out long-term residents who can't afford to stay however, more people could also strain schools and healthcare unless planned for. The need to balancing these factors is key for sustainable development that helps both current residents and future generations while protecting nature.

2. Recommendation of the Environmental Assessment Practitioner ("EAP")

2.1.	Provide Impact management outcomes (based on the assessment and where applicable, specialist assessments) for the proposed activity or development for inclusion in the EMPr

Objective: Protection of Flora and Fauna (Environmental Sensitivity due to the Terrestrial & Aquatic Critical Biodiversity Area 1):
- Impact management outcome: Vegetation clearing in natural areas should be kept to a minimum and restricted to the proposed development footprint only.

Objective: Management of Freshwater Systems
- Impact management outcome: Ensuring for the protection of nearby water sources to ensure that there is no contamination.

Objective: Waste Management
- Impact management outcome: The recycling of waste is encouraged. As such, the provision of separate recycling bins for the disposal of paper, tins and plastic should be erected and displayed in a suitable and visual location on site. A reputable Recycling Waste Company must be appointed to collect recyclable waste (if applicable).

Objective: Water and Energy Saving
- Impact management outcome: Implementing measures to promote environmental sustainability, but also reduce operational costs and improve the quality of life for residents by making use of energy saving materials and maximising water saving measures.

Additionally, the following must also be noted in the EMPr:
- If any archaeological or paleontological artefacts or remains / graves are uncovered during earthmoving activities, work in the vicinity of the find shall cease immediately. The Contractor shall immediately notify the ER, who shall contact the relevant Competent Authority i.e., South African Heritage Resources Agency (SAHRA) who will take appropriate steps.
- Site establishment shall not take place on steep slopes and sites declared as no-go areas.
- All access points, roads and turning areas must be agreed by the engineer and Environmental Control Officer prior to commencement of any construction activities.

2.2.	Provide a description of any aspects that were conditional to the findings of the assessment either by the EAP or specialist that must be included as conditions of the authorisation.

The EAP recommends that the "clearance of vegetation for the purpose of developing the proposed social housing" which has been identified as the preferred alternative be used. It is further recommended that this application be approved with the following conditions:

- The conditions of the Environmental Authorisation from the Competent Authority must be adhered to at all times.
- Compacted soils must be adequately ripped/loosened where compacted, as informed by the Environmental Control Officer (ECO).
- The responsibilities to obtain any further authorisations and/or licenses will rest on the proponent or applicant of the project, **PRIOR** to the commencement of any activities on site.
- An ECO must be appointed to monitor compliance with the environmental authorisation and develop compliance reports to be submitted to the Competent Authority during the construction phase of the development i.e., social housing.
- The EMPr attached and the mitigation measures related to it must be adhered to at all times and the appointed ECO must ensure that the developer complies with the conditions provided in environmental management plan report.
- All the recommendations in the specialist reports that are included as a part of this application should be implemented & strictly adhered to in order to counteract adverse environmental impacts.

2.3.	Provide a reasoned opinion as to whether the proposed activity or development should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be included in the authorisation.

The purpose of this report i.e., draft Basic Assessment Report is to provide the Competent Authority, Western Cape Department of Environmental Affairs and Development Planning with sufficient information regarding the potential impacts of the proposed development in order to make an informed decision regarding its approval.

The proposed development has no fatal flows in terms of the biophysical and socio economic environment. In fact, it is believed that the proposed development compliments the required and desired balance to be achieved between the socio-economic and environmental factors.

The environmental management plan and all the mitigation measures provided in the specialist reports should be strictly adhered to, therefore mitigating impacts as far as possible. Should this site not be developed, it will remain as isolated and an unconnected area that will be vulnerable to crime, illegal waste dumping and potential illegal informal occupation.

The application should therefore be approved with the following conditions:

- The conditions of the Environmental Authorisation from the Competent Authority must be adhered to at all times.
- Compacted soils must be adequately ripped/loosened where compacted, as informed by the Environmental Control Officer.
- The responsibilities to obtain any further authorisations and/or licenses will rest on the proponent or applicant of the project, **PRIOR** to the commencement of any activities on site.
- An ECO must be appointed to monitor compliance with the environmental authorisation and develop compliance reports to be submitted to the Competent Authority during the construction phase of the development i.e., social housing.
- The EMPr attached and the mitigation measures related to it must be adhered to at all times and the appointed ECO must ensure that the developer complies with the environmental management plan.
- All the recommendations in the specialist reports that are included as a part of this application should be implemented & strictly adhered to in order to counteract adverse environmental impacts.

2.4.	Provide a description of any assumptions, uncertainties and gaps in knowledge that relate to the assessment and mitigation measures proposed.
	• The findings, results, observations, conclusions, and recommendations provided in this report are based on the Environmental Assessment Practitioner's 's best scientific and professional knowledge. • Leago Environmental Solutions reserves the right to amend this report, recommendations and/or conclusions at any stage of the project should any **additional / significant information come to light.** • It is assumed that all the information provided in this report and on which the report is based is correct and valid at the time receipt thereof. • It is also assumed that the information provided by the applicant and specialists is true and that the proposed mitigation measures / recommendations will be implemented and be adhered to.

2.5.	The period for which the EA is required, the date the activity will be concluded and when the post construction monitoring requirements should be finalised.

- The recommended / proposed validity period for the commencement of the proposed activity should at least be15 years.
- It is also proposed that the development be concluded at least within 15 years (from the date of the approval / Environmental Authorisation).
- It is also recommended that construction audits be conducted at least every month.

3. Water

Since the Western Cape is a water scarce area explain what measures will be implemented to avoid the use of potable water during the development and operational phase and what measures will be implemented to reduce your water demand, save water and measures to reuse or recycle water.
As a water-scarce location, the Western Cape requires the implementation of measures to decrease overall water demand and prevent the use of potable water during both the development and operating phases. In order to collect and store rainwater for non-potable applications like irrigation, toilet flushing, and cooling systems, rainwater harvesting systems might be established. It will also be essential to implement recycling systems, which clean wastewater from sinks and showers in preparation for reuse in non-potable applications such as landscaping. Water waste during construction can be further reduced by employing water-efficient solutions such as dust suppression systems that do not require potable water. After they're up and running, facilities should install high-efficiency plumbing to reduce daily usage. These actions support sustainable development strategies that are suited to the unique environmental difficulties faced by the Western Cape in addition to aiding in the preservation of drinkable water. It is also recommended that: **Construction Phase:** • The usage of buckets of water to clean tools and machinery, rather than running water. • Mixing of concrete must be done on a bunded surface to avoid water loss and wastage. • Design of the units to include efficient plumbing fixtures, such as low-flow showerheads and dual flush toilets. **Operation** • Employ metered water usage and measurement to monitor water use and enable an effective response, such as reducing water pressures or water temperature. • Eliminate leaks by conducting regular inspections on taps and hoses. • Greywater use can significantly reduce the amount of potable water needed for landscaping irrigation, toilet flushing and other non-drinking water applications.

4. Waste

Explain what measures have been taken to reduce, reuse or recycle waste.
All solid waste generated during the construction phase will be placed in a bulk waste collection area in the construction camp. Litter collection bins will be provided within the construction site not far from each other and will be regularly be disposed. Separation of waste and recycling of paper, glass, cardboards, etc. will be a priority. There will be no burning of waste on site and construction materials that will not be used will be taken out once construction comes to an end. The following measures will be adopted where possible: • The contractor shall ensure that all site personnel are instructed on the proper disposal of all waste material. • Minimisation of waste generation during construction phase of the development. • Burying or dumping of waste, rubble on site is strictly prohibited • As far as possible, spoil generated during construction will be reused for backfilling operations • During the operational phase of the development, a solid waste disposal site of the local municipality must be used to dispose the solid waste. The local municipality must also be responsible for collecting and disposing the solid waste. • Adequate waste disposal bins must be provided around the development. • The recycling of waste is encouraged. As such, the provision of separate recycling bins for the disposal of paper, tins and plastic should be erected and displayed in a suitable and visual location on site. A reputable Recycling Waste Company must be appointed to collect recyclable waste (if applicable).

5. Energy Efficiency

8.1.	Explain what design measures have been taken to ensure that the development proposal will be energy efficient.
Design measures will completely be environmentally friendly. The following measures will be considered: • The architectural design must ensure that there is a proper natural flow of air into and outside of the buildings occur deliberately as ventilation. • Proper insulation of the ceilings is required because as much as 50% of heat losses in a building can be attributed to a lack of ceilings and ceiling insulation, this will significantly reduce heating and cooling expenses. **Power Supply** • Conservation of energy or the usage of renewal and sustainable energy technology must be a priority. This can be in the form of solar panels that generate and store electricity. **Lighting** • Compact fluorescent light bulbs are recommended as compared to ordinary light bulbs.	

SECTION K: DECLARATIONS

DECLARATION OF THE APPLICANT

Note: Duplicate this section where there is more than one Applicant.

I..... **Lester Van Stavel** ....., ID number **...6409215142081**...in my personal capacity or duly authorised thereto hereby declare/affirm that all the information submitted or to be submitted as part of this application form is true and correct, and that:

- I am fully aware of my responsibilities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), the Environmental Impact Assessment ("EIA") Regulations, and any relevant Specific Environmental Management Act and that failure to comply with these requirements may constitute an offence in terms of relevant environmental legislation;
- I am aware of my general duty of care in terms of Section 28 of the NEMA;
- I am aware that it is an offence in terms of Section 24F of the NEMA should I commence with a listed activity prior to obtaining an Environmental Authorisation;
- I appointed the Environmental Assessment Practitioner ("EAP") (if not exempted from this requirement) which:
  - meets all the requirements in terms of Regulation 13 of the NEMA EIA Regulations; or
  - meets all the requirements other than the requirement to be independent in terms of Regulation 13 of the NEMA EIA Regulations, but a review EAP has been appointed who does meet all the requirements of Regulation 13 of the NEMA EIA Regulations;
- I will provide the EAP and any specialist, where applicable, and the Competent Authority with access to all information at my disposal that is relevant to the application;
- I will be responsible for the costs incurred in complying with the NEMA EIA Regulations and other environmental legislation including but not limited to –
  - costs incurred for the appointment of the EAP or any legitimately person contracted by the EAP;
  - costs in respect of any fee prescribed by the Minister or MEC in respect of the NEMA EIA Regulations;
  - Legitimate costs in respect of specialist(s) reviews; and
  - the provision of security to ensure compliance with applicable management and mitigation measures;
- I am responsible for complying with conditions that may be attached to any decision(s) issued by the Competent Authority, hereby indemnify, the government of the Republic, the Competent Authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action for which I or the EAP is responsible in terms of the NEMA EIA Regulations and any Specific Environmental Management Act.

Note: If acting in a representative capacity, a certified copy of the resolution or power of attorney must be attached.

Signature of the Applicant: Date: 13 FEB 2026

Municipality - Munisipaliteit STELLENBOSCH

Name of company (if applicable):

DECLARATION OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER ("EAP")

I, **Mankaleme Martina Magoro**....., EAP Registration number .....**2020/2254**..... as the appointed EAP hereby declare/affirm the correctness of the:

- Information provided in this BAR and any other documents/reports submitted in support of this BAR;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties, and that:
- In terms of the general requirement to be independent:
  - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
  - ~~am not independent, but another EAP that meets the general requirements set out in Regulation 13 of NEMA EIA Regulations has been appointed to review my work (Note: a declaration by the review EAP must be submitted);~~
- In terms of the remainder of the general requirements for an EAP, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- I have disclosed, to the Applicant, the specialist (if any), the Competent Authority and registered interested and affected parties, all material information that have or may have the potential to influence the decision of the Competent Authority or the objectivity of any report, plan or document prepared or to be prepared as part of this application;
- I have ensured that information containing all relevant facts in respect of the application was distributed or was made available to registered interested and affected parties and that participation will be facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments;
- I have ensured that the comments of all interested and affected parties were considered, recorded, responded to and submitted to the Competent Authority in respect of this application;
- I have ensured the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- I have kept a register of all interested and affected parties that participated in the public participation process; and
- I am aware that a false declaration is an offence in terms of Regulation 48 of the NEMA EIA Regulations;

Signature of the EAP: **12 March 2026** Date:

Leago Environmental Solutions
Name of company (if applicable):

ANNEXURE I

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

COMMENT FROM WESTERN CAPE DEPARTMENT OF AGRICULTURE

Western Cape Government

Cor Van Der Walt
LandUse Management
Email: Cor.VanderWalt@westerncape.gov.za
tel: +27 21 808 5099 fax: +27 21 808 5092

OUR REFERENCE : **20/9/2/5/6/990**
YOUR REFERENCE : **NDC_Rezoning/Farm 81/2 and 81/9 Stellenbosch**
ENQUIRIES : **Cor van der Walt**

Nkanivo Development Consultants
PO Box 11948
SILVER LAKES
0054

Att: Mr. Sameul Chauke

APPLICATION FOR REZONING: DIVISION STELLENBOSCH
REMAINDER OF PORTION 2 OF THE FARM CLOETESDAL NO 81
PORTION 9 OF THE FARM CLOETESDAL NO 81

Your application of 10 April 2025 has reference.

The Western Cape Department of Agriculture (WCDoA) has no objection to the proposed application.

Please note:

- Kindly quote the above-mentioned reference number in any future correspondence in respect of the application.

- The Department reserves the right to revise initial comments and request further information based on the information received.

Copy:
Stellenbosch Municipality
PO Box 17
STELLENBOSCH
7599

Yours sincerely

Mr. CJ van der Walt
LANDUSE MANAGER: LANDUSE MANAGEMENT
2025-06-19

ANNEXURE J

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

COMMENT FROM THE DEPARTMENT OF AGRICULTURE REPUBLIC OF SOUTH AFRICA

agriculture
Department:
Agriculture
REPUBLIC OF SOUTH AFRICA

OFFICE OF THE DIRECTOR: LAND AND SOIL MANAGEMENT
Private Bag X120, Pretoria, 0001; 20 Steve Biko Street, Pretoria, 0001
Tel: 012 319 7583/7571; **E-mail:** MotseiM@nda.gov.za; ConstanceN@nda.gov.za
Enquiries: LUAHelpdesk@nda.gov.za; **Tel:** 012 319 7634; **Ref:** 2025_07_0004
Web: www.nda.gov.za

Nkanivo Development Consultants
P. O. Box 11948
SILVER LAKES
0054

Email: info@nkanivo.co.za

Tel: 012 807 7445

Attention : Samuel Chauke

APPLICATION FOR REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 (A PORTION OF LOT A) OF THE FARM CLOETESDAL NO. 81, DIVISION OF STELLENBOSCH, WESTERN CAPE PROVINCE

Your letter bearing reference NDC_Rezoning/Farm 81/2 and 81/9 Stellenbosch dated 10 April 2025 refers.

With reference to the above-mentioned matter, the Department has no objection to the proposed residential developments on the above-mentioned properties.

This comment does not exempt any person from any provision of any other law and does not purport to interfere with the rights of any person who may have an interest in the agricultural land.

DIPEPENENENG SERAGE
DEPUTY DIRECTOR GENERAL: AGRICULTURAL PRODUCTION, BIOSECURITY AND NATURAL RESOURCES MANAGEMENT
DELEGATE OF THE MINISTER
DATE: 2025 - 11- 14

ANNEXURE K

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

BULK SERVICES REPORT AND STORMWATER MANAGEMENT REPORT

CIVILCONSULT
Consulting Engineers

STELLENBOSCH LOCAL MUNICIPALITY

REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81

REVISED STORM WATER MANAGEMENT REPORT

FIRST REVISION

PROJECT NO. 3314

JANUARY 2026

STELLENBOSCH LOCAL MUNICIPALITY

REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81

STORM WATER MANAGEMENT REPORT

FIRST REVISION

STELLENBOSCH LOCAL MUNICIPALITY : REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 : STORM WATER MANAGEMENT REPORT – FIRST REVISION

1. CLIENT :

Name of Client	Nkanivo Development Consultants
Contact Person	Samuel Chauke (Managing Director)
Address	Unit 79, Block 5 Lombardy Business Park 66 Graham Road Pretoria 0084
Telephone No. / Cell No.	012-807 7445 / 083 277 7347
E-mail	info@nkanivo.co.za

2. FOR SUBMISSION TO :

Local Authority	Stellenbosch Local Municipality
Contact Person	Chrizelle Kriel (Manager: Land Use Management)
Address	Development Management 1st Floor, NPK Building Cnr Plein and Ryneveld Streets Stellenbosch 7599
Telephone No.	021-808 8660
E-mail	Chrizelle.Kriel@stellenbosch.gov.za

3. COMPILED BY :

Company	CIVILCONSULT Consulting Engineers (Pty) Ltd
Contact Person	Leon Wentzel (ECSA 950052)
Address	541 Jorissen Street Sunnyside Pretoria 0002
Telephone No. / Cell No.	012-343 6297/0181/0845 / 082 574 3558
E-mail	mail@civilconsult.co.za

STELLENBOSCH LOCAL MUNICIPALITY : REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 : STORM WATER MANAGEMENT REPORT – FIRST REVISION

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STELLENBOSCH LOCAL MUNICIPALITY : REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 : STORM WATER MANAGEMENT REPORT – FIRST REVISION

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ANNEXURE D	:	TYPICAL STORM WATER, WASTEWATER AND EROSION MANAGEMENT PLAN
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STELLENBOSCH LOCAL MUNICIPALITY : REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 : STORM WATER MANAGEMENT REPORT – FIRST REVISION

1. INTRODUCTION

CIVILCONSULT Consulting Engineers (Pty) Ltd was appointed by Samuel Chauke of Nkanivo Development Consultants (Pty) Ltd for the compilation of Storm Water Management Report for civil engineering services for the Rezoning of the Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81.

For the purposes of this report, we will refer to the Rezoning of the Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81, as the Proposed Development.

2. PROFESSIONAL TEAM

The professional team is as follows :

Professional Discipline	Name of Entity	Contact Person(s)
Applicant	Stellenbosch Local Municipality	Geraldine Metler
Land Owner	Nkanivo Development Consultants	Samuel Chauke
Client	Stellenbosch Local Municipality	Lester van Stavel
Project Manager	Nkanivo Development Consultants	Samuel Chauke
Town Planner	Nkanivo Development Consultants	Samuel Chauke
Environmental Specialist	Leago Environmental Solutions	Mankaleme Magoro
Flood Hydrologist	WML Coast Consulting Engineers	Lance Kime
Traffic Engineer	Chrisen Consulting (Pty) Ltd	Moosa Mthembu
Electrical Engineer	CIVILCONSULT Consulting Engineers (Pty) Ltd	Barend van den Bergh
Civil Engineer		Tim Coxon

3. LOCATION OF DEVELOPMENT AND FLOOD LINES

The Proposed Development is located on the Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81.

The Proposed Development is located north east of Kayamandi and south west of Cloetesville. The site is bounded to the east by the R304 and is located approximately 2.1km north west from the centre of Stellenbosch.

Existing Provincial Road R304 (Bird Street) intersects the western portion of the Proposed Development from the north to the south.

An existing unknown asphalt surfaced road divides the proposed development into north and western portions and a south eastern portion. This existing unknown asphalt surfaced road intersects the Provincial Road R304 (Bird Street), approximately 260m south east of the north western corner of the Proposed Development and was considered in the TIA provided in Annexure F.

The Plankenburg Rivier bisects the Proposed Development from north to south on the southern side. The 1:100 year flood lines of the Plankenburg Rivier were determined by WML Coast Consulting Engineers (Pty) Ltd and will be taken into account with the finalization of the layout of the Proposed Development.

Refer to Annexure A, Drawing No. 3314/100/01/00 for a locality plan.

4. LAND USES

The existing- and proposed land uses for the Proposed Development are shown in Tables 4.1 and 4.2 below.

Table 4.1 : Existing Land Uses

Portion No.	Use Zone/ Reservation	Area (ha)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Agriculture and Rural	18.44
Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	0.83

Table 4.2 : Proposed Land Uses

Portion No.	Use Zone/ Reservation	No. of Erf	Units	FAR / Coverage	Total Floor Area (m^2)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Multi-Unit Residential	Ptn A & B	816	0.75 / 50%	43 875 / 29 250
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Roads and Parking	Ptn C & D	-	-	49 800
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Open Space	Ptn E	-	-	76 100
Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	-	-	-	8 300

*Note : Land uses are based on the Proposed Concept Plan provided by Nkanivo Development Consultants

5. SCOPE OF WORK

The scope of work covered in this Storm Water Management Report includes for the following :

- Investigating the availability of existing storm water services
- Consultations with relevant authorities and stakeholders
- Determine the impact of run-off on higher- and lower lying properties
- Proposals to upgrade existing receiving external storm water drainage systems, if required, including measures to mitigate potential impacts on watercourses
- Proposals to accommodate the storm water run-off from the Proposed Development

6. GEOTECHNICAL ASPECTS

BVi Consulting Engineers (Pty) Ltd was appointed to compile a Geotechnical Feasibility Study Report for the Proposed Development (GFSR).

A copy of the GFSR will be provided to the relevant authorities after completion.

7. LAND FEATURES

The total area of the Proposed Development is approximately 19.27ha.

The Proposed Development is currently undeveloped and will be developed to accommodate Multi-Unit Residential infrastructure with a floor area ratio (FAR) of 75% and a coverage of 50%. Approximately 7.61ha will stay undeveloped due to the Plankenburg Rivier's flood line delineation.

The natural drainage pattern of the Proposed Development is to the east towards the Plankenburg Rivier.

The Proposed Development falls within the G22G quaternary drainage region within the Stellenbosch Local Municipality.

8. EXISTING STORM WATER INFRASTRUCTURE

No existing municipal storm water infrastructure is available in the vicinity of the Proposed Development.

9. STORM WATER MANAGEMENT AND DESIGN CRITERIA

9.1 General

The Proposed Development will be considered as one catchment area :

- **Catchment Area :** This includes both the Multi-Unit Residential buildings, the road reserve areas and public open space due to the Plankenburg Rivier's flood line delineation, with a combined area of approximately 19.27ha. A change in pre- and post-development run-off is anticipated as the site transitions from undeveloped land to increased hardened surface areas. The characteristics of the Proposed Development are detailed in Paragraph 9.2 below.

Refer to Annexure B, Drawing No. 3314/500/01/01 for details.

9.2 Pre-Development Assumptions and Parameters for the Proposed Development

For the purposes of this report, we will assume that the pre-development run-off factors are similar to those of agricultural land.

Refer to Tables 9.2.1 to 9.2.4 below for the parameters that influence run-off.

Table 9.2.1 : Area Distribution Factor

Area Distribution Factor = $\alpha + \beta + \gamma = 1$					
Rural		Urban		Lakes	
A=	1	β=	0	γ=	0

Table 9.2.2 : Natural Slopes

Natural Slopes (Rural)	
Topography	**Percentage of Area**
Vleis and Pans	5%
Flat Area	85%
Hilly	10%
Steep Areas	0%
Total	**100%**

Table 9.2.3 : Permeability of Soils

Permeability of Soil (Rural)	
Classification	**Percentage of Area**
Very Permeable	10%
Permeable	40%
Semi Permeable	40%
Impermeable	10%
Total	**100%**

Table 9.2.4 : Vegetation

Vegetation	
Type of Vegetation	**Percentage of Area**
Thick Bush and Plantation	5%
Light Bush and Farmlands	45%
Grasslands	40%
No Vegetation	10%
Total	**100%**

9.3 Pre-Development Hydrologic Data

The pre-development hydrological data used in the calculation of flood peaks and the design of the storm water drainage systems are summarised in Table 9.3 below.

Table 9.3 : Hydrological Data

Hydrological Data	
Description	**Proposed Development**
a) Flood Return Period	1:5 years for storm water pipe systems
	1:25 years for the combined storm water pipe and road systems
	1:50 years
b) Average yearly rainfall	±643mm
c) Time of concentration	±37.52min
d) Rainfall intensity (1:5 years)	±27.59mm/h
e) Rainfall intensity (1:25 years)	±39.40mm/h
f) Rainfall intensity (1:50 years)	±45.62mm/h
g) Design method	Rational method for smaller catchment areas

9.4 Pre-Development Storm Water Run-off

The pre-development storm water run-off is shown in Table 9.4 below.

Table 9.4 : Pre-Development Run-off

Catchment Area	Flood Return Period (Years)	Pre-Development run-off (m^3/s)
The Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81	1:5	0.305
	1:25	0.593
	1:50	0.760

The Rational Method from NTC : Manual on Road Drainage, 6th Edition Fully Revised (2013) was used.

Refer to Annexure C for the Proposed Developments Run-off Calculations.

9.5 Post-Development Assumptions and Parameters for the Proposed Development

The hydrologic characteristics of the Proposed Development will change post-development. Permeable areas will decrease once fully developed.

Refer to Tables 9.5.1 and 9.5.2 below for the parameters that influences run-off in the urban setting (post-development).

Table 9.5.1 : Area Distribution Factor

Area Distribution Factor = α + β + γ = 1					
Rural		Urban		Lakes	
α=	0.4	β=	0.6	γ=	0

Table 9.5.2 : Urban Hydrological Data

Urban Hydrological Data	
Description	**Percentage of Area**
Lawns	30%
Multi-Unit Residential	40%
Streets	30%
Total	**100%**

Pre-development's hydrological data is the same as stated in Paragraph 9.2 of this report.

9.6 Post-Development Hydrologic Data

The post-development hydrological data used in the calculation of flood peaks and the design of the storm water drainage systems are summarised in Table 9.6 below.

Table 9.6 : Hydrological Data

Hydrological Data	
Description	**Proposed Development**
h) Flood Return Period	1:5 years for storm water pipe systems
	1:25 years for the combined storm water pipe and road systems
	1:50 years
i) Average yearly rainfall	±643mm
j) Time of concentration	±9.26min
k) Rainfall intensity (1:5 years)	±58.63mm/h
l) Rainfall intensity (1:25 years)	±83.49mm/h
m) Rainfall intensity (1:50 years)	±96.89mm/h
n) Design method	Rational method for smaller catchment areas

9.7 Post-Development Storm Water Run-off

The post-development storm water run-off to be generated by the Proposed Development is shown in Table 9.7 below. A post-development run-off factor of 0.497 was used for the development.

Table 9.7 : Post-Development Run-off

Catchment Area	Flood Return Period (Years)	Post-Development run-off (m^3/s)
The Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81	1:5	1.466
	1:25	2.222
	1:50	2.640

The Rational Method from NTC : Manual on Road Drainage, 6th Edition Fully Revised (2013) was used.

Refer to Annexure C for the Proposed Developments Run-off Calculations.

10. PROPOSED STORM WATER INFRASTRUCTURE

10.1 Internal Storm Water Infrastructure

Given the absence of municipal storm water infrastructure in the direct vicinity of the Proposed Development, we propose that the storm water generated by the Proposed Development be discharged directly into the Plankenburg Rivier.

An internal storm water drainage network could convey run-off from the Proposed Development to designated outlet structures along the river. These outlets will be fitted with gabions and Reno mattresses to mitigate erosion risks at the discharge points and will be positioned above the 1:100-year flood line of the Plankenburg Rivier.

The internal storm water system will be designed for a 1:25-year flood return period and a run-off coefficient of 49.7% (C= 0.497) will be allowed for the Proposed Development.

Rainwater harvesting is encouraged for the proposed residential units to help reduce post-development run-off.

Refer to Annexure B, Drawing No. 3314/500/01/01 for details.

A Water Use Licence Application (WULA) will not be required for the Proposed Development as storm water will be discharged above the Plankenburg Rivier 1:100-year flood line at pre-development run-off flows.

Refer to Annexure B, Drawing No. 3314/500/01/01 for the proposed storm water system.

10.2 External Storm Water Infrastructure

No external storm water infrastructure is necessary for the Proposed Development as it is being discharged into the Plankenburg Rivier above the 1:100-year flood line.

10.3 Storm Water Higher Lying Areas

Due to the fact that the western portion of the Proposed Development is intersected by the existing Provincial Road R304 (Bird Street) which forms a man-made barrier prohibiting natural surface flow, no storm water run-off generated by higher lying properties needs to be accommodated.

10.4 Design Specifications

Table 10.4 lists the standards used for the design of the storm water infrastructure.

Table 10.4 : Storm Water Design Specifications

Design Element	Specification
a) Minimum pipe size	450mm diameter
b) Pipe Type	Interlocking Joint Pipes Pipe Class : 50D 100D road crossings
c) Minimum pipe gradient	0,5%
d) Storm water details	According to "The Neighbourhood Planning and Design Guide – Creating Sustainable Human Settlements" developed by the Department of Human Settlements published in July 2019 (Red Book)

11. MONITORING AND MANAGEMENT

It is required that adequate monitoring and management be implemented for the proposed storm water infrastructure of the Proposed Development.

We are of the opinion that the following key aspects be adhered to at all times in order to ensure the proposed storm water infrastructure functions as intended and to mitigate any possible chance for impacting the environment in a negative way :

- Regular inspections of the outlet structures should be conducted to check for any signs of erosion damage or deterioration. Inspections should be done after each significant rainfall event and at least once every six months
- The vegetation in and around the outlet structures should be regularly maintained to prevent it from becoming overgrown and reducing the flow capacity. Dead vegetation and debris should be removed from the to prevent clogging
- Storm water run-off can carry a variety of litter and debris, which can impact the water quality and function of the storm water infrastructure. Regular trash removal should be done to keep the storm water infrastructure clean and functioning properly
- Include an erosion monitoring plan. This plan should ensure that all erosion effects are identified as soon as possible and that the rehabilitation of these erosion effects be rehabilitated within 6 months. Erosion which might have occurred as a result of a major storm event should be detected and rehabilitated within 2 weeks
- Frequent inspections are required during the construction phases until the proposed storm water infrastructure is installed and operational as per the design standards

Refer to Annexure D for a typical Storm Water, Wastewater and Erosion Management Plan.

12. CONCLUSION

We trust that the above report meets with your requirements. Please contact us should you require any additional information.



.....

Leon Wentzel
for CIVILCONSULT Consulting Engineers (Pty) Ltd

27/01/2026

.....

Date

ANNEXURE A

LOCALITY PLAN


MOUNT SIMON ESTATE
PROVINCIAL ROAD R304 (BIRD STREET)
PORTION 37 OF THE FARM 183
PORTION 8 OF THE FARM 183
REMAINDER OF PARCEL 6886 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PARCEL 6847 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PORTION 2 & PORTION 9 OF THE FARM CLOETESDAL 81
CLOETESVILLE DEVELOPMENT
PLANKENBURG RIVER
PARCEL 6841 OF STELLENBOSCH TOWNSHIP
PROVINCIAL ROAD R304 (BIRD STREET)
PARCEL 12817 OF STELLENBOSCH TOWNSHIP
PARCEL 13178 OF STELLENBOSCH TOWNSHIP
PARCEL 6840 OF STELLENBOSCH TOWNSHIP
KAYAMANDI TOWNSHIP DEVELOPMENT
DEVELOPMENT BOUNDARY
PROPOSED DEVELOPMENT
1:100 YEAR FLOOD LINE
PLANKENBURG RIVER
ALL LEVELS & POSITIONS TO BE CHECKED AND VERIFIED ON SITE PRIOR TO CONSTRUCTION
STELLENBOSCH
Nkanivo Development Consultants
CIVILCONSULT Consulting Engineers
L. WENTZEL
T COXON
J. DAVEL
REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81
LOCALITY PLAN
JULY 2024
1 : 2500
3314/100/01/00

ANNEXURE B

ENGINEERING LAYOUT DRAWINGS


DEVELOPMENT BOUNDARY
PLANKENBURG RIVIER
1:100 YEAR FLOOD LINE
R304 ROAD RESERVE (30m)
STORM WATER INFRASTRUCTURE
FLOW DIRECTION
ALL LEVELS & POSITIONS TO BE CHECKED AND VERIFIED ON SITE PRIOR TO CONSTRUCTION
MOUNT SIMON ESTATE
PORTION 37 OF THE FARM 163
PORTION 8 OF THE FARM 163
PLANKENBURG RIVER
REMAINDER OF PARCEL 6886 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PARCEL 6847 OF STELLENBOSCH TOWNSHIP
CLOETESVILLE DEVELOPMENT
REMAINDER OF PORTION 8 & PORTION 9 OF THE FARM CLOETESDAL 81
PARCEL 6841 OF STELLENBOSCH TOWNSHIP
PROVINCIAL ROAD R304 (BIRD STREET)
PLANKENBURG RIVER
PARCEL 12817 OF STELLENBOSCH TOWNSHIP
PARCEL 12175 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PORTION 9 OF THE FARM CLOETESDAL 81
KAYAMANDI TOWNSHIP DEVELOPMENT
PARCEL 6840 OF STELLENBOSCH TOWNSHIP
STELLENBOSCH
Kanivo Development Consultants
CIVILCONSULT Consulting Engineers
DRAWN L WENTZEL
CHECKED T. COXON
APPROVED J DAVEL
REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81
STORM WATER RETICULATION: GENERAL LAYOUT
DATE JULY 2024
SCALE 1: 2500
3314/500/01/01
3314/500/01/01

ANNEXURE C

RUN-OFF CALCULATIONS AND AREAS

RATIONAL METHOD

Description of catchment	Remainder of Portion 2 and Portion 9 of farm Cloettesdal 81, Stellenbosch				
River detail	Pre-Development Run-off : Proposed Development Area				
Calculated by	T.Coxon		**Date**	2026/01/26	

Physical characteristics

Size of catchment (A)	0.1927	km^2	Rainfall region	INLAND	
Longest watercourse (L)	0.417	km	**Area distribution factors**		
Average slope (S_{av})	0.0239808	m/m	Rural (α)	Urban (β)	Lakes (γ)
Dolimite area ($D_\%$)	0	%	100%	0%	0%
Mean annual rainfall (MAR)	643	mm			
Surface roughness coefficient (r)	0.4				

Rural (C_1)				**Urban (C_2)**			
Surface slope	**%**	**Factor**	**C_s**	**Description**	**%**	**Factor**	**C_2**
Vleis and pans	5	0.03	0.00	**Lawns**			
Flat areas	85	0.08	0.07	Sandy, flat (<2%)	0	0.1	0
Hilly	10	0.16	0.02	Sandy, steep (>7%)	0	0.2	0
Steep areas	0	0.26	0.00	Heavy soil, flat (<2%)	0	0.17	0
Total	100	-	0.09	Heavy soil, steep (<7%)	0	0.35	0
Permeability	**%**	**Factor**	**C_p**	**Residential areas**			
Very permeable	10	0.04	0.00	Houses	100	0.5	0
Permeable	40	0.08	0.03	Flats	0	0.7	0
Semi-permeable	40	0.16	0.06	**Industry**			
Impermeable	10	0.26	0.03	Light industry	0	0.8	0
Total	100	-	0.13	Heavy industry	0	0.8	0
Vegetation	**%**	**Factor**	**C_v**	**Business**			
Thick bush and plantation	5	0.04	0.00	City centre	0	0.7	0
Light bush and farm-lands	45	0.11	0.05	Suburban	0	0.7	0
Grass lands	40	0.21	0.08	Streets	0	0.95	0
No vegetation	10	0.28	0.03	Maximum flood	0	1	0
Total	100	-	0.16	Total (C_2)	100	-	0

Time of concentration (T_c)

Notes:

Overland Flow		Defined watercourse	
$T_C = 0{,}604\left(\frac{rL}{\sqrt{S_{av}}}\right)^{0{,}467}$		$T_C = \left(\frac{0{,}87L^2}{1000S_{av}}\right)^{0{,}385}$	
0.625	hours (min=0.25)	0.000	hours

Run-off coefficient

Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
Run-off coefficient, C_1 ($C_1=C_S+C_P+C_V$)	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Adjusted for dolomitic areas, C_{1D} ($C_{1D}=C_1(1-D_\%)+C_1D_\%(\Sigma(D_{factor} \times C_{S\%}))$	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Adjustment factor for initial saturation, Ft	0.500	0.550	0.600	0.670	0.750	0.830	1.000
Adjusted run-off coefficient, C_{1T} ($C_{1T}=C_{1D} \times F_t$)	0.188	0.206	0.225	0.251	0.281	0.311	0.375
Combined run-off coefficient C_T ($C_T=\alpha C_{1T} + \beta C_2 + \gamma C_3$)	0.188	0.206	0.225	0.251	0.281	0.311	0.375

Rainfall

Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
Point rainfall (mm), PT	12.90	17.25	20.48	23.9	24.6	28.53	32.36
Point intenity (mm/hour), $P_{iT}(=P_T/T_C)$	20.63	27.59	32.76	38.16	39.40	45.62	51.75
Area reduction factor (%), ARFT	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average intensity (mm/hour), I_T ($I_T=P_{iT} \times ARF_T$)	20.6	27.6	32.8	38.2	39.4	45.6	51.8
Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
$Peak_flow(m^3/s), Q_T = \frac{C_T I_T A}{3{,}6}$	0.207	0.305	0.395	0.513	0.593	0.760	1.039

RATIONAL METHOD

Description of catchment	Remainder of Portion 2 and Portion 9 of farm Cloettesdal 81, Stellenbosch				
River detail	Post -Development Run-off : Proposed Development Area				
Calculated by	T.Coxon		**Date**	2026/01/26	

Physical characteristics

Size of catchment (A)	0.1927	km^2	Rainfall region	INLAND	
Longest watercourse (L)	0.417	km	**Area distribution factors**		
Average slope (S_{av})	0.0239808	m/m	Rural (α)	Urban (β)	Lakes (γ)
Dolimite area ($D_{\%}$)	0	%	40%	60%	0%
Mean annual rainfall (MAR)	643	mm			
Surface roughness coefficient (r)	0.02				

Rural (C_1)

Surface slope	**%**	**Factor**	**C_s**
Vleis and pans	5	0.03	0.00
Flat areas	85	0.08	0.07
Hilly	10	0.16	0.02
Steep areas	0	0.26	0.00
Total	100	-	0.09
Permeability	**%**	**Factor**	**C_p**
Very permeable	10	0.04	0.00
Permeable	40	0.08	0.03
Semi-permeable	40	0.16	0.06
Impermeable	10	0.26	0.03
Total	100	-	0.13
Vegetation	**%**	**Factor**	**C_v**
Thick bush and plantation	5	0.04	0.00
Light bush and farm-lands	45	0.11	0.05
Grass lands	40	0.21	0.08
No vegetation	10	0.28	0.03
Total	100	-	0.16

Urban (C_2)

Description	**%**	**Factor**	**C_2**
Lawns			
Sandy, flat (<2%)	5	0.1	0.005
Sandy, steep (>7%)	5	0.2	0.01
Heavy soil, flat (<2%)	5	0.17	0.0085
Heavy soil, steep (<7%)	15	0.35	0.0525
Residential areas			
Houses	0	0.5	0
Flats	40	0.7	0.28
Industry			
Light industry	0	0.8	0
Heavy industry	0	0.8	0
Business			
City centre	0	0.7	0
Suburban	0	0.7	0
Streets	30	0.95	0.285
Maximum flood	0	1	0
Total (C_2)	100	-	0.641

Time of concentration (T_c)

Notes:

Overland Flow		Defined watercourse	
$T_C = 0{,}604\left(\frac{rL}{\sqrt{S_{av}}}\right)^{0{,}467}$		$T_C = \left(\frac{0{,}87L^2}{1000S_{av}}\right)^{0{,}385}$	
0.154	hours (min=0.25)	0.000	hours

Run-off coefficient

Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
Run-off coefficient, C_1 ($C_1=C_S+C_P+C_V$)	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Adjusted for dolomitic areas, C_{1D} ($C_{1D}=C_1(1-D_{\%})+C_1D_{\%}(\Sigma(D_{factor} \times C_{S\%}))$	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Adjustment factor for initial saturation, Ft	0.500	0.550	0.600	0.670	0.750	0.830	1.000
Adjusted run-off coefficient, C_{1T} ($C_{1T}=C_{1D} \times F_t$)	0.188	0.206	0.225	0.251	0.281	0.311	0.375
Combined run-off coefficient C_T ($C_T=\alpha C_{1T} + \beta C_2 + \gamma C_3$)	0.460	0.467	0.475	0.485	0.497	0.509	0.535

Rainfall

Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
Point rainfall (mm), PT	6.76	9.05	10.66	12.5	12.9	14.96	16.85
Point intenity (mm/hour), $P_{IT}(=P_T/T_C)$	43.81	58.63	69.09	80.82	83.49	96.89	109.18
Area reduction factor (%), ARFT	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average intensity (mm/hour), I_T ($I_T=P_{IT} \times ARF_T$)	43.8	58.6	69.1	80.8	83.5	96.9	109.2
Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
$Peak_flow(m^3/s), Q_T = \frac{C_T I_T A}{3{,}6}$	1.078	1.466	1.755	2.098	2.222	2.640	3.124

ANNEXURE D

TYPICAL STORM WATER, WASTEWATER AND EROSION MANAGEMENT PLAN

General Principal	Specific outcomes	When	Ref No.	Focus area	Action	By whom
Separate clean- and dirty water to ensure clean water remains uncontaminated	Temporary containments and diversion (designed for a 1:5 year return period)	During construction phase	1	• Stockpiles • Laydown areas • Workshops; and • Any other area likely to generate sediment during a storm event or contain contaminants that can be disbursed.	• Clean water diversions or bunds. • Construct stormwater drains or bunds to divert clean water runoff around dirty areas. • The diversion should be sized to accommodate the 1:5 year flood return period. Typical design will be an excavated earth channel or berms.	• Construction contractor who is onsite • Environmental officer / representative
	Permanent containments and diversions (designed for a :50 year return period)	Constructed prior to operation	2	• The workshop and chemical stores; • Transformers, inverters and substations • Wastewater conservancy tank.	• Clean water earth channels or bunds • Construct stormwater earth channels or bunds to divert clean runoff around the workshop, chemical stores, transformers, inverters, substations and wastewater conservancy tank. • The diversion should be designed for a 1: 50 flood return period.	• Included in detailed designs of design engineer • carried out by contractor appointed for construction
Collect and, where required, treat dirty water or runoff from any dirty areas.	Dirty water should not have the potential to spill into clean water systems more than once every fifty years (where influenced by stormwater)	Before stockpiles are deposited	3	• Stockpiles	• Construct silt fences or berms • prevent the sediment transport into rivers.	• Included in detailed designs of design engineer • carried out by contractor appointed for construction
		Throughout construction	4	• Waste	• Dispose of landfill, oils and other contaminants offsite	
		During site establishment	5	• Sewage	• Supply chemical toilets	
		Constructed prior to operation	6	• Workshop	• Workshop collection drain with oil and grease trap • Construct a small concrete drain collecting all water, potentially containing oils and lubricants, from workshop floor and directing it through an oil and grease trap before discharge (or removing to offsite facility) • Floor to be sloped such that all water will collect in drains.	
		Inspected every 3 months for first 2 years and then revise	7	• Workshop	• Clean the oil and grease trap • The oil and grease traps are to be inspected and cleaned and waste taken to a registered offsite facility	• Workshop manager and assurance by environmental manager
		As required when the tank is full	8	• Transformers	• Dispose of transformer oil offsite • Dispose of any spent oil, removed from transformers during maintenance to a registered offsite facility	
		As required when the tank is full	9	• The sewage conservancy tank	• Transport sewage to municipal works • Regularly collect sewage in the conservancy tank and disposed of at a licensed municipal sewage treatment plant.	
	Bund any hazardous substance or pollutant storage areas (including any oils), as per regulations	Throughout construction		• General	• Construct temporary bunds for any chemicals such as oils or fuel stored on sited during construction • Bunds must contain at least 110% of the volume of the container • If all containers are stored together the bund must store at least 110% of the largest container or 25% of the total storage capacity, whichever is greater • Suitability of the material of bund must be investigated whenever a new substance is added to the bund	• Included in detailed designs of design engineer • carried out by contractor appointed for construction
		Constructed prior to operation		• Transformers	• Transformer bund • All transformers will be bunded with bund capacity of at least 110% of the maximum volume of oil in the transformer • Transformers and bund will be protected from rainfall by small covers or roof or housed in containers, as applicable.	
				• The sewage conservancy tank	• Sewage conservancy bund • The sewage conservancy tank will be a closed tank with an automatic alert system.	

		During operation: as and when containers are purchased		• Workshop	• Small trays for workshop chemicals • Bund any containers with oils and lubricants by placing them in plastic trays that is at least 100% of the volume of the container • If all containers are stored together the bund needs to store at least 110% of the largest container or 25% of the total storage capacity, whichever is greater • Suitability of the bund must be investigated whenever a new substance is added to the bund.	• Workshop manager and assurance by environmental manager
Do not impede surface and subsurface flow along drainage lines	Minimise dirty areas such that surface and subsurface movement of water along the drainage lines is not impeded	Constructed prior to operation		• The workshop, transformers, wastewater conservancy tank	• Diversion channels placed to minimised dirty areas • Place diversion channels directly upstream of dirty areas such that dirty area catchments are minimised in footprint	• Included in detailed designs of design engineer • carried out by contractor appointed for construction
	Ensure any engineered clean stormwater drainage directs water to the closest naturally receiving drainage line	Throughout construction		• Laydown areas; and • Stockpiles	• Minimise laydown areas and stockpiles.	
				• All drains	• Ensure that any temporary stormwater drains or diversion berms direct water towards the drainage line to which it would naturally flow	
		Constructed prior to operation		• Along roads, the workshop, transformers, wastewater conservancy tank	• Drains to follow natural topography • Ensure outlets drain towards the natural drainage line that would originally have received flow from that area	
Control, monitor and manage erosion	Prevent erosion in general	Constructed prior to operation		• All areas	• Maintain natural topography • Do not disturb the natural topography or vegetation between the solar panel installations	• Included in detailed designs of design engineer • carried out by contractor appointed for construction
		During operation			• No stockpiles if possible • Do not stockpile • If spoil from pilings is likely to be significant, a dedicated stockpile location must be identified, and stormwater protection measures designed when detailed layouts are available.	• Assurance by environmental manager
	Minimize erosion in large storm event of 1:50 year flood return period or greater	Constructed prior to operation		• All drains	• Engineer low velocity drains • Drains sloped and sized such that velocities do no exceed 1 m/s	• Included in detailed designs of design engineer • carried out by contractor appointed for construction
				• Road crossings	• Engineered drifts • Line all major drifts on road crossings with concrete to protect from traffic damage and high flow • Place a section of riprap underlain by gravel and with gravel on either side to facilitate a smooth flow transition • Detailed modelling and design of road crossings such that erosion is controlled to be a feature of the detailed design.	
	Dissipate stormwater at all drainage outlets to velocities unlikely to cause erosion in natural soils for a 1:50 year flood return period			• All drains	• Dissipaters • At drain outlets widen the channel and use riprap or reno-mattresses to dissipate storm water flows	
				• Road crossings	• Dissipation at road crossings • Detailed modelling and design of road crossings including riprap or reno-mattresses.	
	Prevent erosion in general	Throughout construction		• All	• Maintain natural topography and vegetation • Do not disturb the natural topography or vegetation where possible	• Construction contractors onsite • environmental officer / representative
	Minimize erosion in large storm event of 1:5 year flood return period or greater			• All drains •	• Engineer low velocity temporary drains • Drains sloped and sized such that velocities do no exceed 1 m/s in a 1:5 year flood return period	
		Early in construction		• Road crossings	• Engineered temporary drifts	

					• Build roads and road crossings before other infrastructure.	
	Ensure that any chronic erosion is detected and rehabilitated within 6 months	Every 3 months for the first 2 years and annually thereafter		• Drains; • Outlet of all Drains; and • All-natural drainage lines that cross the access road.	• Inspect and remediate noticeable erosion • Inspect all focus areas for erosion • If erosion is found, remediate and redesign the drainage in the area • If erosion is found in a natural drainage line, conduct an assessment and determine the cause • Develop a plan to prevent future erosion.	• Environmental manager • Hydrologist • Engineer • environmental scientist appointed by the environmental manager
	Ensure that any acute erosion due to large storm events is detected within 2 weeks.	Install prior to operation		• Main office	• Install a rain gauge that can measure greater than 115 mm (100-year, 24-hour event)	• Included in detailed designs of design engineer • carried out by contractor appointed for construction
		After a rain event or when staff notice flood damage.		• All-natural drainage lines that run through the site	• Inspect and remediate acute erosion • Inspect all focus areas for erosion • If erosion is found remediate and redesign the drainage in the area • If erosion is found in a natural drainage line conduct and assessment and determine the cause and develop a plan to prevent future erosion.	• Environmental manager • Hydrologist • Engineer • environmental scientist appointed by the environmental manager
		Design and development prior to operation		• All	• Set up rain data system • Build or buy a basic rain program, preferably electronic, that allows site staff to enter rain data from the rain gauge • Ideally the system should alert the environmental manager and site manager when a rainfall event is entered.	
		Daily		• Main office	• Record rain data • Read and record rain gauge daily;	• Onsite staff member • Environmental manager
		Update annually in case of staff change			• Signs at main office to aid problem reporting • Ensure that a sign providing the following is posed in the reception area, the control room, on each transformer and in the workshop: • The name, telephone number and email address of the environmental manager • The sign should state: "If you notice any leaks or spills or erosion anywhere on the property please phone or email the environmental manager"	• Environmental manager
	Training	Annually		• All	• Training • Provide a short briefing to all construction staff on the dynamics of erosion and leaks that covers at least: - How to identify erosion; - How to identify a leak, including car leaks; - Where to find contact details of the environmental officer/representative in case of leaks or erosion.	• Environmental manager • Hydrologist • Engineer • environmental scientist appointed by the environmental manager
	Ensure that any erosion is detected and rehabilitated	After rain events During site establishment			• Inspect the site for erosion after rain events • If erosion is found, remediate and redesign the drainage in the area • If erosion is found in a natural drainage line, conduct an assessment to determine the cause and develop a plan to prevent future erosion.	• Contractors environmental officer / representative
		During site establishment			• Install a rain gauge that can measure greater than 115 mm (100-year, 24-hour event) • This rain gauge will also be used during operation.	
Monitor and manage stormwater system	Include a monitoring system for spills and leaks such that they are detected as soon as possible.	Once every 2 weeks		• All	• Leak inspection • regularly check for leaks and for any breaches or evidence of spills or any other problems • All cars should also be checked for oil leaks and any leaks found should be stopped immediately, the cause of the leak identified, the problem remediated such that no further leaks occur, and any contaminated soil or water assessed and remediated.	• Contractors environmental officer / representative
	Include a monitoring system for spills and leaks such that they are detected as soon as possible.	Every 3 months for the first 2 years and annually thereafter			• Leak inspection • regularly check for leaks and for any breaches or evidence of spills or any other problems that would indicate that it is not in adherence to this plan	• Environmental manager • Hydrologist • Engineer

					• All cars should also be checked for oil leaks during the inspection. Any leaks found should be stopped immediately, the cause of the leak sought, the problem remediated such that no further leaks occur, and any contaminated soil or water assessed and remediated.	• environmental scientist appointed by the environmental manager
		Continuous			• Data capture, training and signs	• Environmental manager and staff in general
		Construct prior to operation		• The sewage conservancy tank	• Sewage conservancy tank alert system • Install a float switch-controlled alarm that will alert the control room when the conservancy tank has less than 2 weeks of capacity remaining.	• Included in detailed designs of design engineer • carried out by contractor appointed for construction
				• Transformers	• Signs at transformers • Post a sign on transformers stating "If you notice any leaks or spills or erosion anywhere on the property please phone reception and report it"	
General	Do not build infrastructure within or near a watercourses	Detailed design		• All	• Ensure no infrastructure except roads, solar panels and solar panel supports are built within 300 m of a water course. • ensure no dirty areas, that may contain pollutants, are within 300 m of the water course	• Design engineer or engineer appointed by the design engineer
	Do not build infrastructure containing potential pollutants in any of the natural drainage lines.				• Ensure that final infrastructure plans do not propose any potentially polluting infrastructure, such as transformers, workshops or conservancy tanks in the natural drainage lines	
	Review and improve stormwater management plan regularly.	Once every 5 years			• Review and improve the stormwater plan	• Environmental manager or engineer appointed by the environmental manager
	Review and inspect	Once every 2 months depending on the construction schedule			• Inspect the site to ensure adherence to the stormwater management plan	• Clients environmental representative or engineer
	Do not place stockpiles or other potentially polluting construction items within 300 m of the watercourse	Detailed design and throughout construction			• Do not place laydown areas, stockpiles within 300 m of the watercourse	• Design engineer or engineer appointed by the design engineer
	General	Detailed design			• Develop a specific environmental specification for any construction including, but not limited to, the actions in this stormwater management plan and its principles	• Clients environmental representative or specialist

ANNEXURE E

PROPOSED CONCEPT PLAN AND SDP

PROPOSED CONCEPT PLAN OF REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL NO. 81



SCALE
1 : 2 000 (A1 Format)
1 : 4 000 (A2 Format)
1 : 8 000 (A3 Format)
1 : 16 000 (A4 Format)

LOCALITY MAP



LEGEND

ZONING (PROPOSED ZONING)	LAND USES	NO. OF ERF	AREA (HA)	AREA (%)	NOTATION
MULTI-UNIT RESIDENTIAL	VACANT	PTN A OF 81/2	2,70	14,01	
MULTI-UNIT RESIDENTIAL	VACANT	PTN B OF 81/2	3,15	16,35	
PUBLIC ROAD AND PARKING	ROAD	PTN C OF 81/2	4,45	23,09	
PUBLIC ROAD AND PARKING	ROAD & PARKING	PTN D OF 81/2	0,53	2,75	
PUBLIC OPEN SPACE	RIVER	PTN E OF 81/2	7,61	39,50	
PUBLIC ROAD AND PARKING	ROAD	81/9	0,83	4,30	
		TOTAL AREA (HA)	19,27	100%	

NOTES:
- Represents the Parent Farm
- Represents the Proposed Portions
- Represents the River

CLIENT: STELLENBOSCH MUNICIPALITY

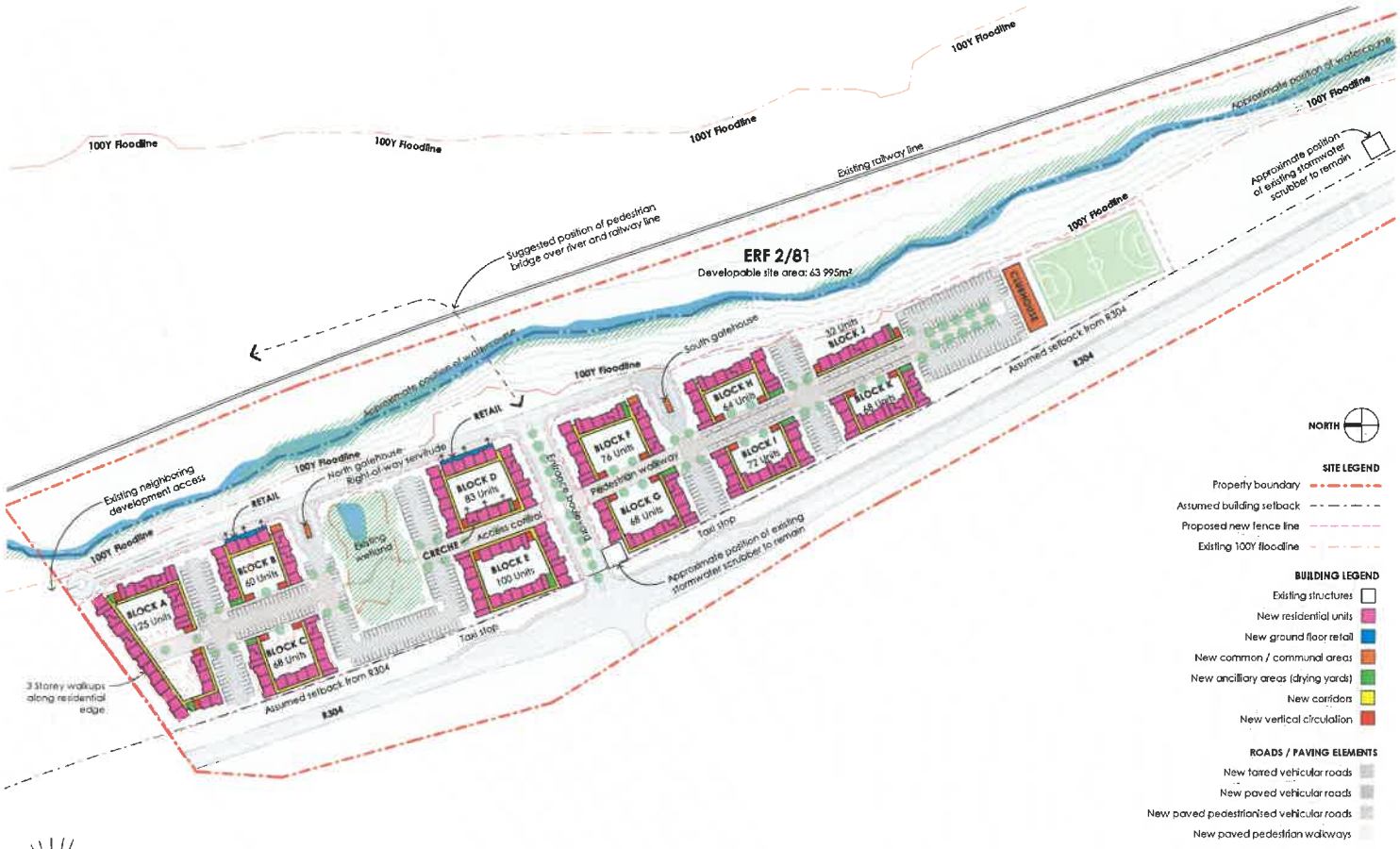
STELLENBOSCH

CONSULTANTS	NAME	SIGNATURE
MKANIVO DEVELOPMENT CONSULTANTS	SAMUEL CHAUKE	

DESIGNED:	GABABILE MODIBE C.Pln 7/10028/2024
CHECKED	SAMUEL CHAUKE Pr Pln A/51/10/2022
DRAWING No	202406-RE PTN2&9 _F 81-REV2
DATE	04/12/2025

COMPILED BY:

Mkanivo Development Consultants



GAPP

STELLENBOSCH HOUSING TENDER BSM 26/21

PAGE 1 - PROPOSED SITE LAYOUT

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cape town 150 longmarket st cape town 8001 | po box 15598 vlaeberg 8018 | +27 21 424 2390 | office@cln.gapp.net
GAPP architects & urban designers (pty) ltd | reg no. 1993/003667/07 | www.gapp.net

revision
A

CIVILCONSULT
Consulting Engineers

STELLENBOSCH LOCAL MUNICIPALITY

REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81

BULK SERVICES REPORT

SECOND REVISION

PROJECT NO. 3314

JANUARY 2026

STELLENBOSCH LOCAL MUNICIPALITY

REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81

BULK SERVICES REPORT

SECOND REVISION

STELLENBOSCH LOCAL MUNICIPALITY : REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 : BULK SERVICES REPORT – SECOND REVISION

1. APPLICANT / LAND OWNER :

Name of Land Owner	Stellenbosch Local Municipality
Contact Person	Geraldine Metler (Municipal Manager)
Address	71 Plein Street Stellenbosch 7600
Telephone No. / Cell No.	021-808 8025
E-mail	Municipal.Manager@stellenbosch.gov.za

2. CLIENT :

Name of Client	Nkanivo Development Consultants
Contact Person	Samuel Chauke (Managing Director)
Address	Unit 79, Block 5 Lombardy Business Park 66 Graham Road Pretoria 0084
Telephone No. / Cell No.	012-807 7445 / 083 277 7347
E-mail	info@nkanivo.co.za

3. FOR SUBMISSION TO :

Local Authority	Stellenbosch Local Municipality
Contact Person	Chrizelle Kriel (Manager: Land Use Management)
Address	Development Management 1st Floor, NPK Building Cnr Plein and Ryneveld Streets Stellenbosch 7600
Telephone No.	021-808 8660
E-mail	Chrizelle.Kriel@stellenbosch.gov.za

4. COMPILED BY :

Company	CIVILCONSULT Consulting Engineers (Pty) Ltd
Contact Person	Leon Wentzel (ECSA 950052)
Address	541 Jorissen Street Sunnyside Pretoria 0002
Telephone No. / Cell No.	012-343 6297/0181/0845 / 082 574 3558
E-mail	mail@civilconsult.co.za

STELLENBOSCH LOCAL MUNICIPALITY : REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 : BULK SERVICES REPORT – SECOND REVISION

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STELLENBOSCH LOCAL MUNICIPALITY : REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 : BULK SERVICES REPORT – SECOND REVISION

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ANNEXURE C	:	STELLENBOSCH LOCAL MUNICIPALITY ROAD NETWORK
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ANNEXURE G	:	WATER AND SEWER CAPACITY LETTER FROM SLM

STELLENBOSCH LOCAL MUNICIPALITY : REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81 : BULK SERVICES REPORT – SECOND REVISION

1. INTRODUCTION

CIVILCONSULT Consulting Engineers (Pty) Ltd was appointed by Samuel Chauke of Nkanivo Development Consultants (Pty) Ltd for the compilation of a Bulk Services Report for civil- and electrical engineering services for the Rezoning of the Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81.

For the purposes of this report, we will refer to the Rezoning of the Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81, as the Proposed Development.

2. PROFESSIONAL TEAM

The professional team is as follows :

Professional Discipline	Name of Entity	Contact Person(s)
Applicant / Land Owner	Stellenbosch Local Municipality	Geraldine Metler
Client / Project Manager / Town Planner	Nkanivo Development Consultants	Samuel Chauke
Geologist	BVI Consulting Engineers (Pty) Ltd	Bruce Webber
Environmental Specialist	Leago Environmental Solutions	Mankaleme Magoro
Flood Hydrologist	WML Coast Consulting Engineers	Lance Kime
Traffic Engineer	Chrisen Consulting (Pty) Ltd	Moosa Mthembu
Electrical Engineer	CIVILCONSULT Consulting Engineers (Pty) Ltd	Barend van den Bergh
Civil Engineer		Tim Coxon

3. LOCATION OF DEVELOPMENT AND FLOOD LINES

The Proposed Development is located on the Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81.

The Proposed Development is located north east of Kayamandi and south west of Cloetesville. The site is bounded to the east by the R304 and is located approximately 2.1km north west from the centre of Stellenbosch.

Existing Provincial Road R304 (Bird Street) intersects the western portion of the Proposed Development from the north to the south.

An existing unknown asphalt surfaced road divides the Proposed Development into north and western portions and a south eastern portion. This existing unknown asphalt surfaced road intersects the Provincial Road R304 (Bird Street), approximately 260m south east of the north western corner of the Proposed Development and was considered in the TIA provided in Annexure F.

The Plankenburg Rivier bisects the Proposed Development from north to south on the southern side. The 1:100 year flood lines of the Plankenburg Rivier were determined by WML Coast Consulting Engineers (Pty) Ltd and will be taken into account with the finalization of the layout of the Proposed Development.

Refer to Annexure A, Drawing No. 3314/100/01/00 for a locality plan.

4. LAND USES

The existing- and proposed land uses for the Proposed Development are shown in Tables 4.1 and 4.2 below.

Table 4.1 : Existing Land Uses

Portion No.	Use Zone/ Reservation	Area (ha)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Agriculture and Rural	18.44
Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	0.83

Table 4.2 : Proposed Land Uses

Portion No.	Use Zone/ Reservation	No. of Erf	Units	FAR / Coverage	Total Floor Area (m^2)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Multi-Unit Residential	Ptn A & B	816	0.75 / 50%	43 875 / 29 250
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Roads and Parking	Ptn C & D	-	-	49 800
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Open Space	Ptn E	-	-	76 100
Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	-	-	-	8 300

*Note : Land uses are based on the Proposed Concept Plan provided by Nkanivo Development Consultants

5. GEOTECHNICAL ASPECTS

BVi Consulting Engineers (Pty) Ltd was appointed to compile a Geotechnical Feasibility Study Report for the Proposed Development (GFSR).

A copy of the GFSR will be provided to the relevant authorities after completion.

6. TRAFFIC IMPACT ASSESSMENT

A Traffic Impact Assessment (TIA) dated April 2025 was compiled for the Proposed Development by Emile du Preez of Delta BEC (Pty) Ltd.

The following is an extract from the TIA.

Recommendation:

The analysis revealed that the current road network and intersections generally operate at acceptable levels of service (LOS), except intersections 5, 6 and 7, which are performing at an unacceptable LOS. The following mitigation measures are recommended. However, the developer is not responsible for these upgrades, as the intersections are already operated at an unacceptable level of service (LOS F) without the development volumes.

- *Intersection 5 mitigation measures*
  - *The traffic signal is recommended*
- *Intersection 6 mitigation measures*
  - *The traffic signal is recommended*
- *Intersection 7 mitigation measures*
  - *A revised signal timing plan must be introduced. Modify a through movement lane on the southwestern leg to function as a shared through and left-turn lane*
- *It is recommended that the pedestrian sidewalks be extended to seamlessly connect with the existing sidewalks along the R304.*

In conclusion, Delta BEC recommends that the Proposed Development under Stellenbosch Municipality be approved, provided that the proposed mitigation measures and recommendations are implemented

7. CIVIL ENGINEERING SERVICES

7.1 Design Standards

The design standards to be followed are in accordance with the standards specified in "Stellenbosch Municipality Design Guidelines and Minimum Standards for Civil Engineering Services" compiled by Stellenbosch Municipality published June 2015.

Where standards are unclear designs shall adhere to the "The Neighbourhood Planning and Design Guide – Creating Sustainable Human Settlements" developed by the Department of Human Settlements published in July 2019 (Red Book).

7.2 Design Software

The designs of the civil engineering services will be carried out with TechnoCad design programs.

7.3 Ownership of Services

The external and internal engineering services will be taken over by the Stellenbosch Local Municipality (SLM), which will be responsible for the maintenance of the civil and electrical services.

8. WATER

8.1 Estimated Water Demand

The estimated water demand for the Proposed Development is shown in Table 8.1 below.

Table 8.1 : Estimated Water Demand for the Proposed Development

Portion Number	Land Uses	Proposed Development			
		No. of Units	Area (m^2)	Average Annual Daily Demand (AADD)	Water Demand (kℓ/d)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Multi-Unit Residential	816	43 875	0.25kℓ / unit	204.00
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Roads and Parking	-	49 800	-	-
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Open Space	-	76 100	-	-
The Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	-	8 300	-	-
Total					**204.00**

Note : The Average Annual Daily Demand (AADD) figures were obtained from "The Neighbourhood Planning and Design Guide – Creating Sustainable Human Settlements" developed by the Department of Human Settlements published in July 2019 (Red Book).

8.2 General

The Proposed Development falls within the water supply area of the SLM. An existing unknown asphalt surfaced road divides the Proposed Development into a north western portion and a south eastern portion.

8.3 Existing Water Infrastructure

According to information provided by SLM, an existing 200mm Ø uPVC Class 12 water pipeline runs parallel to and on the northern and western side of the existing road, which divides the Proposed Development. This line provides water to the existing Mount Simon Estate development.

8.4 Proposed Bulk Water Infrastructure

8.4.1 Proposed Bulk Water Reticulation

It is proposed that two new 160mm Ø bulk water connections, water meters and isolation valves be installed for the north western portion and south eastern portion of the Proposed Development connecting directly off the existing 200mm Ø uPVC Class 12 water pipeline.

The internal reticulation of the north western portion and south eastern portion could connect directly to the proposed 160mmm Ø uPVC Class 12 bulk connection.

According to SLM, water upgrades are required for the Proposed Development, which can be seen in Annexure G of this report.

A Water Use Licence Application (WULA) will not be required for the Proposed Development as water will be provided by Stellenbosch Water. None of the Proposed Developments activities trigger a WULA.

Refer to Annexure B, Drawing No. 3314/200/01/02 for details.

8.5 Water Design Criteria

8.5.1 Water Design Criteria

The design criteria to be used during the analyses and design of the water network are indicated in Table 8.5.1 below.

Table 8.5.1 : Water Design Criteria

Item No.	Design Element	Criteria
1.	Average Annual Daily Demand (AADD) for the Proposed Development	Refer to Table 8.1 above
2.	Gross Average Annual Daily Demand (GAADD)	Allow 10% losses
3.	Daily Peak Factor (DPF)	2.2
4.	Peak Hourly Factor (PHF)	4.6
5.	Design Peak Flow Rate (DPFR) for the Proposed Development flows	GAADD x PHF
6.	Maximum static head	90m
7.	Minimum residual head under peak demand conditions	20m
8.	Maximum linear flow velocity under peak demand conditions	1.8m/s
9.	Pipe type	uPVC
10.	Minimum pipe class	Class 12
11.	Total fire flow under peak demand conditions	25ℓ/s
12.	Fire flow at any one hydrant under peak demand condition	25ℓ/s
13.	Minimum pressure at any one hydrant under peak demand conditions	10m
14.	Maximum linear flow velocity under fire-fighting conditions	2.2m/s
15.	Boundary roughness (K-Value)	0.1mm
16.	Available static head	To be confirmed
17.	Available dynamic head under fire flow conditions	To be confirmed
18.	Flow formulae	D'Arcy Weissbach
19.	Minimum pipe diameter	110mm

9. SEWERAGE

9.1 Estimated Sewerage Flow

The estimated sewerage flow for the Proposed Development is shown in Table 9.1 below.

Table 9.1 : Estimated Sewerage Flow for the Proposed Development

Erf Number	Land Uses	Proposed Development			
		No. of Units	Area (m^2)	Average Annual Daily Flow (AADF)	Sewerage Flow (kℓ/d)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Multi-Unit Residential	816	43 875	0.25kℓ / unit	204.00
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Roads and Parking	-	49 800	-	-
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Open Space	-	76 100	-	-
The Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	-	8 300	-	-
Total					**204.00**

Note : The Average Annual Daily Flow (AADF) figures were obtained from the latest edition of the "The Neighbourhood Planning and Design Guide – Creating Sustainable Human Settlements" developed by the Department of Human Settlements published in July 2019 (Red Book).

9.2 General

The natural drainage pattern of the Proposed Development is to the east towards the Plankenburg Rivier.

9.3 Existing Sewerage Infrastructure

According to information provided by SLM, an existing 300mm Ø sewer pipeline runs partially parallel to and inside the western boundary of the Proposed Development.

9.4 Proposed Sewerage Infrastructure

Due to the natural drainage of the Proposed Development, we proposed that a sewerage pump station and sump be constructed inside the eastern boundary of the Proposed Development above the 1:100 year flood line of the Plankenburg Rivier. However, SLM has indicated that no pump station will be permitted. The Proposed Development must therefore connect to the existing sewerage infrastructure via a gravity sewer. Refer to Annexure G for the correspondence received from SLM.

Sewerage from the Proposed Development could drain with an internal sewerage reticulation to the existing 300mm outfall sewerage infrastructure. According to SLM, sewer upgrades are required for the Proposed Development, which can be seen in Annexure G of this report.

A Water Use Licence Application (WULA) will not be required for the Proposed Development as there will be no discharging of wastewater and all internal sewerage infrastructure will connect to the existing Stellenbosch sewerage infrastructure.

Refer to Annexure B, Drawing No. 3314/300/01/02 for details.

9.5 Sewerage Design Criteria

9.5.1 Sewerage Design Criteria

The design criteria to be used during the design of the sewerage networks are indicated in Table 9.5.1 below.

Table 9.5.1 : Sewerage Design Criteria

Item No.	Design Element	Criteria
1.	Average Annual Daily Flow (AADF) for the Proposed Development	Refer to Table 9.1 above
2.	Peak Factor	2.5
3.	Allowance for infiltration	0.04ℓ / min / m length / m dia
4.	Capacity of Sewer	Pipes shall be designed to run at 70% full, measured in terms of flow depth, at total design flow
5.	Sewer pipe type	uPVC Class 34
6.	Minimum velocity	0.75m/s at full flow
7.	Minimum pipe diameter	160mm
8.	Minimum depth to the invert of a sewer connection in road reserve	1.5m
9.	Minimum depth to the invert of a sewer connection in a mid-block	1.2m

10. STORM WATER DRAINAGE

10.1 General

The Proposed Development falls within the G22G quaternary drainage region within SLM.

The natural drainage pattern of the Proposed Development is to the east towards the Plankenburg Rivier.

10.2 Existing Storm Water Infrastructure

No existing municipal storm water infrastructure is available in the vicinity of the Proposed Development.

10.3 Proposed Storm Water Infrastructure

Given the absence of municipal storm water infrastructure in the direct vicinity of the Proposed Development, we propose that the storm water generated by the Proposed Development be discharged directly into the Plankenburg Rivier.

An internal storm water drainage network will convey run-off from the Proposed Development to designated outlet structures along the river. These outlets will be fitted with gabions and Reno mattresses to mitigate erosion risks at the discharge points and will be positioned above the 1:100-year flood line of the Plankenburg Rivier.

Rainwater harvesting is encouraged for the proposed residential units to help reduce post-development run-off.

Refer to Annexure B, Drawing No. 3314/500/01/01 for details.

A Water Use Licence Application (WULA) will not be required for the Proposed Development as storm water will be discharged above the Plankenburg Rivier 1:100-year flood line at pre-development run-off flows.

Refer to Annexure B, Drawing No. 3314/500/01/01 for the proposed storm water system.

10.4 Hydrology

10.4.1 General

Hydrological data that will be used in the design of the storm water drainage system for the Proposed Development is summarized in Table 10.4.1 below.

Hydrological data used in the calculation of flood peaks are summarized in Table 10.4.1 below.

Table 10.4.1 : Hydrological Data

Hydrological Data	
a) Flood return period	1:5 years for storm water road systems
	1:25 years for the combined storm water pipe and road systems
	1:50 years for the attenuation pond
b) Average yearly rainfall	±643mm
c) Minimum time of concentration and run-off co-efficient according to : "The Guidelines for Human Settlement Planning and Design" (Red Book)	
d) Design method	Rational method for smaller catchment areas

10.5 Design Standards

Table 10.5 lists the standards to be used in the design of the storm water drainage system.

Table 10.5 : Storm Water Design Standards

Design Element	Specification
a) Minimum pipe size	450mm diameter
b) Pipe Type	Interlocking Joint Pipes Pipe Class : 50D and100D for road crossings
c) Minimum pipe gradient	0,5%
d) Storm water details	According to "The Neighbourhood Planning and Design Guide – Creating Sustainable Human Settlements" developed by the Department of Human Settlements published in July 2019 (Red Book)

11. ROADS

11.1 Access to the Development

Access to the Proposed Development will be gained directly off the R304 (Bird Street) on the western boundary of the Proposed Development. This is an existing intersection that serves Mount Simon Estate. A wayleave approval will need to be acquired from the SLM to allow for ingress and egress to the Proposed Development.

According to the Traffic Impact Assessment (TIA) done by Emile du Preez of Delta BEC (Pty) Ltd. According to the TIA the existing road geometry layout can accommodate the background and development traffic. No mitigation measures are required for this intersection.

The TIA states that it is recommended that the pedestrian sidewalks along the R304 be extended along the Proposed Developments boundary.

All internal roads will be designed and constructed according to the standards and specifications of the SLM.

Refer to Annexure B, Drawing No. 3314/400/01/01 for details.

11.2 Classification of Roads

The classifications of roads are shown in Table 11.2 below.

Table 11.2 : Classification Roads

Description	Class No.	Function
Provincial Road R304 (Brid Street)	2	District Distributor
Access Road / Internal Streets	5	Access & Local Streets

The SLM Road Network Hierarchy in relation to the site is contained in Annexure C for reference purposes.

11.3 Geometric Design Standards

Details of the road class are shown in Table 11.3 below.

Table 11.3 : Class 5 – Access & Local Streets

Design speed	40km/h
Minimum horizontal centre line radii (0% superelevation rate)	50m
Minimum gradient	0,5%
Favored maximum gradient	10% & 12%
Maximum grade/grade length	12% over 70m & 15% over 50m
Minimum vertical curve length	30m
Minimum K-value : Crest	2
Sag	4

11.4 Pavement Design

The proposed pavement design will be based on calculated traffic volumes and the in-situ material. The design life of the proposed pavement is 20 years on the provision that repairs to the surface will be made where necessary to maintain its skid resistance and impermeability during the design life of the road.

The pavement designs proposed are shown in Table 11.4. below.

Table 11.4 : Pavement Design of Road Class 5 (Access and Local Streets) / Paved Areas

Wearing Course	25mm thick continuously – graded medium grade asphalt – AC. (see note below)
Base	150mm thick graded crushed stone compacted to 86% of apparent density – G1. (see note below)
Sub Base	150mm thick stabilized natural gravel compacted to 95% of modified AASHTO density. Minimum UCS = 1 200kPa at 95% of modified AASHTO density – C4
Selected Sub Grade	150mm thick natural gravel compacted to 95% of modified AAHSTO density. Minimum CBR = 25 at 95% of modified AASHTO density – G6 (in-situ or imported)
Fill (where required)	150mm thick layers compacted to 93% of modified AASHTO density. Minimum CBR = 7 at 93% of modified AASHTO density – G9

* Note: Pavement design based on preferable soil conditions. Soil samples should be taken and analysed to determine final pavement design specifications

12. SOLID WASTE DISPOSAL

12.1 Volume of Solid Waste

The estimated volume of waste to be generated by the Proposed Development on a weekly basis is shown Table 12.1.

Table 12.1 : Estimated Volume of Solid Waste

Erf Number	Land Uses	Proposed Development	
		No. of Units / m^2	Volume of Solid Waste (m^3/Week)
The Remainder of Portion 2 of the Farm Cloetesdal 81	Multi-Unit Residential	816	122.40
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Roads and Parking	-	-
The Remainder of Portion 2 of the Farm Cloetesdal 81	Public Open Space	-	-
The Portion 9 of the Farm Cloetesdal 81	Public Roads and Parking	-	-
Total			**122.40**

12.2 The collection of the uncompressed solid waste in the Proposed Development will be carried out by the SLM who might appoint a private company for this purpose.

12.3 Waste production at all sources should be minimised and re-use, recycling and composting should be maximised. Most of the material thrown away (bottles, newspapers, aluminium cans, magazines and office paper) is recyclable.

12.4 The residual solid waste will be collected and transported from the Proposed Development to the solid waste disposal site of the SLM, either by the SLM or by a private contractor.

13. ELECTRICAL ENGINEERING SERVICES

13.1 Introduction

The Proposed Development will be supplied with electricity from the SLM Power Supply Network.

The external networks will adhere to the standards and requirements of SLM. The internal network is earmarked for private ownership and use.

Other standards to which the electrical design will adhere to include the relevant SABS safety and equipment standards, as well as the NRS 048 Quality of Supply Standard.

13.2 Estimated Maximum Demand

The total expected demand for the Proposed Development is shown in Table 13.2 below.

Table 13.2 : Estimated Maximum Demand

Zoning	Proposed Development		
	Floor Area (m^2) or No. of Units	VA/m^2 or kVA/unit	kVA
Multi-Unit Residential	816 Units	3.01kVA	2 457.0
Total			**2 457.0**

13.3 External Supply Network

There are existing SLM MV networks in the vicinity of the Proposed Development.

The Proposed Development could be supplied by installing a new metering ring main unit in a 3m x 6m servitude to be registered in favour of SLM. The Proposed Development could then be supplied directly from the metering ring main unit via a T1 consumer switch to be installed inside the boundary of the Proposed Development.

The viability of this proposal depends on the availability of enough spare capacity on the existing SLM network.

13.4 Bulk Metering

Bulk metering will be done by SLM inside the new metering ring main unit to be installed in a 3m x 6m servitude to be registered in favour of SLM.

13.5 Internal Reticulation

The following is proposed :

- install new 315kVA and 500kVA miniature substations of rating 11kV / 415V at optimum positions
- supply the miniature substations with 35mm² 3-core, 11kV, XLPE/PILC insulated, copper cables
- install wall mounted distribution boards or = planted 3CR12 meter kiosks pre-wired with circuit breakers and meters
- install 95mm² and 120mm², 4-core, low voltage, copper cables from the miniature substations up to the distribution or meter kiosks

13.6 Street Lighting

Street lighting equipment should be determined taking into account the following :

- the degree of street luminance required versus the sensitivity of the area to excess lighting
- architectural and landscaping preferences
- whether solar panels must be used for electrical supply

14. BULK SERVICES CONTRIBUTIONS

The Bulk Services Contributions for Civil Engineering Services payable to the SLM, will be determined with the compilation of the services agreements.

The Bulk Services Contributions for Electrical Engineering Services payable to SLM, will be determined after the technical investigation from SLM.

15. CONCLUSION

We trust that the above report meets with your requirements. Please contact us should you require any additional information.



.....

Leon Wentzel
for CIVILCONSULT Consulting Engineers (Pty) Ltd

27/01/2026

.....

Date

ANNEXURE A

LOCALITY PLAN


MOUNT SIMON ESTATE
PROVINCIAL ROAD R304 (ANNE STREET)
PORTION 37 OF THE FARM 183
PORTION 8 OF THE FARM 183
REMAINDER OF PARCEL 8886 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PARCEL 8647 OF STELLENBOSCH TOWNSHIP
CLOETESVILLE DEVELOPMENT
REMAINDER OF PORTION 2 & PORTION 9 OF THE FARM CLOETESDAL 81
PLANKENBURG RIVER
PARCEL 8641 OF STELLENBOSCH TOWNSHIP
PROVINCIAL ROAD R304 (BIRD STREET)
PARCEL 12817 OF STELLENBOSCH TOWNSHIP
PARCEL 12176 OF STELLENBOSCH TOWNSHIP
PARCEL 8640 OF STELLENBOSCH TOWNSHIP
KAYAMANDI TOWNSHIP DEVELOPMENT
STELLENBOSCH
Nkanivo Development Consultants
CIVILCONSULT Consulting Engineers
L WENTZEL
T COXON
J DAVEL
REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81
LOCALITY PLAN
JULY 2024
1 : 2500
3314/100/01/00

ANNEXURE B

ENGINEERING LAYOUT DRAWINGS


EXISTING 200mmø uPVC CLASS 12 WATER PIPE
PORTION 37 OF THE FARM 183
PORTION 8 OF THE FARM 183
PROPOSED 160mmø BULK WATER CONNECTION INCLUDING BULK WATER METER & ISOLATION VALVE
EXISTING BULK WATER INFRASTRUCTURE TO BE UPGRADED AS STATED IN THE BULK SERVICES REPORT
REMAINDER OF PARCEL 8858 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PARCEL 8847 OF STELLENBOSCH TOWNSHIP
CLOETESVILLE DEVELOPMENT
REMAINDER OF PORTION 2 & PORTION 9 OF THE FARM CLOETESDAL 81
PARCEL 8841 OF STELLENBOSCH TOWNSHIP
PROVINCIAL ROAD P29/4 (BANHOEK STREET)
PARCEL 12817 OF STELLENBOSCH TOWNSHIP
PARCEL 12175 OF STELLENBOSCH TOWNSHIP
PARCEL 8840 OF STELLENBOSCH TOWNSHIP
KAYAMANDI TOWNSHIP DEVELOPMENT
DEVELOPMENT BOUNDARY
EXISTING WATER
PROPOSED NEW ISOLATION VALVE
PROPOSED 110mmØ TAKE OFF WATER LINES
PLANKENBURG RIVER
1:100 YEAR FLOOD LINE
NEW BULK WATER METER
ALL LEVELS & POSITIONS TO BE CHECKED AND VERIFIED ON SITE PRIOR TO CONSTRUCTION
STELLENBOSCH
Kanivo Development Consultants
CIVILCONSULT Consulting Engineers
L. WENTZEL
T. COXON
J. DAVEL
REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81
WATER: GENERAL LAYOUT
JULY 2024
1: 2500
3314/200/01/02
3314/200/01/02


DEVELOPMENT BOUNDARY
EXISTING 300mmØ SEWERAGE PIPE
PLANKENBURG RIVIER
1:100 YEAR FLOOD LINE
PROPOSED INTERNAL SEWERAGE INFRASTRUCTURE
ALL LEVELS & POSITIONS TO BE CHECKED AND VERIFIED ON SITE PRIOR TO CONSTRUCTION
PORTION 37 OF THE FARM 183
PORTION 8 OF THE FARM 183
REMAINDER OF PORTION 2 & PORTION 9 OF THE FARM CLOETESDAL 81
REMAINDER OF PARCEL 6886 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PARCEL 6847 OF STELLENBOSCH TOWNSHIP
CLOETESVILLE DEVELOPMENT
PARCEL 6841 OF STELLENBOSCH TOWNSHIP
PARCEL 12617 OF STELLENBOSCH TOWNSHIP
PARCEL 12175 OF STELLENBOSCH TOWNSHIP
PARCEL 6840 OF STELLENBOSCH TOWNSHIP
CONNECT TO EXISTING MUNICIPAL INFRASTRUCTURE
EXISTING BULK 300mmØ SEWER OF WHICH THE PROPOSED DEVELOPMENT WILL TIE IN TO
CONNECT TO EXISTING MUNICIPAL INFRASTRUCTURE
PROVINCIAL ROAD (R44 ROAD STREET)
KAYAMANDI TOWNSHIP DEVELOPMENT
REMAINDER OF PORTION 2 & PORTION 9 OF THE FARM CLOETESDAL 81
BULK SEWERAGE INFRASTRUCTURE TO BE UPGRADES AS STATED IN THE BULK SERVICES REPORT
STELLENBOSCH
Kanivo Development Consultants
CIVILCONSULT Consulting Engineers
L. WENTZEL
T. COXON
J. DAVEL
REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81
SEWERAGE: GENERAL LAYOUT
SEPTEMBER 2025
1: 2500
3314/300/01/02


MOUNT SIMON ESTATE
PORTION 37 OF THE FARM 183
PORTION 6 OF THE FARM 183
PROPOSED SIDEWALK AS PER THE TRAFFIC IMPACT ASSESSMENT
PLANKENBURG RIVER
REMAINDER OF PARCEL 6886 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PARCEL 6847 OF STELLENBOSCH TOWNSHIP
CLOETESVILLE DEVELOPMENT
PLANKENBURG RIVIER
PARCEL 6841 OF STELLENBOSCH TOWNSHIP
PARCEL 12817 OF STELLENBOSCH TOWNSHIP
PARCEL 12175 OF STELLENBOSCH TOWNSHIP
PARCEL 6840 OF STELLENBOSCH TOWNSHIP
KAYAMANDI TOWNSHIP DEVELOPMENT
DEVELOPMENT BOUNDARY
PLANKENBURG RIVIER
1:100 YEAR FLOOD LINE
R304 ROAD RESERVE
EXISTING ROAD AND INTERSECTION TO BE UPGRADED
PROPOSED INTERNAL ROADS
PROPOSED SIDEWALKS
ALL LEVELS & POSITIONS TO BE CHECKED AND VERIFIED ON SITE PRIOR TO CONSTRUCTION
STELLENBOSCH
Kanivo Development Consultants
CIVILCONSULT Consulting Engineers
L. WENTZEL
T. COXON
J. DAVEL
REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81
ROADS: GENERAL LAYOUT
JULY 2024
1 : 2500
3314/400/01/01


DEVELOPMENT BOUNDARY
FLANKENBURG RIVIER
1:100 YEAR FLOOD LINE
R304 ROAD RESERVE (30m)
STORM WATER INFRASTRUCTURE
FLOW DIRECTION
ALL LEVELS & POSITIONS TO BE CHECKED AND VERIFIED ON SITE PRIOR TO CONSTRUCTION
MOUNT SIMON ESTATE
PORTION 37 OF THE FARM 183
PORTION 8 OF THE FARM 183
FLANKENBURG RIVIER
REMAINDER OF PARCEL 6886 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PARCEL 6847 OF STELLENBOSCH TOWNSHIP
CLOETESVILLE DEVELOPMENT
REMAINDER OF PORTION 2 & PORTION 9 OF THE FARM CLOETESDAL 81
PARCEL 6841 OF STELLENBOSCH TOWNSHIP
PROVINCIAL ROAD R304 (BIRD STREET)
FLANKENBURG RIVIER
PARCEL 12817 OF STELLENBOSCH TOWNSHIP
PARCEL 12175 OF STELLENBOSCH TOWNSHIP
REMAINDER OF PORTION 6 OF THE FARM CLOETESDAL 81
KAYAMANDI TOWNSHIP DEVELOPMENT
PARCEL 6840 OF STELLENBOSCH TOWNSHIP
STELLENBOSCH
Kanivo Development Consultants
CIVILCONSULT Consulting Engineers
DRAWN L. WENTZEL
CHECKED T. COXON
CAD/TS J. DAVEL
REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81
STORM WATER RETICULATION: GENERAL LAYOUT
JULY 2024
SCALE 1: 2500
3314/500/01/01
3314/500/01/01

ANNEXURE C

STELLENBOSCH LOCAL MUNICIPALITY ROAD NETWORK


R304
ERVEN 81/2 AND 81/9, STELLENBOSCH
CLOETESVILLE
PNIEL
JOHANNESDAL
HELSHOOGTE
KYLEMORE
R310
ONDER-PAPEGAAIBERG
STELLENBOSCH
R310
M12
TECHNO PARK
LEGEND
EXISTING CLASS 1
EXISTING CLASS 2
EXISTING CLASS 3
EXISTING CLASS 4
EXISTING CLASS 5
MUNICIPAL BOUNDARY

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Our Ref/Ons Verw: *Civil LU 2868 Farm 81-2 & 9 (LU-18098 TP917-2024)*
Your Ref/U Verw:

20 October 2025
Oarabile Modibe
Nkanivo
Unit 79, Block 5, Lombardy Business Park
66 Graham Road
PRETORIA
0084

By e-mail: oarabile@nkanivo.co.za

CAPACITY STATUS OF MUNICIPAL CIVIL ENGINEERING INFRASTRUCTURE TO SERVICE THE PROPOSED DEVELOPMENT ON FARM 81-2 AND 81-9

Your enquiry regarding a capacity letter required for the abovementioned development's Environmental Authorisation process refers.

This letter discusses the capacity status of the municipal bulk civil engineering services required to accommodate the development.

Please be reminded that this is the status at this point in time and is subject to change due to potential new developments in the various service catchment areas.

1. GENERAL

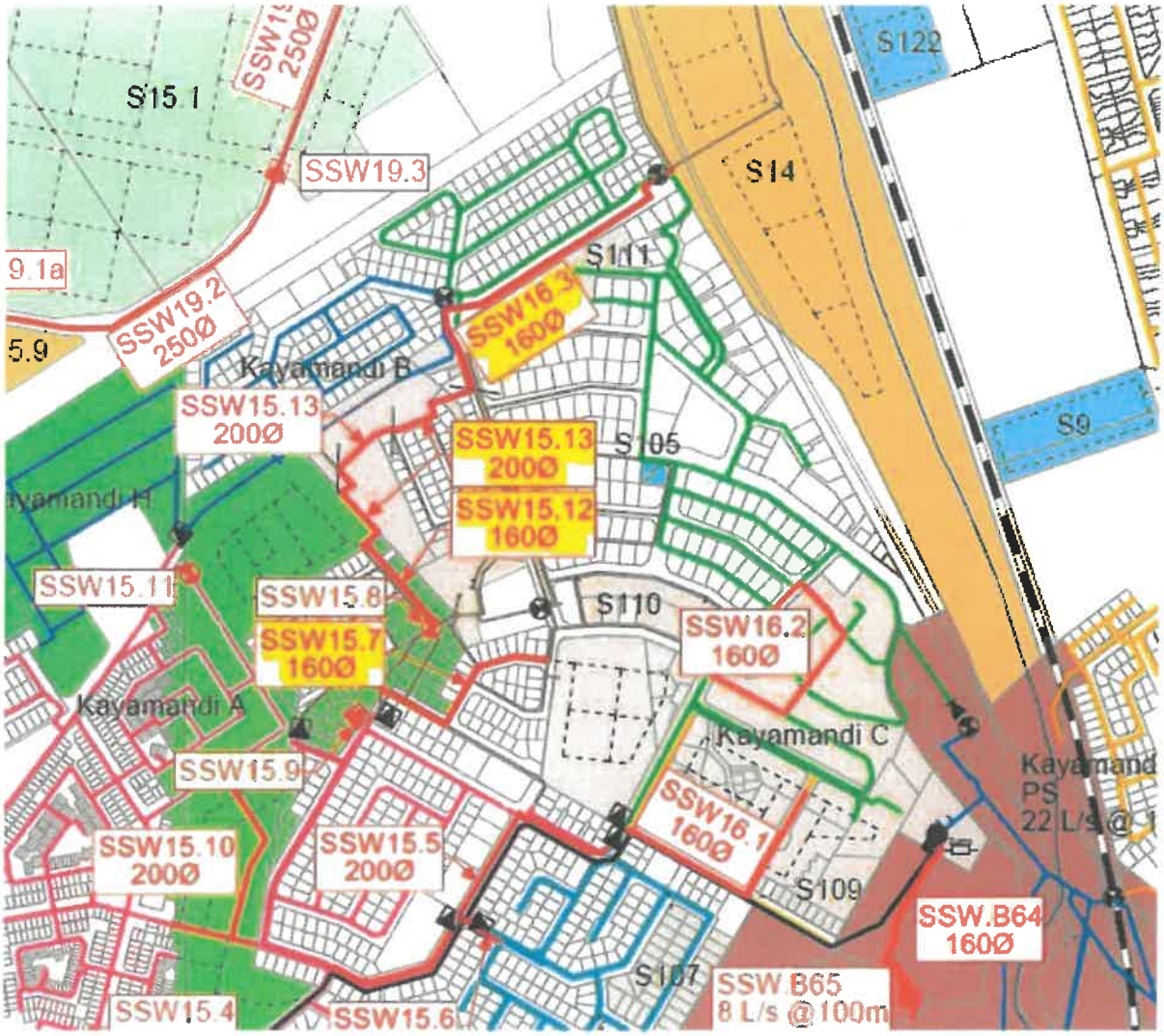
These comments are based on a development of 816 apartment units.

2. WATER CAPACITY

The following Water Master Plan items are triggered as a result of the proposed development:

- SSW16.3: Upgrade required (403m x 160 Ø mm pipeline).
- SSW15.12 and SSW15.13, Upgrade required (233m x 200 Ø mm & 123 x 160 mm Ø pipelines).
- SSW15.7: Upgrade required (228m x 160 Ø mm pipeline).

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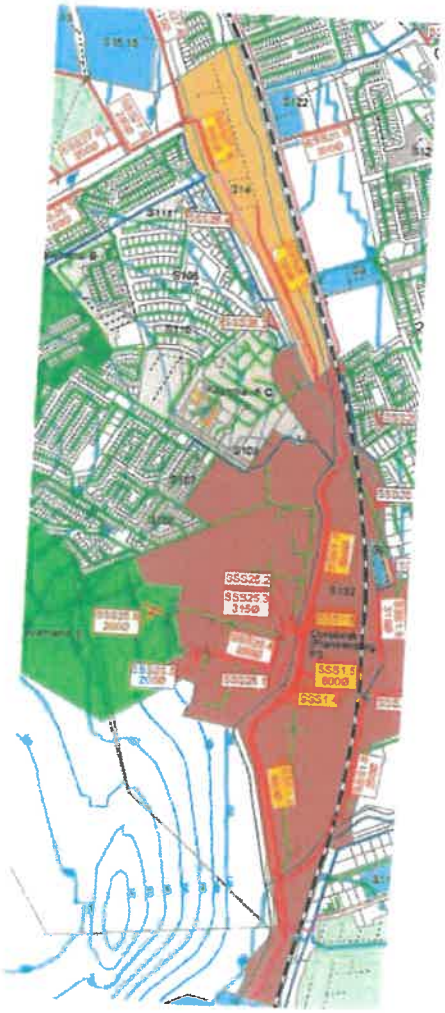
3. SEWER CAPACITY

Please note that no sewer pumpstations will be allowed for this development as a gravity solution must be presented, as gravity flow seems to be technically feasible.

The following Sewer Master Plan items are triggered to support the proposed development:

- SSS27.3: 198 m x 400mm Ø new gravity main. While this item primarily services upstream Kayamandi developments, it should be implemented if it falls within the site boundary. The final pipe-size is to be confirmed at detail design stage.
- SSS26.1: 526 m X 160 Ø mm new gravity main
- Items SSS1.2 to SSS1.7, see below:

Bulk sewer system						
SSS1.2	MP	757 m x 600 mm Ø Upgrade existing Gravity	8 249 000	2028	Required when existing outfall sewer reaches capacity	PRJ-SSS-001
SSS1.4	MP	Upgrade existing Flow Diversion	443 000	2028	Modify existing diversion structure	PRJ-SSS-001
SSS1.5	MP	186 m x 600 mm Ø Upgrade existing Gravity	2 166 000	2033	Required when existing outfall sewer reaches capacity	PRJ-SSS-001
SSS1.6	MP	Upgrade existing Flow Diversion	443 000	2033	Modify existing diversion structure	PRJ-SSS-001
SSS1.7	MP	449 m x 600 mm Ø Upgrade existing Gravity	4 964 000	2023	Required when existing outfall sewer reaches capacity	PRJ-SSS-001



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4. SOLID WASTE

There is currently sufficient spare capacity at the municipal landfill site to accommodate the development.

Yours faithfully

27/10/25

Shane Chandaka
Director: Infrastructure Services
W:\2.0 DEVELOPMENT\09 Capacities (Letters, Constraints, Discussions)\Capacity Letters\20251014 Farm 81-2 and 81-9 (Municipal Housing Project next to R304)\Capacity letter - Farm 81-2 and 81-9.doc

ANNEXURE L

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

HERITAGE SURVEY OF THE PROPOSED DEVELOPMENT

HERITAGE SURVEY OF THE PROPOSED HOUSING DEVELOPMENT ON FARM CLOETESDAL, STELLENBOSCH

FOR NKANIVO DEVELOPMENT CONSULTANTS

DATE: 11 NOVEMBER 2024

REVISED: 29 APRIL 2025

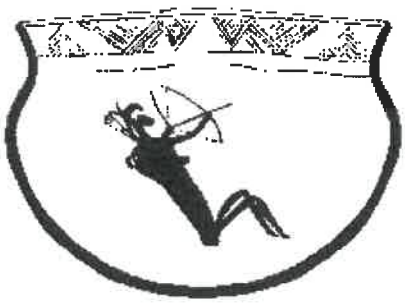
By Gavin Anderson

Umlando: Archaeological Surveys and Heritage Management

PO Box 10153, Meerensee, 3901

Phone: 035-7531785 Cell: 0836585362





INDEMNITY AND CONDITIONS RELATING TO THIS REPORT

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Abbreviations

HP	Historical Period
IIA	Indeterminate Iron Age
LIA	Late Iron Age
EIA	Early Iron Age
ISA	Indeterminate Stone Age
ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age
HIA	Heritage Impact Assessment
PIA	Palaeontological Impact Assessment

INTRODUCTION

The project area is situated on Remainder of Portion 2 Farm Cloetesdal 81 Stellenbosch RD (i.e. Farm 81/2) and Portion 9 of the Farm Cloetesdal 81 Stellenbosch RD (i.e. Farm 81/9) in Stellenbosch, Western Cape Province. The property, approximately 17,47 hectares in size, lies between the Khayamandi and Cloetesville settlements and has a triangular shape. Its western boundary is marked by the R304 road, while the railway line defines the eastern edge. The Plankenburg River runs along the eastern side of the property. To the south, it includes parts of the Khayamandi Tourism Centre and a bridge over the railway line. The northern boundary, where the property is at its widest, is adjacent to the Mount Simon residential development.

The intention of the client is to rezone Remainder of Portion 2 and Portion 9 of the Farm Cloetesdal 81, Stellenbosch RD, Stellenbosch, Western Cape Province from "Agricultural and Rural Zone" and "Public Roads & Parking Zone" to "Multi-Unit Residential Zone", to accommodate residential units.

Umnlando was contracted to undertake the heritage impact assessment of the proposed rezoning.

ASSUMPTIONS AND LIMITIATIONS

- The footprint of the proposed development will remain within the site boundary provided to Umlando by the client.
- Vegetation may cover subsurface features

SCOPE OF WORK

Undertake a desktop and then a field survey of the study area to record any heritage features and/or sites.

FIG. 1 GENERAL LOCATION OF THE STUDY AREA



FIG. 2: AERIAL OVERVIEW OF THE STUDY AREA

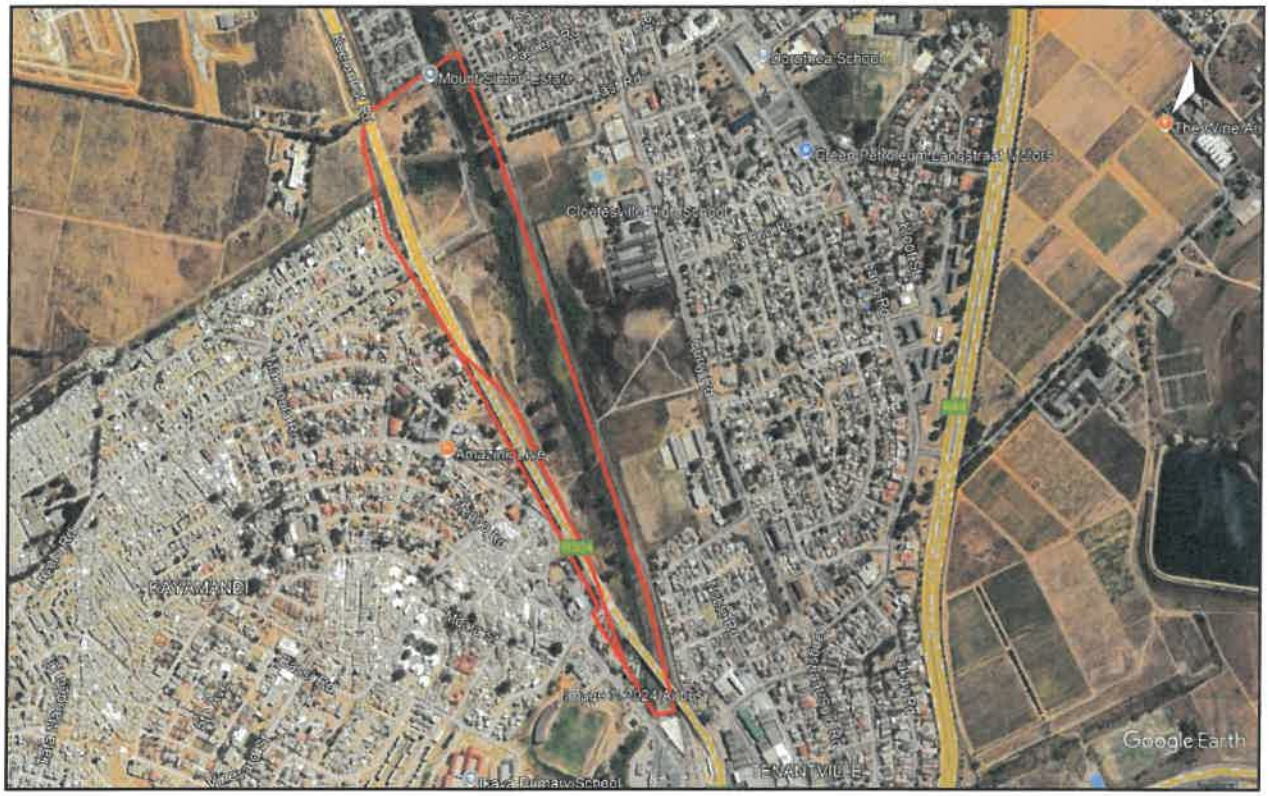


FIG. 3: TOPOGRAPHICAL MAP OF THE STUDY AREA

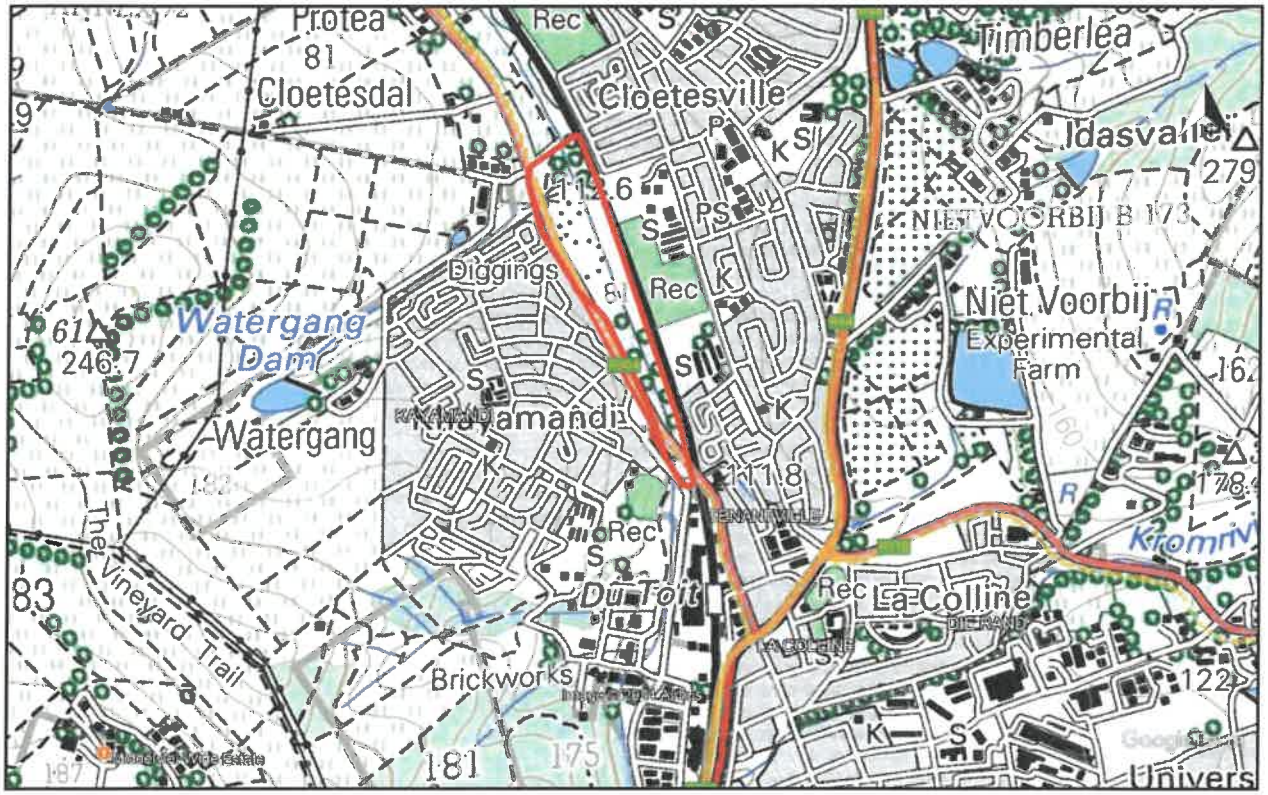


FIG. 4: SCENIC VIEWS OF THE STUDY AREA



NATIONAL HERITAGE RESOURCES ACT OF 1999

The National Heritage Resources Act of 1999 (pp 12-14) protects a variety of heritage resources. This are resources are defined as follows:

1. "For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.
2. Without limiting the generality of subsection (1), the national estate may include—
    - 2.1. Places, buildings, structures and equipment of cultural significance;
    - 2.2. Places to which oral traditions are attached or which are associated with living heritage;
    - 2.3. Historical settlements and townscapes;
    - 2.4. Landscapes and natural features of cultural significance;
    - 2.5. Geological sites of scientific or cultural importance;
    - 2.6. Archaeological and palaeontological sites;
    - 2.7. Graves and burial grounds, including—
        - 2.7.1. Ancestral graves;
        - 2.7.2. Royal graves and graves of traditional leaders;
        - 2.7.3. Graves of victims of conflict;
        - 2.7.4. Graves of individuals designated by the Minister by notice in the Gazette;
        - 2.7.5. Historical graves and cemeteries; and
        - 2.7.6. Other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
3. Sites of significance relating to the history of slavery in South Africa;
    - 3.1. Movable objects, including—

4. Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
   4.1. Objects to which oral traditions are attached or which are associated with living heritage;
   4.2. Ethnographic art and objects;
   4.3. Military objects;
   4.4. objects of decorative or fine art;
   4.5. Objects of scientific or technological interest; and
   4.6. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).
5. Without limiting the generality of subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—
   5.1. Its importance in the community, or pattern of South Africa's history;
   5.2. Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
   5.3. Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
   5.4. Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
   5.5. Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
   5.6. Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
   5.7. Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
   5.8. Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and

5.9. sites of significance relating to the history of slavery in South Africa"

METHOD

The method for Heritage assessment consists of several steps.

The first step forms part of the desktop assessment. Here we would consult the database that has been collated by Umlando. These database contain archaeological site locations and basic information from several provinces (information from Umlando surveys and some colleagues), most of the national and provincial monuments and battlefields in Southern Africa and cemeteries in southern Africa (information supplied by the Genealogical Society of Southern Africa). We use 1st and 2nd edition 1:50 000 topographical and 1937 aerial photographs where available, to assist in general location and dating of buildings and/or graves. The database is in Google Earth format and thus used as a quick reference when undertaking desktop studies. Where required we would consult with a local data recording centre, however these tend to be fragmented between different institutions and areas and thus difficult to access at times. We also consult with an historical architect, palaeontologist, and an historian where necessary.

The survey results will define the significance of each recorded site, as well as a management plan.

All sites are grouped according to low, medium, and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts or features. Sites of medium significance have diagnostic artefacts or features and these sites tend to be sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips, and decorated sherds are sampled, while bone, stone, and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively

sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features.

Defining significance

Heritage sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites.

These criteria are:

1. State of preservation of:

1.1. Organic remains:

1.1.1. Faunal

1.1.2. Botanical

1.2. Rock art

1.3. Walling

1.4. Presence of a cultural deposit

1.5. Features:

1.5.1. Ash Features

1.5.2. Graves

1.5.3. Middens

1.5.4. Cattle byres

1.5.5. Bedding and ash complexes

2. Spatial arrangements:

2.1. Internal housing arrangements

2.2. Intra-site settlement patterns

2.3. Inter-site settlement patterns

3. Features of the site:

3.1. Are there any unusual, unique or rare artefacts or images at the site?

3.2. Is it a type site?

3.3. Does the site have a very good example of a specific time period, feature, or artefact?

4. Research:

4.1. Providing information on current research projects

4.2. Salvaging information for potential future research projects

5. Inter- and intra-site variability

5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?

5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

6. Archaeological Experience:

6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.

7. Educational:

7.1. Does the site have the potential to be used as an educational instrument?

7.2. Does the site have the potential to become a tourist attraction?

7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

8. Other Heritage Significance:

8.1. Palaeontological sites

8.2. Historical buildings

8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites

8.4. Graves and/or community cemeteries

8.5. Living Heritage Sites

8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological

deposit. This occurs in Phase 2. These test-pit excavations may require further excavations if the site is of significance (Phase 3). Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type, but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts.

The above significance ratings allow one to grade the site according to SAHRA's grading scale. This is summarised in Table 1.

TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES

SITE SIGNIFICANCE	FIELD RATING	GRADE	RECOMMENDED MITIGATION
High Significance	National Significance	Grade 1	Site conservation / Site development
High Significance	Provincial Significance	Grade 2	Site conservation / Site development
High Significance	Local Significance	Grade 3A / 3B	
High / Medium Significance	Generally Protected A		Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B		Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C		On-site sampling monitoring or no archaeological mitigation required prior to or during development / destruction

GENERAL HISTORY OF THE AREA

Simon van der Stel found a fertile valley with a clear river and trees on 8 November 1679. After camping on a small island on the Eerste Rivier, he named the area Stellenbosch after himself and the abundant vegetation. Within a year, the small village of Stellenbosch was occupied by European farmers. By 1685 the hamlet was formerly demarcated and had a church, court, school, and plots of land. From 1710 to 1776 the town did not expand much; however, between 1776 and 1817 the town had increased in size (https://www.stellenboschheritage.co.za/stellenbosch-resources/stellenbosch-heritage/stellenbosch).

Stellenbosch thus has a wide range of architecturally significant buildings dating to the Colonial Period of southern Africa.

Khayamandi was established in the early 1950s as part of the apartheid segregation policies for black migrant workers employed on the farms in the Stellenbosch area (https://en.wikipedia.org/wiki/Kayamandi). Several buildings in Khayamandi are listed.

The Pre-Colonial Period of Stellenbosch includes the Early, Middle and Late Stone Ages where stone tools are widely spread across the landscape. KhoeKhoe pastoralists would have lived in this valley for the last 1 700 years.

DESKTOP STUDY

The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. There are no known heritage surveys near the study area.

The general area is known for heritage sites (fig. 5 - 6). These sites are mostly architectural sites and a few cemeteries. The agricultural activity for over 300 years would have destroyed open Stone Age and KhoeKhoe sites.

Cloetesdal Farm was "granted in 1692 to Guillaume du Toit, a Hugenot. In 1739 the farm was transferred to Jacob Cloete, and then to Nicolas Volk in the same day. In 1750 Volk sold the farm to Martin Melck. In 1784 Caspar Albertyn became the owner..." (https://stellenboschheritage.co.za/smhs/map/site-pdfs/382.pdf). The buildings are within 500m of the proposed development.

The proposed footprint would be in an archaeologically sensitive area as it is flat land next to a river, and would have been used for watering cattle and other agricultural activity.

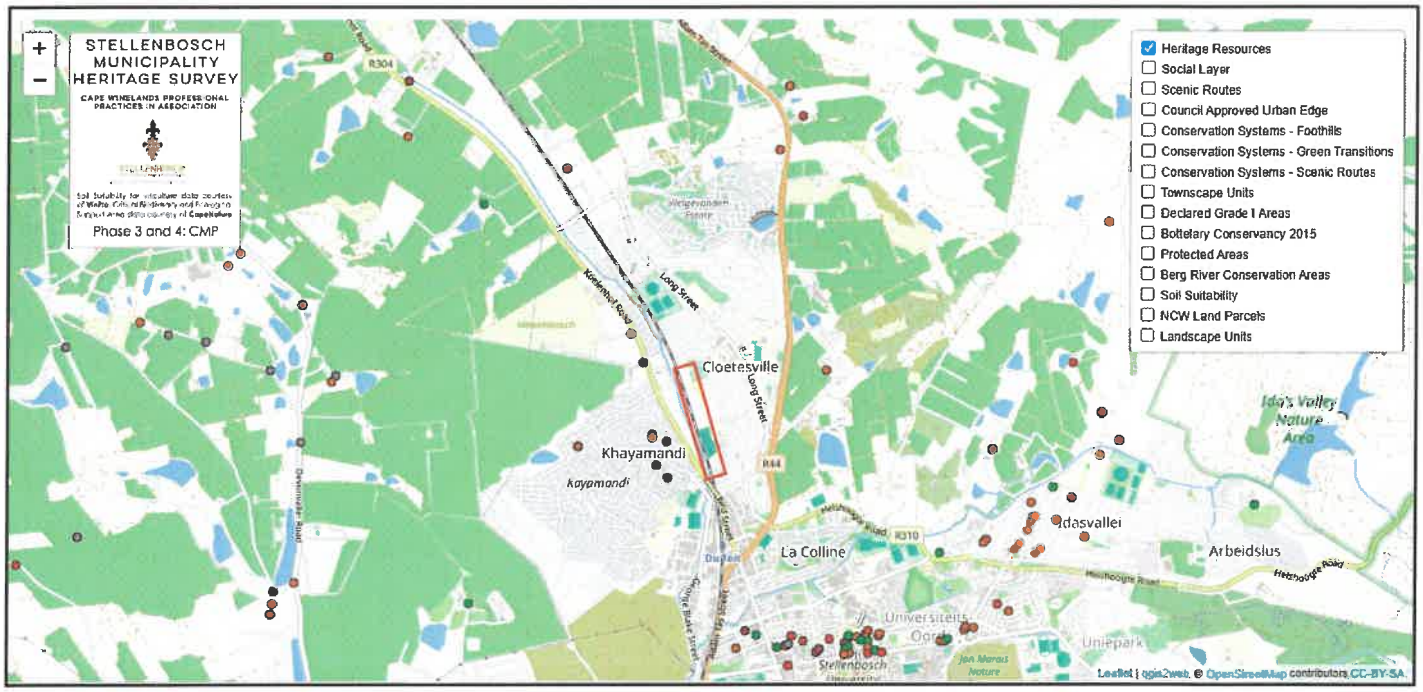
The 1935 topographical map indicates that there are no buildings within the property footprint (fig. 7). There is an established path from Carnowstie (now Khayamandi) to the main road east of the railway. In 1944, this path still exists and there is an established track adjacent to the river (fig. 8). The aerial photograph also shows buildings, indicating that Khayamandi was already established. By 1960 the northern half of the footprint is being used as open areas of land and paths/tracks are visible (fig. 9). There are still no buildings within the footprint.

In summary, there have been no built structures on the property since 1935, or before; however the land has been used a thoroughfare for at least 100 years and could have been in use since the late 18th century. There is a possibility for historical middens. The northern part of the footprint may have been used as a recreational area.

FIG. 5: LOCATION OF RECORDED SITES WITHIN THE GENERAL AREA

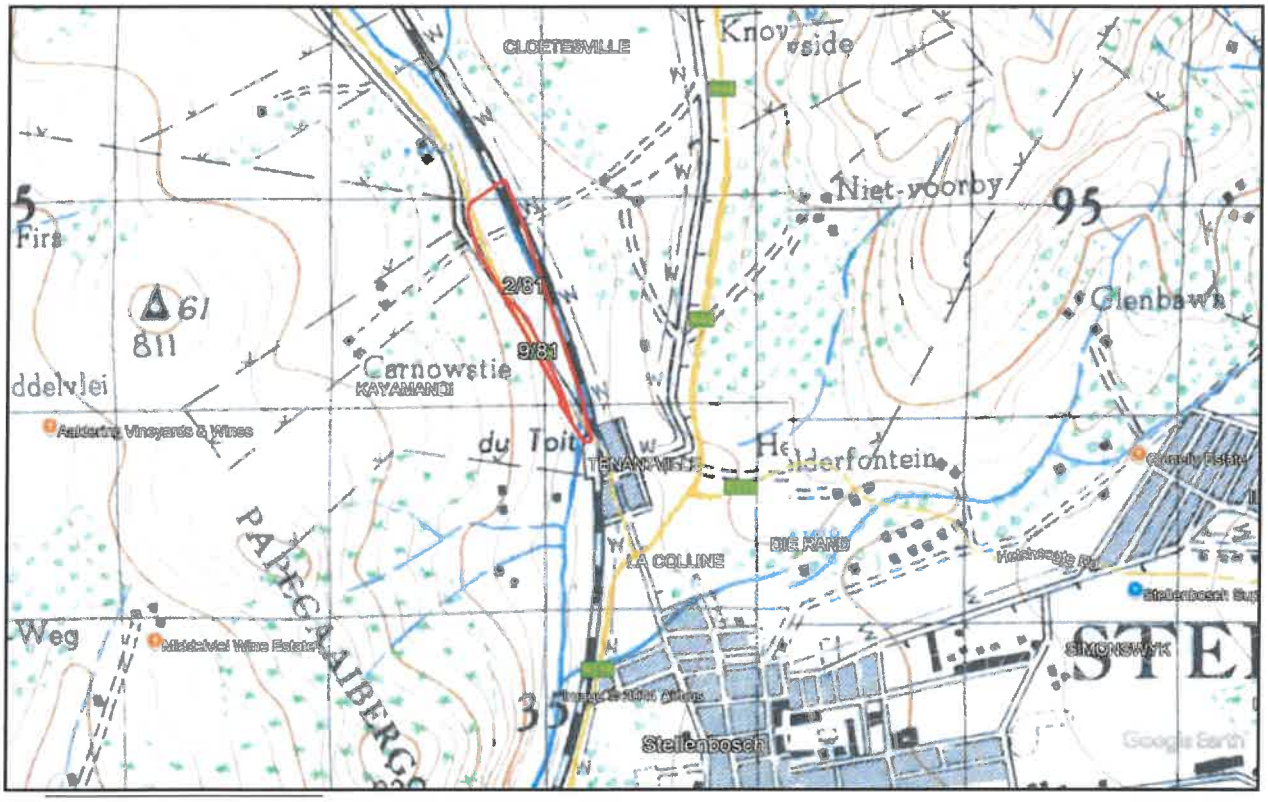


FIG. 6: LOCATION OF KNOWN SITES FROM THE MUNICIPAL HERITAGE SURVEY[1]



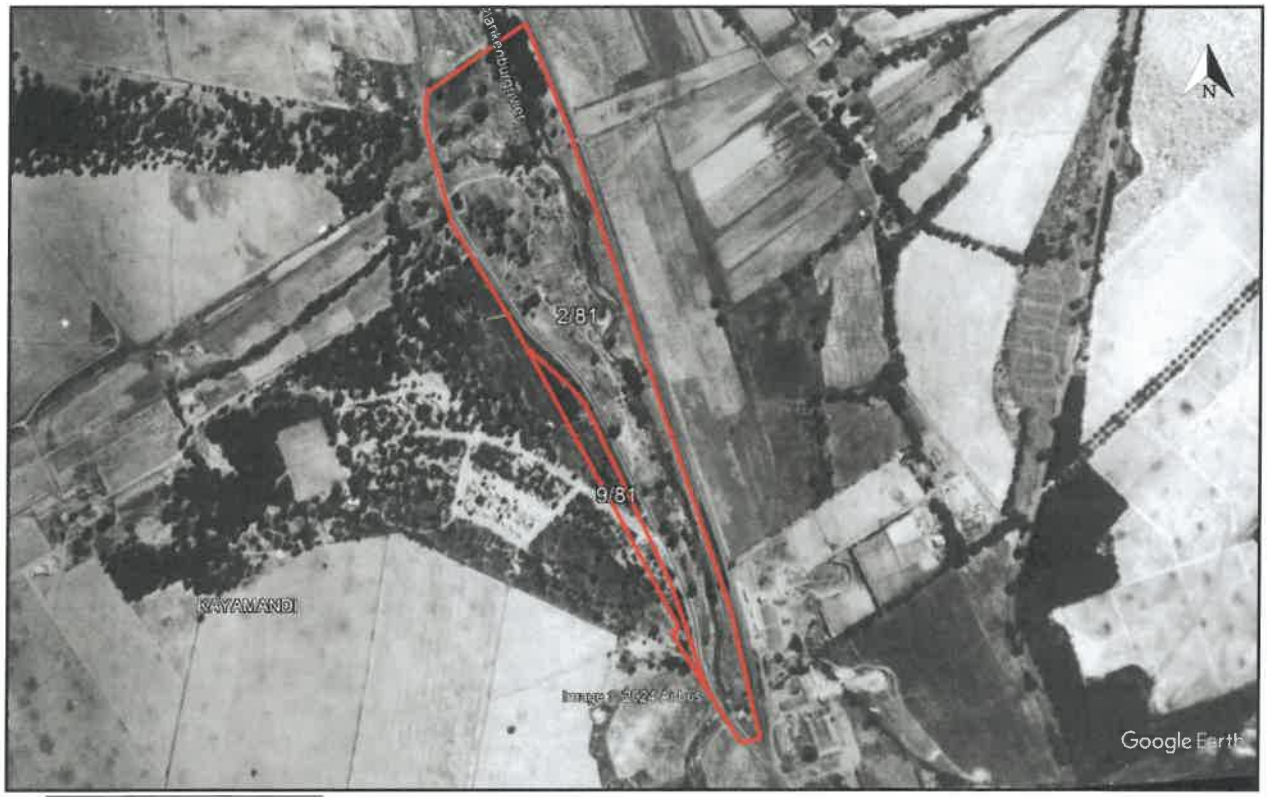
[1] https://www.stellenboschheritage.co.za/smhs/map/#14/-33.9103/18.8532

FIG. 7: LOCATION OF KNOWN SITES FROM THE1935 TOPOGRAPHICAL MAP[2]



[2] 3318DD Stellenbosch 1935

FIG. 8: LOCATION OF THE STUDY AREA IN 1944[3]



[3]61_018_00947

FIG. 9: LOCATION OF THE STUDY AREA IN 1960[4]



[4]454_018_07613

PALAEONTOLOGICAL SENSITIVITY

The area is mostly in an area of high and low palaeontological sensitivity (fig. 10). Dr Gideon Groenwald undertook a desktop study of the footprint (Appendix A). The geology underlying the development area is limited to Quaternary aged soils and alluvium with a moderate sensitivity for palaeontological heritage.

No further mitigation for Palaeontological Heritage is required and that this Desktop Survey and Chance Find Protocol will only have to be supplemented with a Phase 1 site visit and Phase 1 PIA report if, by chance, significant fossils are recorded during construction

FIG. 10: PALAEONTOLOGICAL SENSITIVITY MAP



COLOUR	SENSITIVITY	REQUIRED ACTION
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required

GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

ARCHAEOLOGICAL FIELD SURVEY

A field survey was undertaken on the 8 November 2024. Ground surface varied from open areas to recently mowed grass. There is a large pipeline running adjacent to the R304 and a more recent road (Mt Simon Drive). A small river, wetlands and the Plankenburg River occur on the property.

The southern half of the properties appear to be very disturbed and partially used for dumping of material. The northern part of the property is less disturbed and consists of a wetland, pine trees (from 1940s and 1960s) and grassed area (11).

FIG. 11: NORTHERN PART OF THE FOOTPRINT



Much of the northern area had good ground clearance of paths and open areas. These areas were surveyed for potential historical middens and isolated artefacts. No middens or historical artefacts were observed, and only late 20th and early 21st century building rubble was noted.

VISUAL IMPACT

The heritage sites noted from the desktop study are not visible from the study area. The Luisenhoff Cottages are the closest heritage buildings, but these are screened by pine trees and vineyards. Other heritage buildings occur further away and are not visible from the study area. These heritage sites are also screened by vegetation and/or other buildings.

Heritage Western Cape did not request a Visual Impact Assessment.

RESULTS

A HIA was undertaken for the proposed Cloetesdal housing project.. The HIA included a desktop review of previous work undertaken in the general area as well as the location of known heritage sites. The HIA also included an archaeological and palaeontological study.

No archaeological material was observed within the study area. Similarly, the PIA noted that it was highly unlikely that fossiliferous material will be uncovered. In the event that heritage and/or palaeontological material is observed during constructuion, a Chance Find Protocol (Appendix B) must be initiated. Photographs of artefacts can be photographed and sent to a heritage practitioner for fast identification.

No further heritage mitigation is required.

CONCLUSION

A desktop and Phase 1 heritage survey was undertaken for the proposed rezoning of Portion 9 of the Farm Cloetesdal 81 and Remainder of Portion 2 of the Farm Cloetesdal 81. The client wishes to rezone this area for housing and a parking area for cars.

The area has high heritage sensitivity due to its proximity to several heritage buildings. Cloetesdal itself dates to 1692 and is 500m from the development footprint. The footprint was considered sensitive as it was near a stream and had been used as a footpath for most of the 20th century. The proximity of a flat area near a running stream also made the area potentially sensitive. The field survey did not locate any middens or isolated historical artefacts.

The PIA desktop noted the project area has Quaternary aged soils and alluvium with a moderate sensitivity for palaeontological heritage. However, it is unlikely that significant fossil would be found.

A Chance Find Protocol will be initiated for the construction phase.

REFERENCES

https://www.stellenboschheritage.co.za/smhs/map/#14/-33.9103/18.8532

https://stellenboschheritage.co.za/smhs/map/site-pdfs/382.pdf

https://www.stellenboschheritage.co.za/stellenbosch-resources/stellenbosch-heritage/stellenbosch

https://en.wikipedia.org/wiki/Kayamandi

MAPS

3318DD Stellenbosch 1935, 2000

61_018_00947

454_018_07613

EXPERIENCE OF THE HERITAGE CONSULTANT

Gavin Anderson has a M. Phil (in archaeology and social psychology) degree from the University of Cape Town. Gavin has been working as a professional archaeologist and heritage impact assessor since 1995. He joined the South African Archaeology Association – CRM Section in 1998 that then became the Association of Southern African Professional Archaeologists. Gavin is rated as a Principle Investigator with expertise status in Rock Art, Stone Age and Iron Age studies. In addition to this, he was worked on both West and East Coast shell middens, Anglo-Boer War sites, and Historical Period sites.

DECLARATION OF INDEPENDENCE

I, Gavin Anderson, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.



Gavin Anderson
Archaeologist/Heritage Impact Assessor

APPENDIX A

PIA DESKTOP

DESKTOP PALAEONTOLOGICAL ASSESSMENT

PALAEONTOLOGICAL IMPACT ASSESSMENT (PIA).

PERTAINING TO THE PROJECT OF REZONING OF THE REMAINDER OF PORTION 2 AND PORTION 9 OF THE FARM CLOETESDAL 81, STELLENBOSCH RD IN THE STELLENBOSCH LOCAL MUNICIPALITY, CAPE WINELANDS DISTRICT MUNICIPALITY, WESTERN CAPE PROVINCE

FOR

Nkanivo Development Consultants



DATE: 20 September 2024

Scientific Specialist
Dr Gideon Groenewald, Hon Research Fellow ESI Wits University
Cell: 078 713 6377

EXECUTIVE SUMMARY

Dr Gideon Groenewald has been appointed by Nkanivo Development Consultants to do a Palaeontological Impact Assessment in compliance with the requirement of a Basic Assessment (BA) process pertaining to the project of rezoning of the remainder of Portion 2 and Portion 9 of the farm Cloetesdal 81, Stellenbosch RD in the Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province.

The geology underlying the development area for the proposed rezoning of the remainder of Portion 2 and Portion 9 of the farm Cloetesdal 81, Stellenbosch RD in the Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province, is limited to Quaternary aged soils and alluvium with a moderate sensitivity for palaeontological heritage.

Although it is imperative to indicate the moderate sensitivity on the initial maps, the *modus operandi* of the project palaeontologist, when appointed, must be to train the ECO and team members to adhere to the "Chance Find Protocol" recommendation. Fossils recorded during all prospecting activities must be curated and moved to the institute indicated by Heritage Western Cape (HWC) and SAHRA.

Recommendations

- The EAP and developer must be informed that the development site is underlain by rocks with a moderate sensitivity for palaeontological heritage.
- The project will require a formal "Chance Find Protocol" (attached to this report).
- It is the professional opinion of Dr Gideon Groenewald, accredited palaeontologist, that **NO FURTHER MITIGATION IS NEEDED** for Palaeontological Heritage at this site. It is recommended that, should any fossils be recorded "by chance" during construction, a Phase 1 site inspection and report will be a minimum requirement for further excavation on this site. Compliance with the Chance Find Protocol (attached) must be adhered to.
- Recommendations for palaeontological monitoring and mitigation will have to be incorporated into the EMPr for approval by HWC and SAHRA.

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INTRODUCTION

Dr Gideon Groenewald has been appointed by Nkanivo Development Consultants to do a Palaeontological Impact Assessment in compliance with the requirement of a Basic Assessment (BA) process pertaining to the project of rezoning of the remainder of Portion 2 and Portion 9 of the farm Cloetesdal 81, Stellenbosch RD in the Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province (Figure 1).

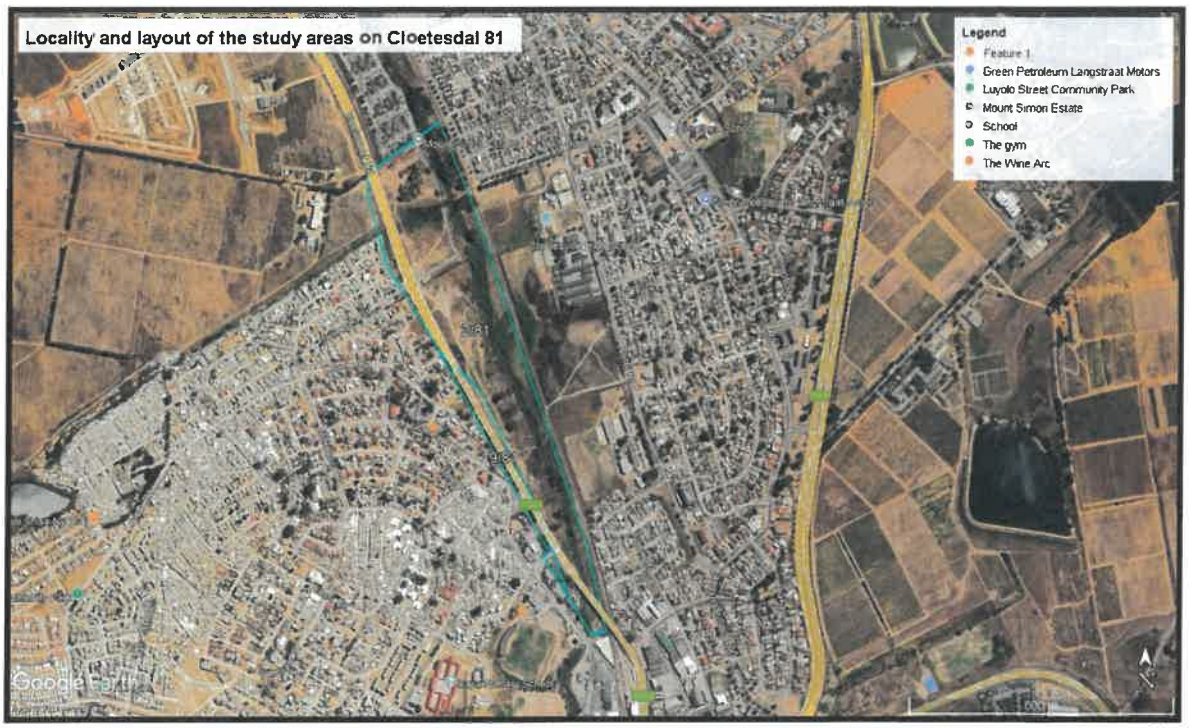


Figure 1 Locality and layout of the proposed study area on Cloetesdal 81, at Stellenbosch in Western Cape Province (Light Blue Polygons)

The aims of this independent assessment of the Palaeontological Heritage is to:

a. *Review of findings and impact assessment of previous Paleontological Assessments in the same area*
b. *Determine and assess the possible impacts of significance (if any), specifically in relation to the various amendments to be applied for (particularly to the localities of specific infrastructures, property boundary etc.; and*

c. *Review and comment on mitigation and management measures (if any) for inclusion into the Basic Environmental Assessment and Environmental Management Programme (EMPr).*

Modus operandi

- *Review documentation of existing PIA studies of the area*
- *Review reality of the palaeontology of the site to determine reasoning for previous recommendations*
- *Desktop PIA Report with recommendations and indication of any significant changes in the impact assessment as reported – GIS mapping of palaeontological sensitivity -* ***first deliverable***
- *Inclusion of a "Chance Find Protocol" (CFP) document to assist the EAP and the ECO with operational management issues regarding possible impact on palaeontological heritage –* ***secondary deliverable***

Summary of Project Parameters as per ToR's

Client name: **Nkanivo Development Consultants.**
Site name: **Portions 2 and 9 of Cloetesdal 81, Stellenbosch Local Municipality**
Property description: **Portions 2 and 9 of farm Cloetesdal 81, Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province**
Project title: **Rezoning of Portions 2 and 9 of Cloetesdal 81, Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province.**

This desktop palaeontological impact assessment is therefore a general assessment of the entire proposed area and, due to the fact that the entire site applicable for review falls within a geological environment with a moderate sensitivity rating for Palaeontological Heritage (Groenewald, 2012; Groenewald et al., 2014); SAHRIS database (2023), the report aims to address the entire development footprint.

From a preliminary assessment and following recommendations on the SAHRIS sensitivity map for Palaeontology, this desktop assessment must be seen as a final assessment for palaeontological heritage and that no further mitigation is recommended.

Legal Requirements

This palaeontological assessment forms part of the Heritage Impact Assessment (HIA) and complies with the requirements of the South African

National Heritage Resource Act No 25 of 1999 (revised 2014). In accordance with Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), a HIA is required to assess any potential impacts to palaeontological heritage within the development footprint.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

geological sites of scientific or cultural importance;
objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; and
objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

Aims and Methodology

A desktop investigation is often the only opportunity to record the fossil heritage within the development footprint. These records are very important to understand the past and form an important part of South Africa's National Estate.

Following the "*SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports*" the aims of the palaeontological impact assessment are:

- to identify exposed and subsurface rock formations that are considered to be palaeontologically significant;
- to assess the level of palaeontological significance of these formations;
- to comment on the impact of the development on these exposed and/or potential fossil resources and
- to make recommendations as to how the developer should conserve or mitigate damage to these resources.

Prior to a field investigation, a preliminary assessment (desktop study) of the topography and geology of the study area is made, using appropriate 1:250 000 scale geological mapping information (3318 Cape Town) in conjunction with Google Earth. Potential fossiliferous rock units (groups, formations etc.) are identified within the study area and the known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region and the author's field experience.

Priority palaeontological areas are identified within the development footprint to focus the field investigator's time and resources. The aim of the desktop survey is to document any exposed fossil material and to assess the

palaeontological potential of the region in terms of the type and extent of rock outcrop in the area.

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the minimal extent of fresh bedrock excavation envisaged. The different sensitivity classes used are explained in Table 1 below.

Table 1 Palaeontological sensitivity analysis outcome classification

PALAEONTOLOGICAL SIGNIFICANCE/VULNERABILITY OF ROCK UNITS	
The following colour scheme is proposed for the indication of palaeontological sensitivity classes. This classification of sensitivity is adapted from that of (Almond et al., 2009; Almond and Pether, 2008; Groenewald, 2012; Groenewald et al., 2014)	
RED	Very High Palaeontological sensitivity/vulnerability. Development will most likely have a very significant impact on the Palaeontological Heritage of the region. Very high possibility that significant fossil assemblages will be present in all outcrops of the unit. Appointment of professional palaeontologist, desktop survey, phase I Palaeontological Impact Assessment (PIA) (field survey and recording of fossils) and phase II PIA (rescue of fossils during construction) as well as application for collection and destruction permit compulsory.
ORANGE	High Palaeontological sensitivity/vulnerability. High possibility that significant fossil assemblages will be present in most of the outcrop areas of the unit. Fossils most likely to occur in associated sediments or underlying units, for example in the areas underlain by Transvaal Supergroup dolomite where Cenozoic cave deposits are likely to occur. Appointment of professional palaeontologist, desktop survey and phase I Palaeontological Impact Assessment (field survey and collection of fossils) compulsory. Early application for collection permit recommended. Highly likely that a Phase II PIA will be applicable during the construction phase of projects.
GREEN	Moderate Palaeontological sensitivity/vulnerability. High possibility that fossils will be present in the outcrop areas of the unit or in associated sediments that underlie the unit. For example, areas underlain by the Gordonia Formation or undifferentiated soils and alluvium. Fossils described in the literature are visible with the naked eye and development can have a significant impact on the Palaeontological Heritage of the area. Recording of fossils will contribute

	significantly to the present knowledge of the development of life in the geological record of the region. Appointment of a professional palaeontologist, desktop survey and phase I PIA (ground proofing of desktop survey) compulsory.
BLUE	Low Palaeontological sensitivity/vulnerability. Low possibility that fossils that are described in the literature will be visible to the naked eye or be recognized as fossils by untrained persons. Fossils of for example small domal Stromatolites as well as micro-bacteria are associated with these rock units. Fossils of micro-bacteria are extremely important for our understanding of the development of Life, but are only visible under large magnification. Recording of the fossils will contribute significantly to the present knowledge and understanding of the development of Life in the region. Where geological units are allocated a blue colour of significance, and the geological unit is surrounded by highly significant geological units (red or orange coloured units), a palaeontologist must be appointed to do a desktop survey and to make professional recommendations on the impact of development on significant palaeontological finds that might occur in the unit that is allocated a blue colour. An example of this scenario will be where the scale of mapping on the 1:250 000 scale maps excludes small outcrops of highly significant sedimentary rock units occurring in dolerite sill outcrops. Collection of a representative sample of potential fossiliferous material recommended. At least a Desktop Survey and "Chance Find Protocol" is compulsory. The Chance Find Protocol must be included in the EMPr for the project.
GREY	Very Low Palaeontological sensitivity/vulnerability. Very low possibility that significant fossils will be present in the bedrock of these geological units. The rock units are associated with intrusive igneous activities and no life would have been possible during implacement of the rocks. It is however essential to note that the geological units mapped out on the geological maps are invariably overlain by Cenozoic aged sediments that might contain significant fossil assemblages and archaeological material. Examples of significant finds occur in areas underlain by granite, just to the west of Hoedspruit in the Limpopo Province, where

	significant assemblages of fossils and clay-pot fragments are associated with large termite mounds. Where geological units are allocated a grey colour of significance, and the geological unit is surrounded by very high and highly significant geological units (red or orange coloured units), a palaeontologist must be appointed to do a desktop survey and to make professional recommendations on the impact of development on significant palaeontological finds that might occur in the unit that is allocated a grey colour. An example of this scenario will be where the scale of mapping on the 1:250 000 scale maps excludes small outcrops of highly significant sedimentary rock units occurring in dolerite sill outcrops. It is important that the report should also refer to archaeological reports and possible descriptions of palaeontological finds in Cenozoic aged surface deposits. At least a Desktop Survey and "Chance Find Protocol" document is compulsory. The Chance Find Protocol must be included in the EMPr of the project.

Rocks with a moderate palaeontological sensitivity are present within the development footprint and palaeontological mitigation measures must be incorporated into the Environmental Management Plan (EMP) for this project. The 1:250 000 scale vector maps obtained from the Council for Geoscience indicates that rocks with very high palaeontological sensitivity are present within the development footprint and palaeontological mitigation measures must be incorporated into the Environmental Management Plan (EMP) for this project. The 1:250 000 scale vector maps obtained from the Council for Geoscience indicates that the formations underlying the area applicable to this report as being deep soils and alluvium.

The study area is characterised by a dominantly urban landscape, characterised by very highly modified Anthropogenic development (town development). Most of the younger geology is associated with Cenozoic aged palaeo-land surfaces and river terraces.

Literature surveys indicate that the rock units that will be exposed most of the time is the potentially un-fossiliferous Quaternary aged soils and alluvium.

Scope and Limitations of the Desktop Study

The study will include: i) an analysis of the area's stratigraphy, age and depositional setting of fossil-bearing units; ii) a review of all relevant

palaeontological and geological literature, including geological maps, and previous palaeontological impact reports; iii) data on the proposed development provided by the developer (e.g. location of footprint, depth and volume of bedrock excavation envisaged) and iv) where feasible, location and examination of any fossil collections from the study area (e.g. museums).

The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologists carrying out fieldwork in RSA and the Kingdom of Lesotho. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by weathering, or are buried beneath a thick mantle of unfossiliferous "drift" (soil, alluvium etc.).

Locality and Proposed Development

The project comprises the proposed Palaeontological Impact Assessment in compliance with the requirement of a Basic Assessment (BA) process pertaining to the project of rezoning of the remainder of Portion 2 and Portion 9 of the farm Cloetesdal 81, Stellenbosch RD in the Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province (Figure 1).

It is important to note that the proposed developments vary from single unit or specific point sites (erven), to linear streets and trenches for the proposed housing development activities. This desktop survey aims to provide the decision making authority with a detailed summary of the geology and palaeontology of the development site.

GEOLOGY

The development site is underlain by very young, Quaternary aged geological units and alluvium (Figure 2).



Figure 2 Geology of the study area. The larger part of the study area is underlain by deep soils and alluvium. No fossils are known from these younger cover materials in the study area

Soil and Alluvium

The study area is underlain by deep soils that results from the weathering of Precambrian aged rocks and deep alluvium deposits in the wide valley-floor deposits of the local streams.

PALAEONTOLOGY

Recent Alluvium

The entire study area is underlain by deep soils as well as recent alluvium of the local streams. These deposits are allocated a moderate sensitivity for Palaeontological heritage.

PALAEONTOLOGICAL IMPACT ASSESSMENT

The impact rating for Palaeontological Heritage is therefore predicted and mapped according to the underlying geology for the entire study area provided by the client (Figure 3).

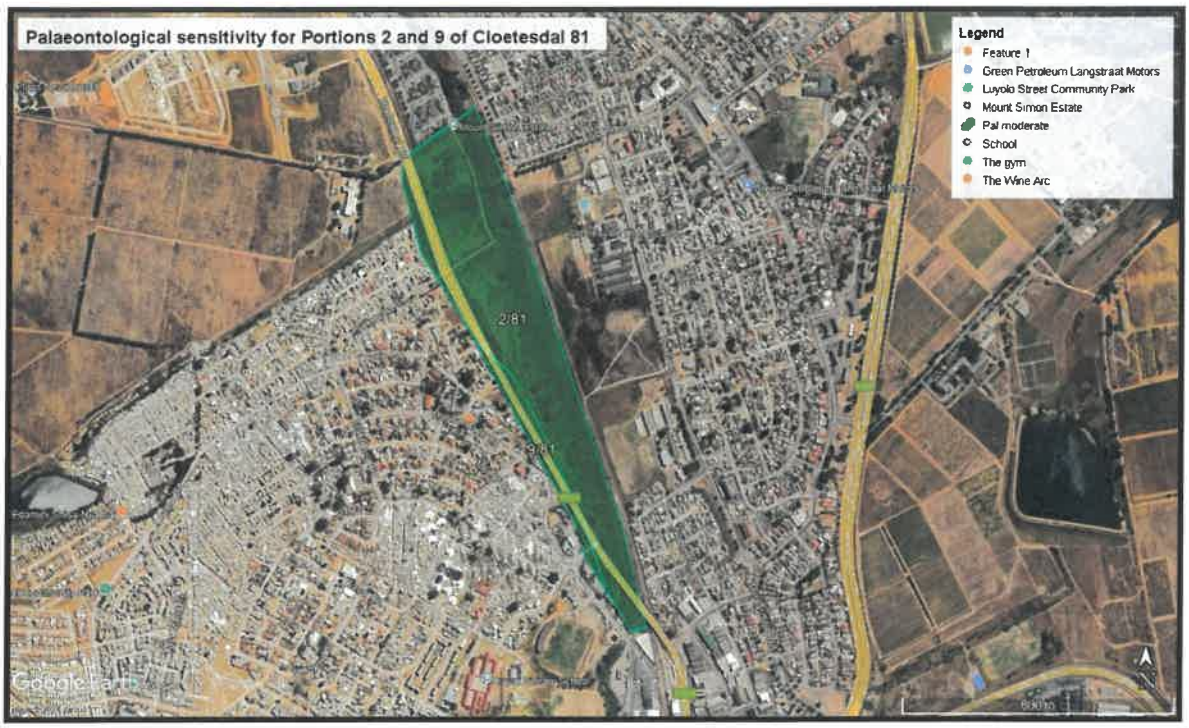


Figure 3 Palaeontological sensitivity is mapped as moderate for the entire study area. (For colour coding see Table 1)

Following a detailed desktop survey of existing data, the palaeontological sensitivity of the study area is based on the sensitivity of the underlying geological formations (Table 2).

Table 2 Summary of Palaeontological Sensitivity sections for areas on farm Cloetesdal 81

Item	Geology and Palaeontology	Dominant area	Colour code
2	Soil and Alluvium – moderate sensitivity	Entire study area	

It is however very important to note that, although a moderate sensitivity rating is allocated to areas underlain by recent geology, the actual impact per site

of excavation might be limited. Although it is imperative to indicate the moderate sensitivity on the initial maps, the *modus operandi* of the project palaeontologist, when appointed, must be to train the ECO and team members to implement the "Chance Find Protocol" (attached to this report) so that they know what to look for during excavation and are able to inform the palaeontologist of a significant find immediately. Fossils recorded during construction must be curated and moved to the institute indicated by SAHRA.

In all sections of the prospecting activity with a very high to moderate sensitivity rating, the impact rating for Palaeontological Heritage will be **highly negative** if no mitigation is implemented, whereas mitigation (collecting and recording of significant fossils) will contribute significantly towards our understanding of the Permian age eco-systems, resulting a **very highly positive impact** of high significance.

Following this desktop survey, it is recommended that no further mitigation for Palaeontological Heritage is required and that this Desktop Survey and Chance Find Protocol will only have to be supplemented with a Phase 1 site visit and Phase 1 PIA report if, by chance, significant fossils are recorded during construction.

CONCLUSIONS

The geology underlying the development area for the proposed rezoning of the remainder of Portion 2 and Portion 9 of the farm Cloetesdal 81, Stellenbosch RD in the Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province, is limited to Quaternary aged soils and alluvium with a moderate sensitivity for palaeontological heritage.

Although it is imperative to indicate the moderate sensitivity on the initial maps, the *modus operandi* of the project palaeontologist, when appointed, must be to train the ECO and team members to adhere to the "Chance Find Protocol" recommendation. Fossils recorded during all prospecting activities must be curated and moved to the institute indicated by Heritage Western Cape (HWC) and SAHRA.

Recommendations

- The EAP and developer must be informed that the development site is underlain by rocks with a moderate sensitivity for palaeontological heritage.
- The project will require a formal "Chance Find Protocol" (attached to this report).

- It is the professional opinion of Dr Gideon Groenewald, accredited palaeontologist, that **NO FURTHER MITIGATION IS NEEDED** for Palaeontological Heritage at this site. It is recommended that, should any fossils be recorded "by chance" during construction, a Phase 1 site inspection and report will be a minimum requirement for further excavation on this site. Compliance with the Chance Find Protocol (attached) must be adhered to.
- Recommendations for palaeontological monitoring and mitigation will have to be incorporated into the EMPr for approval by HWC and SAHRA.

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QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr Gideon Groenewald has a PhD in Geology from the University of Port Elizabeth (Nelson Mandela Metropolitan University) (1996) and the National Diploma in Nature Conservation from Technicon RSA (the University of South Africa) (1989). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeo-ecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

DECLARATION OF INDEPENDENCE

I, Gideon Groenewald, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of palaeontological heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.



Dr Gideon Groenewald
Geologist

CHANCE FIND PROTOCOL FOR PALAEONTOLOGICAL HERITAGE

PALAEONTOLOGICAL IMPACT ASSESSMENT (PIA) pertaining to the project of rezoning of the remainder of Portion 2 and Portion 9 of the farm Cloetesdal 81, Stellenbosch RD in the Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province

Mitigation for excavation Impact on Palaeontological Heritage Resources

It is essential that the appointed palaeontologist, in consultation with the Project Environmental Manager and the contractors and ECO's of further excavation works during the implementation phase of the project, develop a short-term strategy for the recovery of significant fossils during the excavation operation. As part of such a strategy, the discussions with the palaeontologist must include:

- Initially, and at least for the *duration of excavations*, visit the site on request of the ECO of the specific construction site, to ensure recording of all potentially significant fossil strata. Due to the longevity of this contractual involvement it is not possible to have pre-determined timing on long term visits and it is a conclusion from present information, that frequent visits by the Palaeontologist during excavations into the Quaternary aged material **will not be required** at this stage.
- Determine a short-term strategy and budget for the recording of significant fossils. This Strategy is simply an oral agreement on when the site is to be inspected and what the finds are that might be recorded. The site visit must include an introduction session with all the managers of the Project Team, including training of the ECO and site managers by the appointed palaeontologist, to basically train people to know what to look out for in terms of fossil heritage on site. This action will be required at the start of each individual construction activity for the duration of prospecting in the "greenfield sections" of the site.
- **Following the Desktop Survey, follow-up site visits (Phase 1 PIA) are NOT REQUIRED.**
- In the unlikely case of reporting of any unusual sedimentary structures, the Palaeontologist must be notified, and a site visit must be arranged at the earliest possible time with the Palaeontologist. In the case of the site ECO or the Site Manager becoming aware of suspicious looking material that might be a "Significant Find", the construction must be halted in that

specific area and the Project Environmental Manager (PEM) must be informed who will inform the Project Engineer. The Palaeontologist must be given enough time to reach the site and the PEM will request a Site Instruction from the Engineer to allow for removal the material before excavation continues.

Mitigation Measures Normally Encountered

1. Mitigation of palaeontological material must begin as soon as possible and preferably when "trial excavation" takes place. The appointed specialists must acquaint themselves with the operation and determine feasible mitigation strategies.
2. A plan for systematic sampling, recording, preliminary sorting and storage of palaeontological and sedimentological samples will be developed during the early stages of the project, in collaboration with the Evolutionary Studies Institute (ESI) at WITS University.
3. Mitigation will involve an attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labelled, boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. Ensuring, at their cost, that a representative archive of palaeontological samples and other records is assembled to characterise the palaeontological occurrences affected by the excavation operations.
2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas. In the case of this project it is foreseen that invertebrate, plant and trace fossils will be present. (*If fossils of Quaternary age are exposed, it will be Very Highly significant and the Palaeontologist will obviously be in close communication with the site ECO and the PEM to act as required by HWC/SAHRA without causing undue standing time for the contractors).*

3. "Facilitate" systematic recording of the stratigraphic and palaeo-environmental features of exposures in the fossil-bearing excavations, by allowing time to describe and measure geological sections, and by providing aid in the surveying of positions where significant fossils are found. *(In the case of this specific development, the likelihood of such finds is* ***moderate****).*
4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as "normal" fossil finds.
5. Provide covered, dry storage for samples and facilities that is defined as a work area for sorting, labelling and boxing/bagging of samples.
6. Costs of basic curation and storage in the sample archive at the ESI, WITS University (labels, boxes, shelving and, if necessary, specifically-tasked temporary employees).

Documentary record of palaeontological occurrences

1. The contractors will, after consultation with the PEM and in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which the following information are indicated on the plan in the site office at the excavation site. This must be done in conjunction with the appointed specialist and form part of the on-going revision of this "Chance Find Protocol" (CFP), during the excavation stage of the project:
1.1. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period.
1.2 Locations of samples and measured sections are to be pegged, and routinely accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any significant fossils are recorded during the time of excavation. This information must be recorded during the first site visit and a clearance from the Palaeontologist (e-mail message will suffice) must be followed up with subsequent e-mail communications with the Site Specific ECO, Site Manager and the PEM.

Functional responsibilities of the appointed Palaeontologist

1. If applicable after completion of the Phase 1 site visit, apply for a permit to collect fossils during the lifetime of the Project and establishment of a representative collection of fossils and a contextual archive of appropriately documented and sampled palaeoenvironmental and sedimentological geodata in collaboration with the ESI at WITS University, depending on the expertise available at the Institute.

2. Undertake an initial evaluation of potentially affected areas and of available exposures in excavations. A short training session, inclusive of the PEM, Project Managers and the ECO's or their representatives, can be presented during the second site visit of the appointed palaeontologist to this project.
3. On the basis of the above, and evaluation during the early stages of excavation development, in collaboration with the PEM and the contractor management team, more detailed practical strategies to deal with the fossils encountered routinely during excavation, as well as the strategies for major finds must briefly be agreed on.
4. Informal on-site training in responses applicable to "normal" fossil finds must be provided for the PEM, ECO and environmental staff by the appointed specialist. This step is will only be arranged following the discovery of significant fossils at the time of the Phase 2 site visits.
5. Respond to significant finds and undertake appropriate mitigation.
6. Initially, for the first year of operation, and if the PEM or the appropriate ECO indicates significant "strange looking rocks" that might be similar to the fossils indicated to the staff during the information sessions, visit at least once in twelve weeks to "touch base" with the monitoring progress. Document interim "normal" finds and undertake an inspection and documentation of new excavation faces. A strategy for further visits during the life of the prospecting period must be discussed.
7. Transport of material from the site to the ESI, WITS University or the allocated Institute where an expert on the specific fossils discovered, is presently employed.
8. Reporting on the significance of discoveries, as far as can be preliminarily ascertained. This report is in the public domain and copies of the report must be deposited at ESI, AMAFA and the South African Heritage Resources Authority (SAHRA). It must fulfil the reporting standards and data requirements of these bodies.
9. Reasonable participation in publicity and public involvement associated with palaeontological discoveries.

Exposure of palaeontological material

1. In the event of construction exposing new palaeontological material, not regarded as normative/routine as outlined in the initial investigation, such as a major fossil find, the following procedure must be adhered to:
1.1 The appointed specialist or alternates (ESI WITS University) must be notified by the responsible officer (e.g. the PEM, Chief Engineer, ECO or Contractor

Manager), of major or unusual discoveries during excavation, found by the Contractor Staff.

1.2 Should a major *in situ* occurrence be exposed, excavation will immediately cease in that area so that the discovery is not disturbed or altered in any way until the appointed specialist or scientists from the ESI at WITS University, or its designated representatives, have had reasonable opportunity to investigate the find. Such work will be at the expense of the Developer.

1.3 Significant fossil finds are known from this area and the appointed palaeontologist must clear continued excavation on the proviso that any suspicious material will be indicated by the ECO to the Palaeontologist via emailed photographic information.

CONCLUSION

The development site for the proposed application pertaining to the project of rezoning of the remainder of Portion 2 and Portion 9 of the farm Cloetesdal 81, Stellenbosch RD in the Stellenbosch Local Municipality, Cape Winelands District Municipality, Western Cape Province, falls in an area with a moderate sensitivity for palaeontological heritage.

It is recommended that:

- The PEM and ECO's must be informed of the fact that a moderate Palaeontological Sensitivity was allocated to the larger part of the study area.
- This "Chance Find Protocol" must be included in the EMPr of the Project and a reasonable budget must be allocated to ensure compliance with the legal responsibility of the developer in terms of the proper conservation of and storage of Palaeontological Heritage.
- HWC/SAHRA must be informed of the content of this "Chance Find Protocol" and EMPr arrangements by the PEM and the Developer, for inclusion in the ROD for the Project.
    - **Following the desktop survey, it is the professional opinion of Dr Gideon Groenewald, accredited palaeontologist, that NO FURTHER MITIGATION for Palaeontological Heritage is required before the start of excavations.**

APPENDIX B

CHANCE FIND PROTOCOL

CHANCE FIND PROTOCOL – HERITAGE RESOURCES

PURPOSE

Potential impacts on heritage resources can occur during construction as a result of unearthing during construction. This protocol outlines the procedures to be followed in the event that a heritage resource is uncovered.

Palaeontological finds

Monitoring Programme for Palaeontology is to commence once the excavations for all structures and infrastructure begin. The following procedure is only required if fossils are seen on the surface and when excavations commence.

1. When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (silicified wood, plants, insects, bone, shells) should be put aside in a suitably protected place. This way the construction activities will not be interrupted.
2. Where possible, photographs of similar fossils must be provided to the contractor to assist in recognizing the fossil plants and bones that might be encountered on site. This information must be built into the EMPr's training and awareness plan and procedures.
3. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
4. If there is any possible fossil material found by the Contractor/environmental officer then a qualified palaeontologist should visit the site to inspect the selected material and check the excavations where feasible.
5. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed,

catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site, a South African Heritage Resources Agency (SAHRA) permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.

6. If no good fossil material is recovered, then any site inspections by the palaeontologist will not be necessary.

7. If no fossils are found and the excavations have finished, then no further monitoring is required.

Archaeological finds

If you believe that you may have encountered any archaeological materials, stop work in the area and follow the procedure below:

1. The heritage resource must be avoided and all activities in the immediate vicinity temporarily ceased.

2. A suitably qualified specialist must be informed and commissioned to consider the heritage resource, either via communicating with the Environmental Officer via telephone or email, or based on a site visit.

3. Appropriate measures are to be provided by a qualified specialist towards immediate management of the heritage resource.

Should the specialist conclude that the find is a heritage resource protected in terms of the NRHA (1999) Sections 34, 36, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), the specialist must notify SAHRA on behalf of the Developer.

If required by SAHRA, the specialist must conduct a HIA in terms of NHRA Section 38 that must include rescue actions/excavations.

Graves

Should any unmarked human burials/remains be found during the course of construction:

1. Work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA).
2. Where human remains are part of a burial they would need to be exhumed under a permit from SAHRA (for pre-colonial burials as well as burials later than about AD 1500).
3. For newer graves, should the specialist conclude that the find is a heritage resource protected in terms of the NHRA (1999) Section 35 and NHRA (1999) Regulations (Regulation 38, 39, 40) SAHRA may require that an identification of interested parties, consultation and /or grave relocation take place;
4. Consultation must take place in terms of NHRA (1999) Regulations 39, 40, 42;
5. Grave relocation must take place in terms of NHRA (1999) Regulations 34.
6. These measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions, laws and by-laws pertaining to human remains.

If required by current, relevant legislation, a full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.
Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.

ANNEXURE M

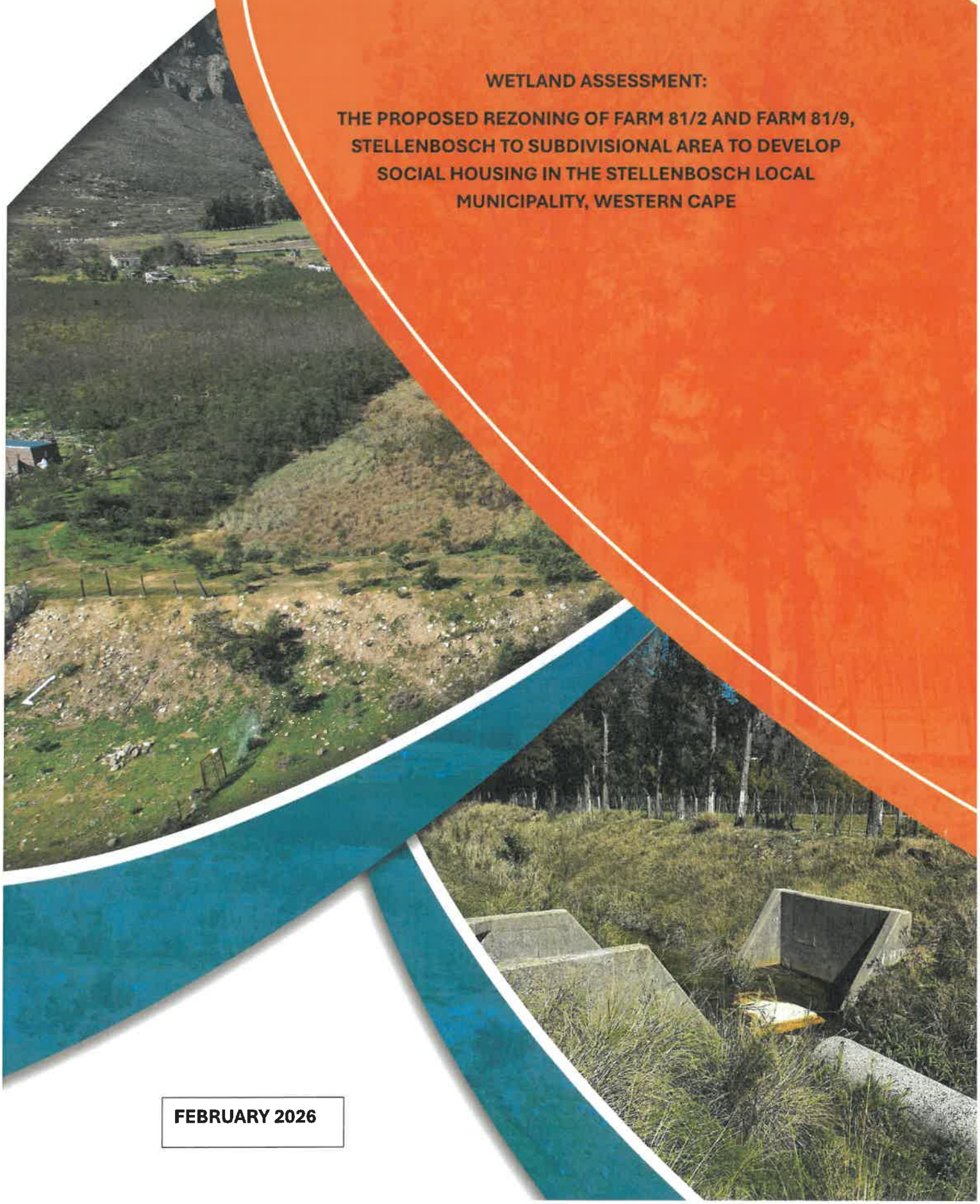
APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

WETLAND ASSESSMENT

WETLAND ASSESSMENT:

THE PROPOSED REZONING OF FARM 81/2 AND FARM 81/9, STELLENBOSCH TO SUBDIVISIONAL AREA TO DEVELOP SOCIAL HOUSING IN THE STELLENBOSCH LOCAL MUNICIPALITY, WESTERN CAPE



FEBRUARY 2026

DOCUMENT CONTROL SHEET

Report Details

Project Title	**WETLAND ASSESSMENT: THE PROPOSED REZONING OF FARM 81/2 AND FARM 81/9, STELLENBOSCH TO SUBDIVISIONAL AREA TO DEVELOP SOCIAL HOUSING IN THE STELLENBOSCH LOCAL MUNICIPALITY, WESTERN CAPE**

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Report Revision Record

Revision	Date	Description
01	03/02/2026	

This report has been prepared by MORA Ecological Services (Pty) Ltd with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client. This report is confidential to the client, and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

For and on behalf of		
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Signature:		
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EXECUTIVE SUMMARY

MORA Ecological Services (Pty) Ltd was appointed by Nkanivo Development Consultants (Pty) Ltd to undertake a wetland impact assessment as part of the proposed the rezoning of Farm 81/2 and Farm 81/9, Stellenbosch to a subdivisional area to develop social housing Stellenbosch Municipality, of the Western Cape Province, South Africa. The project area is situated on Remainder of Portion 2 Farm Cloetesdal 81 Stellenbosch RD (i.e. Farm 81/2) and Portion 9 of the Farm Cloetesdal 81 Stellenbosch RD (i.e. Farm 81/9) in Stellenbosch, Western Cape Province. The property, approximately 19,27 hectares in size, lies between the Khayamandi and Cloetesville settlements (Figure 1). .

The wetland impact assessment forms part of the Environmental Authorisation in compliance with the National Environmental Management Act (Act 107 of 1998), the Environmental Impact Assessment (EIA) Regulations, 2014, GN R. 983, R. 984 and R.985

The terms of reference for the current study were as follows:

- Identify and delineate any wetland areas and/or watercourses on and within the proposed project site, according to the Department of Water and Sanitation "Practical field procedure for the identification and delineation of wetlands and riparian areas";
- Determine the Present Ecological Status (PES) and Functional Integrity of identified wetlands using the WET-Health and Wet-EcoServices approach;
- Determine the Ecological Importance and Sensitivity (EIS) of identified wetlands using the latest applicable approach as supported by the DWS;

The wetland assessment initially involved desktop investigations for the presence of wetland and watercourse systems within a 500m buffer around the proposed site. A subsequent field investigation identified the presence of a river traversing the site from south to north west and also an artificial wetland. The wetland systems were classified as a Channelled valley-bottom and an artificial hillslope.

The current status of the wetland system was assessed using the wetland health methodology and was categorised as largely modified (PES Category D). There have been some modifications to the system as a result of alien invasion, solid waste dumping and stormwater discharge within this system. These anthropogenic activities have resulted in the alteration of the hydrological flow through the wetland systems, therefore having an effect on the geomorphological processes which govern the wetland system.

These modifications to the wetland system have further impacted the system's ability to provide ecological goods and services with scores for this assessment ranging from moderate to low. Functions relating to flood attenuation as well as the filtration of nutrients and toxicants received moderate scores.

An Ecological Importance and Sensitivity (EIS) assessment was undertaken to rank water resources in terms of provision of goods and service or valuable ecosystem functions which benefit people; biodiversity support and ecological value; and reliance of subsistence users (especially basic human needs uses). The system was observed to be providing minimal ecosystem services.

The impact assessment identified the following negative impacts associated with the proposed development on the wetland and watercourse; (i) soil erosion and sedimentation of the wetland and watercourses, and (ii) pollution of the wetland, watercourses and soil as a result of construction and the degradation of these wetland during operational activities. When assessing the current land use and its impact on the aquatic systems within the parameters of the study it was demonstrated that current land management practises place a large burden on the aquatic systems. In comparison the construction and operational activities are unlikely to unduly impact on the aquatic ecology of the area. During both the construction and operational phases the impacts were assessed to be of a moderate environmental significance. Mitigation measures were proposed and focus on trapping sediment when the site is cleared and slowing runoff rates when surfaces are hardened.

Based on the information collected through the desktop and groundtruthing, it is the opinion of the specialist that this application is considered, provided that all recommendations in this report are strictly followed.

1. INTRODUCTION

1.1 Background

It is widely recognised that it is of the utmost importance to conserve natural resources in order to maintain ecological processes and life support systems for plants, animals and humans. To ensure that sustainable development takes place, it is therefore important that the environment is considered before relevant authorities approve any development. This led to legislation protecting the natural environment. The Environmental Conservation Act (Act 73 of 1989), the National Environmental Management Act, 1998 (NEMA) (Act 107 of 1998) and the National Environmental Management Biodiversity Act, 2004. (Act 10 0f 2004) ensure the protection of ecological processes, natural systems and natural beauty as well as the preservation of biotic diversity in the natural environment. They also ensure the protection of the environment against disturbance, deterioration, defacement or destruction as a result of man-made structures, installations, processes or products or human activities.

The "applicant" is proposing to undertake the rezoning of Farm 81/2 and Farm 81/9, Stellenbosch to a subdivisional area to develop social housing Stellenbosch Municipality, of the Western Cape Province, South Africa. The project area is situated on Remainder of Portion 2 Farm Cloetesdal 81 Stellenbosch RD (i.e. Farm 81/2) and Portion 9 of the Farm Cloetesdal 81 Stellenbosch RD (i.e. Farm 81/9) in Stellenbosch, Western Cape Province. The property, approximately 19,27 hectares in size, lies between the Khayamandi and Cloetesville settlements (Figure 1).

MORA Ecological Services (Pty) Ltd was requested by the appointed to conduct a wetland study towards their pursuit of obtaining a decision from the Competent Authority for the proposed project.

1.2 Scope of Assessment

MORA Ecological Services (Pty) Ltd was appointed by Nkanivo Development Consultants (Pty) Ltd to undertake a wetland impact study in Cloetesdal (Figure 1).

The wetland impact assessment forms part of the Environmental Impact Assessment and Water Use Licence Application in compliance with the National Environmental Management Act (Act 107 of 1998), the Environmental Impact Assessment (EIA) Regulations, 2014, GN R. 983, R. 984 and R.985 and the National Water Act (Act 36 of 1998).

Wetland Assessment

The terms of reference for the current study were as follows:

- Identify and delineate any wetland areas and/or watercourses on and within the proposed project site, according to the Department of Water Affairs "Practical field procedure for the identification and delineation of wetlands and riparian areas";
- Determine the Present Ecological Status (PES) and Functional Integrity of identified wetlands using the WET-Health and Wet-EcoServices approach;
- Determine the Ecological Importance and Sensitivity (EIS) of identified wetlands using the

latest applicable approach as supported by the DWS;

- Identify possible impacts and recommend mitigation measures of the proposed project on the wetland and watercourses within the study site.

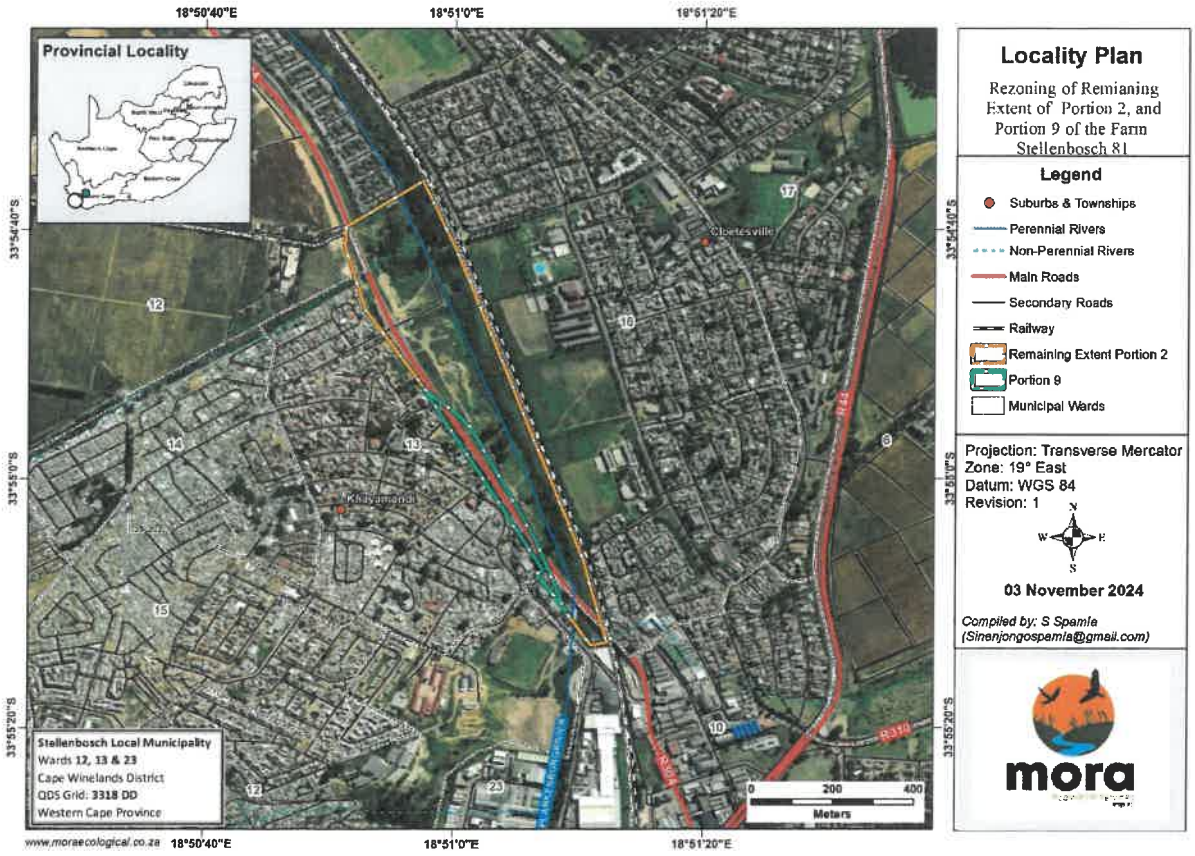


Figure 1: Locality map of the project site.

1.3 Assumptions and Limitations

It is difficult to apply pure scientific methods within a natural environment without limitations or assumptions. The following apply to this study:

i. The findings, results, observations, conclusions and recommendations provided in this report are based on the authors' best scientific and professional knowledge as well as available information regarding the perceived impacts on the water resources;
ii. The wetland assessment is confined to a 50m buffer of the project boundary;
iii. A hand held Garmin eTrex 30x used to delineate wetland, watercourse and riparian boundaries has an accuracy of 3-6m; and
iv. The assessments of the identified wetland and watercourse systems were based on a one-day field investigation. Site visits should ideally be conducted over differing seasons in order to better understand the hydrological and geomorphologic processes driving the characteristics of the watercourses and the functional integrity of the wetland and watercourse systems.

2. METHODOLOGY

2.1. Assessment techniques and tools

The following techniques and tools were used in the assessment:

2.1.1. Baseline data

The desktop study conducted for the proposed project involved the examination of aerial photography, GIS databases including the NFEPA and South African National Wetland maps as well as literature reviews of the study site, in order to determine the likelihood of wetland and watercourse systems within the area.

The study made use of the following data sources:

- Google Earth ™ satellite imagery was used at the desktop level;
- Relief dataset from the Surveyor General was used to calculate slope and in the desktop mapping of watercourses;
- The NFEPA dataset from (Driver, et al., 2011) was used in determining any priority wetlands and rivers;
- Geology dataset was obtained from AGIS3 ,
- Vegetation type dataset from (Mucina & Rutherford, 2006) and SANBI 2012 vegetation map was used in determining the vegetation type of the study area; and
- In field data collection was taken on the 22nd of January 2025.

2.1.2. Wetland Definition & Delineation Technique

For the purpose of this assessment, wetlands are considered as those ecosystems defined by the National Water Act as:

"land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."

The study site was assessed with regards to the determination of the presence of wetland areas according to the procedure described in 'A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas –Edition 1' (DWAF, 2005).

2.1.3. Wetland Health and Functional Integrity Assessment Techniques

A Level 2 Wet-Health Assessment to determine the Present Ecological State (PES) as well as a Level 2 Wet-EcoServices Assessment to determine the Functional Integrity of each wetland unit was assessed. Further to this the Ecological Importance and Sensitivity (EIS) of each delineated wetland unit was determined.

2.1.6. Assessment of Impact Significance

Significance scoring assesses and predicts the significance of environmental impacts through evaluation of the following factors; probability of the impact; duration of the impact; extent of the impact; and magnitude of the impact.

The significance of environmental impacts is then assessed taking into account any proposed mitigations. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required. Each of the above impact factors have been used to assess each potential impact using ranking scales.

Unknown parameters are given the highest score (5) as significance scoring follows the Precautionary Principle. The Precautionary Principle is based on the following statement:

'When the information available to an evaluator is uncertain as to whether or not the impact of a proposed development on the environment will be adverse, the evaluator must accept as a matter of precaution, that the impact will be detrimental. It is a test to determine the acceptability of a proposed development. It enables the evaluator to determine whether enough information is available to ensure that a reliable decision can be made.'

Table 1: Significance scoring used for each potential impact.

PROBABILITY	*DURATION*
1-very improbable	*1- very short duration (0-1years)*
2-improbable	*2- short duration (2-5 years)*
3-probable	*3- medium term (5-15 years)*
4-high probable	*4- long term (>15 years)*
5-definite	*5- permanent/unknown*
EXTENT	*MAGNITUDE*
1- Limited to the site	*2- minor*
2- Limited to the local area	*4- low*
3-Limited to the region	*6-moderate*
4-National	*8-high*
5-International	*10-very high*

The following formula was used to calculate impact significance:

Impact Significance: (Magnitude + Duration + Extent) x Probability)

The formula gives a maximum value of 100 points which are translated into 1 of 3 impact significance categories; Low, Moderate, and High as per Table 2 below.

Table 2: Impact significance ratings.

SIGNIFICANCE POINTS	SIGNIFICANCE RATING
0 - 30 points	Low environmental significance
31 - 59 points	Moderate environmental significance
60 -100 points	High environmental significance

3. BASELINE BIOPHYSICAL DESCRIPTION

3.1. Climate

The study area falls with the Winter-rainfall regime, with MAP 270–670 mm (mean: 430 mm), peaking from May to August. Mean daily maximum and minimum temperatures 29.6°C and 6.3°C for February and July, respectively. Frost incidence 3 or 4 days per year. Mists are common in winter.

3.2. Vegetation structure and composition

The proposed development footprint falls on the Fynbos Biome is considered by many to be synonymous with the Cape Floristic Region or Cape Floral Kingdom. The vegetation composition has been compromised due to anthropogenic activities (**Photograph 1**).



Photograph 1: Typical vegetation structure within the study area.

3.3. Geology

The area has Clay soils derived from Malmesbury Group shales (specifically the Porterville Formation in the north and east and the Moorreesburg Formation in the west). The soils contain prismacutanic and pedocutanic diagnostic horizons and Glenrosa and Mispah forms are predominant. Land types mainly Db, Fb and Da.

Catchment characteristics and watercourses

The proposed project falls within the quaternary catchment G22G and is located with Breede-Olifants (previously Berg) Water Management Area of the Greater Cape Town subWMA (Figure 2). The Berg Water Management Area (WMA) is situated in the extreme southwest corner of South Africa and falls entirely within the Western Cape Province. It derives its name from the largest river within its boundaries, namely the Berg River. The WMA borders on the Atlantic Ocean and Indian Oceans to the west and south, respectively. (Ninham Shand. 2004).



Figure 2: A Map of the six newly configured WMA in South Africa (DWS, 2023).

3.4. 2018 National Wetland Map 5 and Confidence Map (NWM5) vs National Freshwater Ecosystem Priority Areas (NFEPA)

The National Wetland Map version 5 (NWM5) shows the distribution of inland wetland ecosystem types across South Africa and includes estuaries and the extent of some rivers.

A confidence map was compiled to identify areas where wetland extent and hydrogeomorphic (HGM) units (which contributed to defining the inland wetland ecosystem types together with the regional setting) attained at a higher level of certainty compared to other areas (Van Deventer, et al., 2019).

The National Freshwater Ecosystem Priority Areas (NFEPA) is a project that was developed to provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or FEPAs (Driver, et al., 2011).

3.5.1. Wetlands

An examination of the NFEPA wetland database revealed two wetlands that are located outside the project area (Figure 3).

3.5.2. Rivers

The Plankeburg River which traverse the site, originates upstream as Kromrivier. These areas are of strategic important for future water management (Nel *et al.*, 2011).



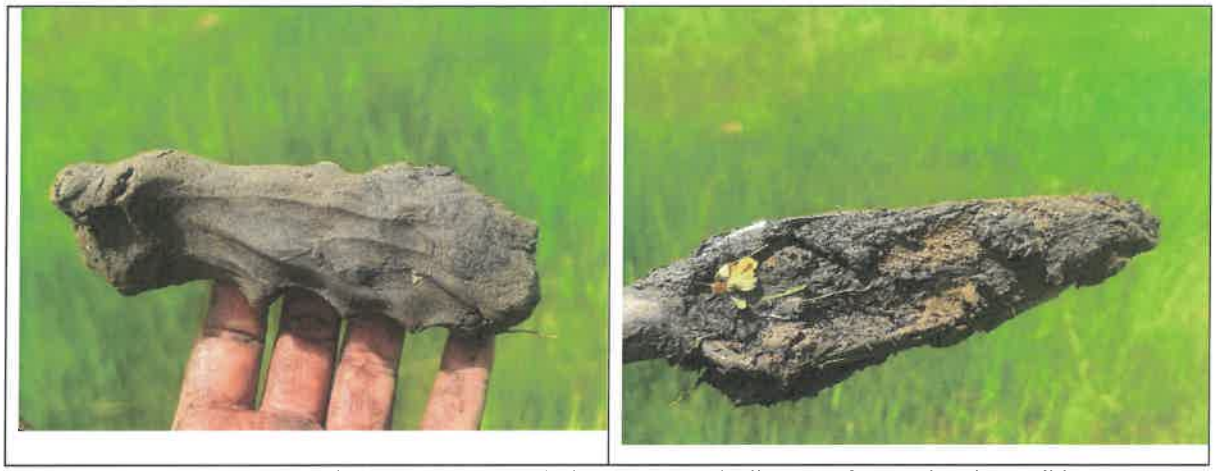
Figure 3: A Map of NFEPA Wetlands.

4. WETLAND ASSESSMENT RESULTS

4.1. Soil Wetness and Soil Form Indicator

Soil samples were collected across the area and examined for hydric characteristics—typical indicators of wetland conditions—such as redoximorphic features. These features, which appear due to prolonged and repeated soil saturation, include mottling (bright insoluble iron compounds), a gleyed matrix, and/or manganese/iron concretions (Photograph 2).

The presence of redoximorphic features is the most important indicator of wetland occurrence, as these soil wetness indicators remain in wetland soils, even if they are degraded or desiccated (DWAF, 2005). It is important to note that the presence or absence of redoximorphic features within the upper 500mm of the soil profile alone is sufficient to identify the soil as being hydric, or non-hydric (Collins, 2005).



Photograph 2: Examples of hydric characteristics used as indicators for wetland conditions

4.2. Vegetation Indicator

DWAF (2005) states that vegetation is an important element in the delineation procedure for wetlands. Vegetation also plays a central role in the wetland definition according to the National Water Act (Act 36 of 1998). However, using vegetation as a primary wetland indicator requires undisturbed conditions (DWAF, 2005); The typical wetland vegetation observed on site was mainly the reeds and bulrush.

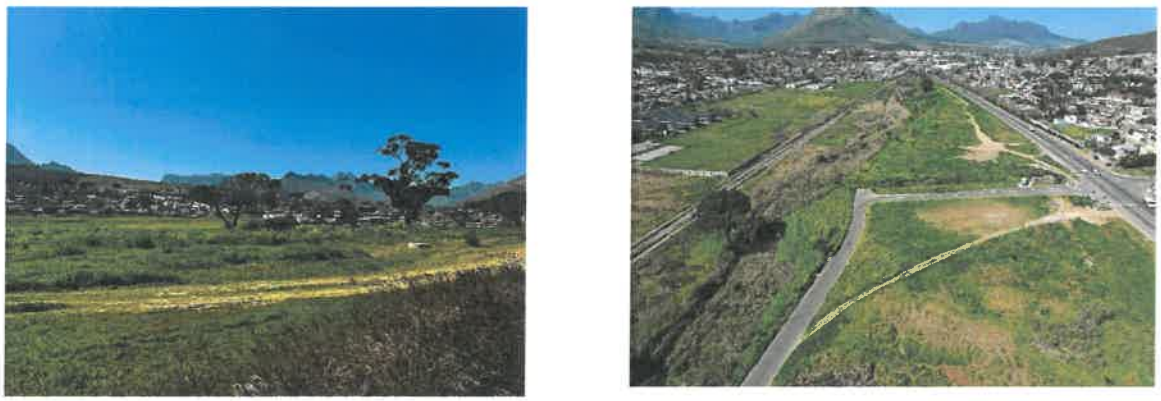


Photograph 3: Examples of wetland vegetation.

4.3. Terrain Indicator

The topography of an area is generally a good practical indicator for identifying those parts in the landscape where wetlands are likely to occur. Generally, wetlands occur as a valley bottom unit however wetlands can also occur on steep to mid slopes where groundwater discharge is taking place through seeps (DWAF, 2005). In order to classify a wetland, the localised landscape setting must be taken into consideration through ground-truthing of the study site after initial desktop investigations (Ollis *et al.*, 2014).

The site is situated on a gentle slope which result in a flow of water into the Plankeburg river. (Photograph 4).



Photograph 4: The landscape setting within the study area.

4.4. Wetland Delineation & Hydrogeomorphic (HGM) Classification

The hydrogeomorphic classification system categorises wetland systems based on their geomorphological and hydromorphological characteristics. There are five recognised wetland systems based on the abovementioned system and are depicted in the diagram below (Figure 4).

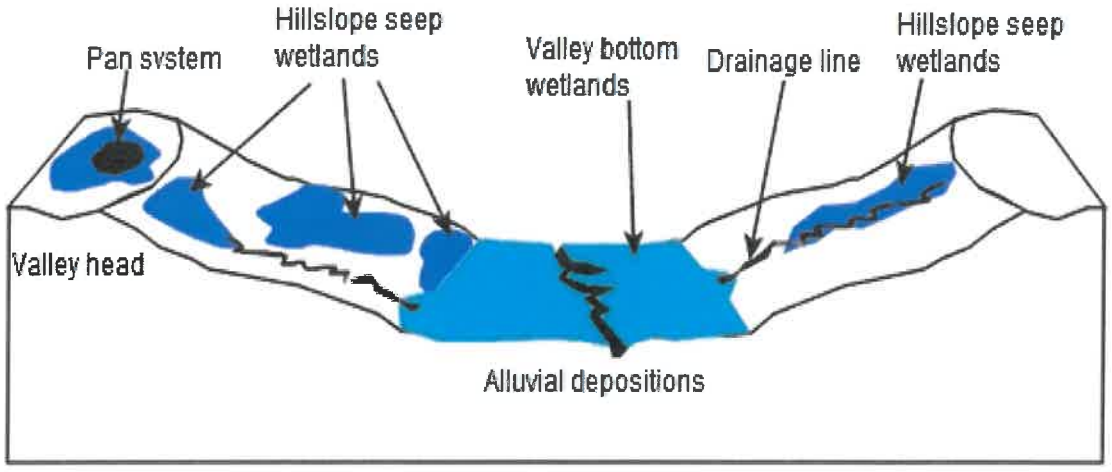


Figure 4: Diagrammatic representation of common wetland systems identified in Southern Africa (based on Kotze et al., 2007).

One natural wetland system was identified on the western section of the site. This wetland was categorised into a single hydrogeomorphic (HGM) unit, namely a Channelled valley-bottom wetland. Additionally, an artificial hillslope wetland was observed near the R304 (Figure 5). An HGM unit is a recognisable physiographic wetland unit based on the geomorphic setting, water source of the wetland and the water flow patterns (Macfarlane *et al.*, 2008).

Valley bottom with a channel	Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterized by the net accumulation of alluvial deposits or may have steeper slopes and be characterized by the net loss of sediment. Water inputs from main channel (when channel banks overspill) and from adjacent slopes.	***	*/***

[1] Precipitation is an important water source and evapotranspiration an important output

Water source: * Contribution usually small

** Contribution usually large

*** Contribution may be small or important depending on local circumstances

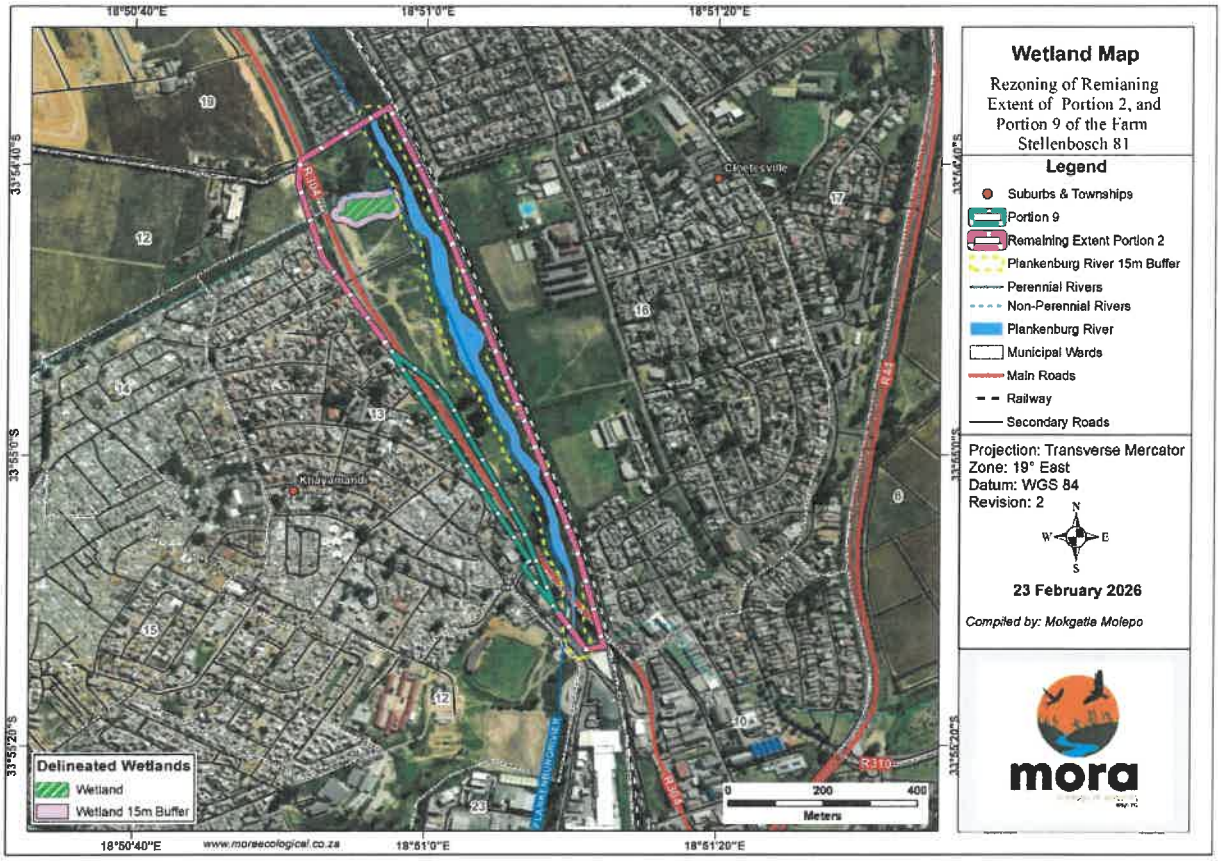


Figure 5: A Map of delineated wetland at the project site.

4.5. Present Ecological State (PES)

The wetland was assessed in terms of its health and was categorised as largely modified (PES Category D; Table 3)

There have been some modifications to the vegetation community and soil profile associated with this wetland as a result of stormwater input from the residential areas and alien invasion. This has affected the hydrological flow both into and through the wetland, having a knock on effect on the geomorphological process that governs this system. These impacts on the wetland system have resulted in varying degrees of soil erosion and the deposition of sediment in the wetland system (Photograph 5).

Table 3: Summary of PES score.

MAP REFERENCE	HYDROLOGY	GEOMORPHOLOGY	VEGETATION	PES SCORE (CATEGORY)
Channelled valley-bottom	5.3	4.5	7.8	D (5.6)
Artificial Hillslope	7.5	7.0	7.2	E (7.2)



Photograph 5: Littering within the project area.

4.6. Functional Assessment (Ecosystem Goods and Services)

The assessment of the ecosystem services supplied by the wetlands was conducted according to the guidelines as described by Kotze et al (2005). An assessment was undertaken that examines and rates the services listed in Table 4 and Figure 6. The characteristics were scored according to the general levels of services provided. It is important to ensure that wetland areas can continue to provide the valued goods and services.

Table 4: Goods and services assessment results for wetlands (high=4; low=0).

GOODS AND SERVICES	CVB	Artificial Hillslope
Flood attenuation	1,8	1,8
Stream flow regulation	1,8	1,0
Sediment trapping	1,8	1,4
Phosphate trapping	1	1,0
Nitrate removal	0,8	0,8
Toxicant removal	1	1,0
Erosion control	1,2	1,2
Carbon storage	0,6	0,6
Maintenance of biodiversity	1,2	0,8
Water supply for human use	1,2	1,2
Natural resources	0,6	0,6
Cultivated foods	0,4	0,4
Cultural significance	0,2	0,2
Tourism and recreation	0,2	0,0
Education and research	1,8	1,4

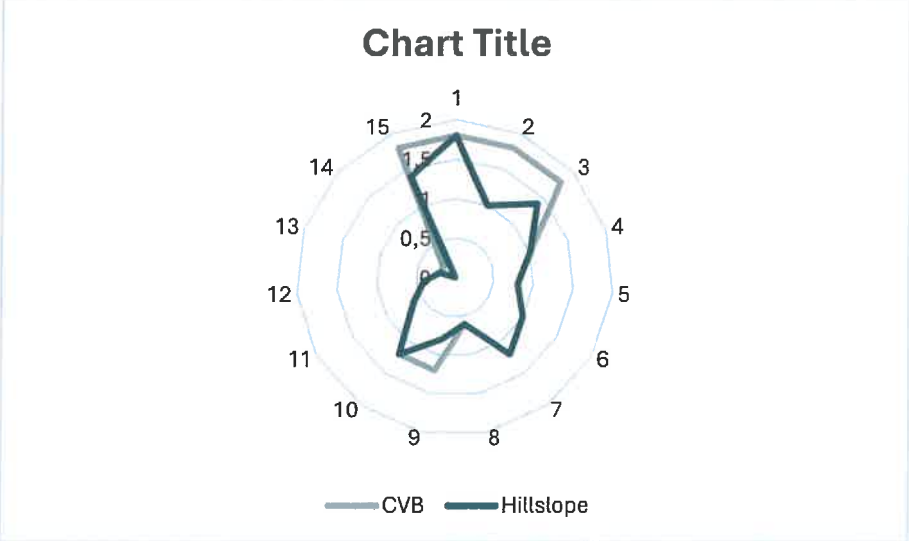


Figure 6: WET-EcoServices results.

4.8. Ecological Importance and Sensitivity (EIS)

The Ecological Importance and Sensitivity of the wetlands have been recorded as moderate-low (Table 5). The wetland systems provide habitat for some avifaunal species that utilise the habitats. The Hydrological Functional Importance of the channelled valley bottom has been recorded as low with the main provision of ecosystem goods and services being associated with flood attenuation and filtration of nutrients and toxicants.

Table 5: Wetland EIS rating categories

EIS Score	EIS Rating	General Description
0.0-0.79	Very Low	Wetlands that are not ecologically important and sensitive at any scale and provide negligible biodiversity maintenance, regulating, provisioning and cultural services.
0.8 – 1.29	Low	Wetlands that are not ecologically important and sensitive at any scale and provide low levels of biodiversity maintenance, regulating, provisioning and cultural services.
1.3 – 1.69	Moderately-Low	Wetlands that are not ecologically important and sensitive at any scale and provide moderately-low levels of biodiversity maintenance, regulating, provisioning and cultural services.
1.7 – 2.29	Moderate	Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale and provide biodiversity maintenance, regulating, provisioning and/or cultural services of moderate importance. They play a small but measurable role in moderating the quantity and quality of water in major rivers.
2.3 – 2.69	Moderately-High	Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale and provide biodiversity maintenance, regulating, provisioning and/or cultural services of moderately-high importance. They play a measurable role in moderating the quantity and quality of water of major rivers.
2.7 – 3.19	High	Wetlands that are ecologically important and sensitive on a provincial or national scale and provide biodiversity maintenance, regulating, provisioning and/or cultural services of high importance. They play an important role in moderating the quantity and quality of water of major rivers.
3.2 - 4.0	Very High	Wetlands that are considered ecologically important and sensitive on a national or even international level and provide biodiversity maintenance, regulating, provisioning and/or cultural services of very high importance The biodiversity of these wetlands is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water in major rivers.

Table 6: Criteria used for ecological sensitivity and importance rating.

Determinant	Channelled Valley Bottom	Artificial Hillslope
Primary Determinants	Score	Score
1. Rare & endangered species	0	0
2. Populations of unique species	0	0
3. Species/taxon richness	1	1
4. Diversity of habitat types or features	2	2
5. Migration route/breeding and feeding site for wetland species	2	1
6. Sensitivity to changes in the natural hydrological regime	2	2
7. Sensitivity to water quality changes	2	1
8. Flood storage, energy dissipation & particulate/element removal	2	2
Modifying Determinants		
9. Protected status	1	1
10. Ecological integrity	2	1
Scoring: 0=None; 1=Low; 2=Moderate; 3=High; 4=Very High	1,4	0,8

5. IMPACT DESCRIPTION, ASSESSMENT AND MITIGATION

Any development activity in a natural system will have an impact on the surrounding environment, usually in a negative way. The purpose of this phase of the study was to identify and assess the significance of the potential impacts that may be occur as a result of the proposed activities and to provide a description of the mitigation required so as to limit the identified negative impacts on the waterbodies.

The potential impacts and risks of the proposed development on the wetland habitat are associated with both the construction and operational phases.

Table 7: Summary of impacts assessed for each of the project activities.

Project Phasing & Activities	Impact Group	Impact Description
C1.Construction activities: Clearing of vegetation, stripping / grubbing of soil, earthworks, infilling..	C1-1: Direct ecosystem destruction and modification impacts	• Accidental direct impacts to the watercourse and vegetation by heavy machinery and/or fill material during construction.
	C1-2: Indirect hydrological and geomorphological impacts	• Erosion and/or sedimentation of watercourse/wetland due to catchment and/or wetland soil and vegetation clearing and landcover disturbance during construction. Erosion impacts like gully formation of channel incision and widening will further confine flows and reduce soil saturation in the rooting zone, thus resulting in changes to vegetation composition. • Increased sedimentation of wetlands. Sedimentation impacts will result in the smothering and possibly burial of wetland vegetation and reduced near-surface soil saturation rates also resulting in changes to vegetation composition. • Temporary flow diversion and reduced water inputs to certain areas during the construction phase.
	C1-3: Water quality impacts	• Pollution of water due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction (e.g. oil and diesel leaks and spills). • Any erosion leading to sedimentation of watercourse onsite/downstream could also lead to raised water turbidity and suspended solids concentrations, also affecting water quality. • Accidental damage and/or rupture to existing sewer, gas, oil and fuel pipes during construction activities along the road and/or within the wetland.
	C1-4: Fragmentation and ecological disturbance impacts	• Modified ecological connectivity. • Expanded / more intense edge impacts could result in the deterioration in vegetation quality and cover and the potential for increased alien invasive plant invasion due to disturbance causing activities in and near watercourse. • Noise pollution and vibrations associated with earthworks and the use of heavy machinery could affect local wildlife (birds, amphibians and small mammals especially).
Project Phasing & Activities	**Impact Group**	**Impact Description**

O1: Operational activities: Mining/quarrying, stormwater management, internal roads maintenance	O1-1: Direct ecosystem destruction and modification impacts	• Accidental direct impacts to wetland and wetland/buffer vegetation by heavy machinery during infrastructure repair and maintenance activities.
	O1-2: Indirect hydrological and geomorphological impacts	• Erosion and/or sedimentation of watercourse as a result of increased stormwater runoff discharges from the surrounding slopes. • Erosion impacts like gully formation of channel incision and widening will further confine flows and reduce soil saturation in the rooting zone, thus resulting in changes to vegetation composition. • Sedimentation impacts will result in the smothering vegetation and reduced near-surface soil saturation rates also resulting in changes to vegetation composition.
	O1-3: Water quality impacts	• Pollution of onsite and downstream rivers due to the mishandling of hazardous substances and/or improper maintenance of machinery during repair and maintenance activities (e.g. oil and diesel leaks). • Any erosion leading to sedimentation could also lead to raised water turbidity and suspended solids concentrations, also affecting water quality.
	O1-4: Fragmentation and ecological disturbance impacts	• Modified ecological connectivity. • Expanded / more intense edge impacts as a result of vegetation clearance, could result in the deterioration in vegetation quality and cover and the potential for increased alien invasive plant invasion due to disturbance causing activities taking place near watercourse.

6. CONCLUSION AND RECOMMENDATIONS

The assessment found that there is one natural channelled-valley bottom wetland within the site, located on the eastern part of the site, and also an artificial hillslope wetland that has resulted from stormwater input from the nearby township. These wetlands were found to be of low ecological importance due to their condition and disturbances around them. Although the wetland provided limited ecosystem services, it warrants protection and conservation. As a result, a relevant buffer of 15m was applied to the wetland systems. This was based on the site conditions and proposed activities.

It is highly recommended that the wetland and buffer be marked as a no-go zone during all phases of construction, as most of the impacts are likely to be during this stage. The areas within can be used later as part of the landscaping, but only indigenous vegetation will be accepted. Furthermore, the developer should commit to improving the functionality of the wetland by preventing any further degradation.
Lastly, it is recommended that all areas impacted by the proposed development must be rehabilitated by undertaking the following general tasks:

- All foreign material must be removed from site.
- Land must be regraded / re-shaped and topsoils must be reinstated.
- Compacted soils must be adequately ripped/loosened where compacted, as informed by the ECO.
- Re-vegetation should take place as follows:
  - For any permanently and seasonally saturated areas - via translocation/ transplanting of resecured sods and, where there are not enough rescued sods, via the translocation/ transplanting of sods from the surrounding wetland as advised by a wetland ecologist.

It is the opinion of the specialist that this application be considered, provided that the mitigations provided are adhered to.

General construction management and good housekeeping practices

Latent and general impacts which may affect the freshwater ecology and biodiversity, will include any activities which take place in close proximity to the project that may impact on the receiving environment.

Proposed construction footprint

- All development footprint areas should remain as small as possible and should not encroach into the freshwater areas unless absolutely essential and part of the proposed project. It must be ensured that the freshwater habitat is off-limits to construction vehicles and non-essential personnel;
- The boundaries of footprint areas, including contractor laydown areas, are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. Edge effects will need to be extremely carefully controlled;

- Planning of temporary roads and access routes should avoid freshwater areas and be restricted to existing roads where possible;
- Appropriate sanitary facilities must be provided for the life of the construction phase and all waste removed to an appropriate waste facility;
- All hazardous chemicals as well as stockpiles should be stored on bunded surfaces and have facilities constructed to control runoff from these areas;
- It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage;
- No fires should be permitted in or near the construction area; and
- Ensuring that an adequate number of waste and "spill" bins are provided will also prevent litter and ensure the proper disposal of waste and spills.
- An appropriate stormwater management strategy must be implemented. Stormwater on the site must be managed so as to reduce the silt loads and runoff peaks into the wetland systems;
- Stormwater management processes must be put into place before vegetation clearing;
- As far as possible, all construction activities occurring within the wetland systems and associated buffer zones should occur in the low flow season, during the drier winter months;
- Construction phasing (sequencing) is a process by which only a portion of the site is disturbed at any one time, according to a planned schedule to complete the project in that phase. Other portions of the site are not cleared and graded until exposed soils from the earlier phase have been stabilised and the construction is nearly completed;

Vehicle access

- All vehicles and equipment must be regularly inspected for leaks. Re-fuelling must take place outside of the stipulated setback area, on a sealed surface area to prevent ingress of hydrocarbons into the topsoil;
- In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss; and
- All spills should they occur, should be immediately cleaned up and treated accordingly.

Vegetation

- Vegetation clearing must occur in a section by section manner, to reduce the exposure time of bare soils at any one time, thus limiting erosion of the area.
- All areas within 5m of the construction footprint should be monitored for erosion and incision and revegetated if necessary.
- Proliferation of alien and invasive species is expected within any disturbed areas. Alien invasive species are opportunistic, and where disturbances occur, they will propagate; therefore, these species should be eradicated and controlled to prevent their spread beyond the project footprint. Alien plant seed dispersal within the top layers of the soil within footprint areas, that will have an impact on future rehabilitation, has to be controlled;
- Removal of the alien and weed species encountered within the study area and particularly any identified within the watercourse must take place in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) and Section 28 of the National Environmental Management Act, 1998 (Act No. 107 of 1998). Removal of species should take place throughout the construction, operational, and maintenance phases; and
- Species specific and area specific eradication recommendations:
    - Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;
    - Footprint areas should be kept as small as possible when removing alien plant species; and
    - No vehicles should be allowed to drive through designated sensitive wetland areas during the eradication of alien and weed species.

Soils

- Sheet runoff from impermeable surfaces such as access roads and the walkways within close proximity to the watercourse should be slowed down by the strategic placement of berms;
- As far as possible, all construction activities should occur in the low flow season, during the drier winter months;
- As much vegetation growth as possible (of indigenous floral species) should be encouraged to protect soils;
- No stockpiling of topsoil is to take place within close proximity to the watercourse, and all stockpiles must be protected with a suitable geotextile to prevent sedimentation of the w watercourse;

- All soils compacted as a result of construction activities as well as ongoing operational activities falling outside of project footprint areas should be ripped and profiled; and
- A monitoring plan for the development and the immediate zone of influence should be implemented to prevent erosion and incision.

Rehabilitation

- Construction rubble must be collected and disposed of at a suitable landfill site; and
- All alien vegetation in the footprint area as well as immediate vicinity of the proposed project should be removed. Alien vegetation control should take place for a minimum period of two growing seasons after rehabilitation is completed.

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8. APPENDICES

APPENDIX A: GLOSSARY OF ACRONYMS

BGIS Biodiversity Geographic Information System

CR Critically Endangered

EIA Environmental Impact Assessment

EN Endangered

EW Extinct in the Wild

EX Extinct

EIS Ecological Important Services

IEM Integrated Environmental Management

IUCN International Union for Conservation of Nature

LC Least Concern

ME Mitigation Efficiency

NBA National Biodiversity Assessment

NEMBA National Environmental Management Biodiversity Act

NFEPA National Freshwater Ecosystem Priority Areas

NT Near Threatened

NWA National Water Act

PES Present Ecological State

QDS Quarter Degree Square

R Rare

RDL Red Data List

SANBI South African National Biodiversity Institute

SCC Species of Conservation Concern

ToR Terms of Reference

VU Vulnerable

WMA Water Management Areas

ANNEXURE N

APPLICATION IN TERMS OF SECTION 15(2)(a) OF THE STELLENBOSCH MUNICIPAL LAND USE PLANNING BYLAW FOR REZONING TO SUBDIVISIONAL AREA:

FARM NO. 81/2 & FARM NO. 81/9, STELLENBOSCH DIVISION

TRAFFIC IMPACT ASSESSMENT









Prepared for:
Stellenbosch Municipality

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AN UPDATE OF THE TRAFFIC IMPACT ASSESSMENT (TIA) REPORT FOR A PROPOSED RESIDENTIAL DEVELOPMENT (3-4 STOREY WALK UP FLATS) ON ERVEN 81/2 AND 81/9, STELLENBOSCH

TRAFFIC IMPACT ASSESSMENT REPORT

DRAFT REPORT
REVISION 00

APRIL 2025

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DOCUMENT CONTROL

TITLE:	TRAFFIC IMPACT ASSESSMENT REPORT		
ELECTRONIC FILE LOCATION:	P25004_REPORTS_01.TRAFFIC IMPACT ASSESSMENT REPORT_REV 00		
REPORT STATUS:	DRAFT		
REVISION NUMBER:	00		
CLIENT:	Stellenbosch Municipality NPK Building, Corner of Rynveld and Van Riebeeck Streets, 2nd Floor, Stellenbosch, 7600		
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RECORD OF REVISIONS

REV. NO.	STATUS	DESCRIPTION OF REVISION	REV. DATE
00	Draft	Issued for comments	04/04/2025

EXECUTIVE SUMMARY

Delta Built Environment Consultants (Delta BEC) was appointed to conduct an update of a Traffic Impact Assessment (TIA) for a proposed residential development (3-4 storey walk up flats) on Erven 81/2 and 81/9, Stellenbosch. The Traffic Impact Assessment was conducted in accordance with the *Manual of Traffic Impact Studies* published by the Department of Transport, 1995 and *Technical Methods of Highways* published by the Committee of Transport and Land Officials (COTO), TMH16 AND TMH17. The proposed development is approximately 17,47 ha in size.

The study area is bound by the Mount Simon Residential development to the north, the R304 route to the south and west, and the railway line to the east. The development traffic demand was analysed in this report and is indicated below:

Weekday AM Trip Generation

LAND USE (TMH17)	CODE	AM TRIPS	AM SPLIT		AM SPLIT	
			IN %	OUT %	IN TRIPS	OUT TRIPS
Apartments and Flats (North)	**220**	169	25%	75%	**42**	**126**
Apartments and Flats (South)	**220**	147	25%	75%	**37**	**110**

Weekday PM Trip Generation

LAND USE (TMH17)	CODE	PM TRIPS	PM SPLIT		PM SPLIT	
			IN %	OUT %	IN TRIPS	OUT TRIPS
Apartments and Flats (North)	**220**	169	70%	30%	**118**	**51**
Apartments and Flats (South)	**220**	147	70%	30%	**103**	**44**

This report focuses mainly on the traffic operations and requirements of the road network and intersections surrounding the site. A detailed description of the traffic findings, current operations and movements are discussed. Weekday traffic counts were conducted at seven critical road intersections that act as main feeders in and out of the study area. The following intersections will be discussed in detail within this report:

1) Intersection of the R304, Welgevonden Boulevard and Farm Access Road
2) Intersection of the R304, Newinbosch Access and Unnamed Road A
3) Intersection of the R304, Sokuqala Street and Mount Simon Drive
4) Intersection of the R304 and Masitandane Road
5) Intersection of the R304, Taxi Rank Access and Unnamed Road B
6) Intersection of the R304, Bell Road and Porter Road
7) Intersection of the R304 and the R310

The traffic analysis was conducted for the base year of 2025. A growth rate factor of 3.0% was applied to the year 2030 traffic volumes at the proposed site location. The analysis for future traffic with and without the development was conducted over a five-year horizon (2030).

The following scenarios were considered during the traffic analysis:

SCENARIO	TRAFFIC SCENARIO	ROAD NETWORK
1	Existing 2025 peak hour	Existing 2025 road geometry
2	Horizon 2030 peak hour with background traffic growth	Existing 2025 road geometry
3	Horizon 2030 peak hour background traffic growth and the proposed development	Existing 2025 road geometry
4	Horizon 2030 peak hour background traffic growth and the proposed development	Proposed 2030 road geometry

The findings were reported in relation to the level of service (LOS), which represents metrics of roadway performance determined by average delay, vehicle queue length, etc. Intersections 1, 2, 3, and 4 showed satisfactory LOS across all scenarios and did not require any mitigation measures. Intersections 5, 6 and 7 showed unacceptable LOS and require mitigation measures, which are fully explained in this report. However, the developer is not accountable for these upgrades since the intersections are already operating at an unacceptable Level of Service (LOS F) before considering the impact of the development's traffic volumes.

There is an existing discontinuous sidewalk along the northeastern side of the R304. It is recommended that the sidewalks be extended to seamlessly connect with the existing sidewalks along the R304.

Delta BEC recommends that the proposed development under the Stellenbosch Municipality be approved, provided that the proposed mitigation measures and recommendations are implemented.

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GLOSSARY OF TERMS AND ABBREVIATIONS

COTO	Committee of Transport Officials
Delta BEC	Delta Built Environment Consultants
ha	Hectare
LFR	Less Formal Residential Zone
LOS	Level of Service
TIA	Traffic Impact Assessment
vph	Vehicles per hour
LVO	Low Vehicle Ownership
VLVO	Very Low Vehicle Ownership

1 INTRODUCTION

1.1 BACKGROUND

Delta Built Environment Consultants (Delta BEC) was appointed by the Stellenbosch Municipality to conduct an update of the Traffic Impact Assessment (TIA) report for a proposed residential development (3-4 storey walk up flats) on Erven 81/2 and 81/9 in Stellenbosch, Western Cape province.

The study area is bound by the R304 to the west and a railway line to the east. The southern boundary of the property includes portions of the Khayamandi Tourism Centre, as well as a bridge over the railway line. The northern boundary is framed by the Mount Simon residential development.

Erven 81/2 and 81/9 cover an area of approximately 17.47 hectares, which include portions of vacant land, the R304 road reserve and a segment of the Plankenburg River. The total developable area is 6.40 hectares.

The Stellenbosch Municipality intends to rezone Erven 81/2 and 81/9 from "Agricultural" to "Residential 4". The proposed residential development will comprise of 816 dwelling units.

1.2 PURPOSE OF REPORT

The purpose of this traffic impact assessment is to evaluate the impact of the proposed development on the surrounding road network and determine whether it is necessary to implement any road and/or intersection improvements. Traffic counts have been undertaken at key intersections of the study area to quantify and assess the traffic flow operations and the current traffic conditions.

The study also investigates and reviews the proposed site access points regarding current traffic operations and infrastructure. The internal and external accessibility of these points were analysed to ensure sustainable and efficient access to the proposed development. The report also comments on the proposed site accesses, Non-Motorised Transport (NMT) and public transport aspects.

1.3 DESIGN CRITERIA AND GUIDELINES

The study regarding the traffic conditions within and surrounding the site has been conducted, considering the requirements and guidelines as set out in the following documents:

- TMH 16 Volume 1 (South African Traffic Impact and Site Traffic Assessment Manual), COTO, Version 1.0, August 2012
- TMH 16 Volume 2 (South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual), COTO, Version 1.01, February 2014

- TMH 17 (South African Trip Data Manual), COTO, Version 1.01, September 2013
- TRH 26 (South African Road Classification and Access Management Manual), COTO, Version 1.0, August 2012.

The manuals recommend that any change of land use or material change of circumstances to existing land use or transportation infrastructure that is likely to generate significant or changed levels of traffic activity be evaluated so that the incremental impact on surrounding roads and intersections can be determined, including the assessment of mitigating measures.

1.4 STRUCTURE OF THE REPORT

The report comprises the following sections:

- Section 1: Introduction
- Section 2: Approach
- Section 3: Development Particulars
- Section 4: Site Investigation
- Section 5: Traffic Counts and Flow Data
- Section 6: Trip Generation, Distribution and Assignment
- Section 7: Traffic Flow Analysis and Mitigation Measures
- Section 8: Parking Demand Analysis
- Section 9: Access Queue Lengths
- Section 10: Public Transport
- Section 11: Non-Motorised Transport
- Section 12: Conclusion
- Section 13: References
- Appendices

2 APPROACH

2.1 METHODOLOGY

The traffic impact assessment (TIA) for the development was conducted based on the total traffic demand for the proposed development. The horizon year of 2030 for the site was identified to conclude whether the current transport infrastructure for the site and surrounding network will be able to accommodate the redistributed traffic. The following methodology was used in compiling the TIA report:

1) Information regarding the proposed change in land use was obtained to identify the site location and to set up the site investigations.
2) The critical road intersections that act as main feeders in and out of the study area were assessed to determine current road and traffic safety conditions and the base year traffic volumes.
3) Traffic volumes projected to be generated by the proposed development were determined according to the size and type of land use.
4) A five-year horizon was used at a growth rate of 3.0% for the background traffic, as proposed in the South African Trip Data Manual (TMH 17, 2013). The existing intersection operation conditions were determined using the SIDRA software design package.

The following scenarios were analysed using SIDRA software design:

Table 2-1: Traffic Scenarios

SCENARIOS	TRAFFIC SCENARIO	ROAD NETWORK
1	Existing 2025 peak hour traffic	Existing 2025 road geometry
2	Horizon 2030 peak hour with background traffic growth	Existing 2025 road geometry
3	Horizon 2030 peak hour background traffic growth and the proposed development	Existing 2025 road geometry
4	Horizon 2030 peak hour background traffic growth and the proposed development	Proposed 2030 road geometry

3 DEVELOPMENT PARTICULARS

3.1 STUDY AREA

The proposed development is located on Erven 81/2 and 81/9 in Stellenbosch, Western Cape province. The study area is bound by the R304 to the west and a railway line to the east. The southern boundary of the property includes portions of the Khayamandi Tourism Centre, as well as a bridge over the railway line. The northern boundary is framed by the Mount Simon residential development. The locality of the development is indicated on Figure 3-1 below.



Figure 3-1: Project Location.

3.2 LAND USE

The total site consists of 63 955 m^2 of the developable site area. The total number of residential dwelling units is 816 with 3 to 4 storeys. The site is currently under "agricultural" zoning as shown on Figure 3-2 below. Stellenbosch municipality intends to rezone to "residential" zoning. The proposed development falls under Land Use Code 220 (Apartments and Flats) on the TMH 17 (South African Trip Data Manual). This code was used for trips generation of the development.

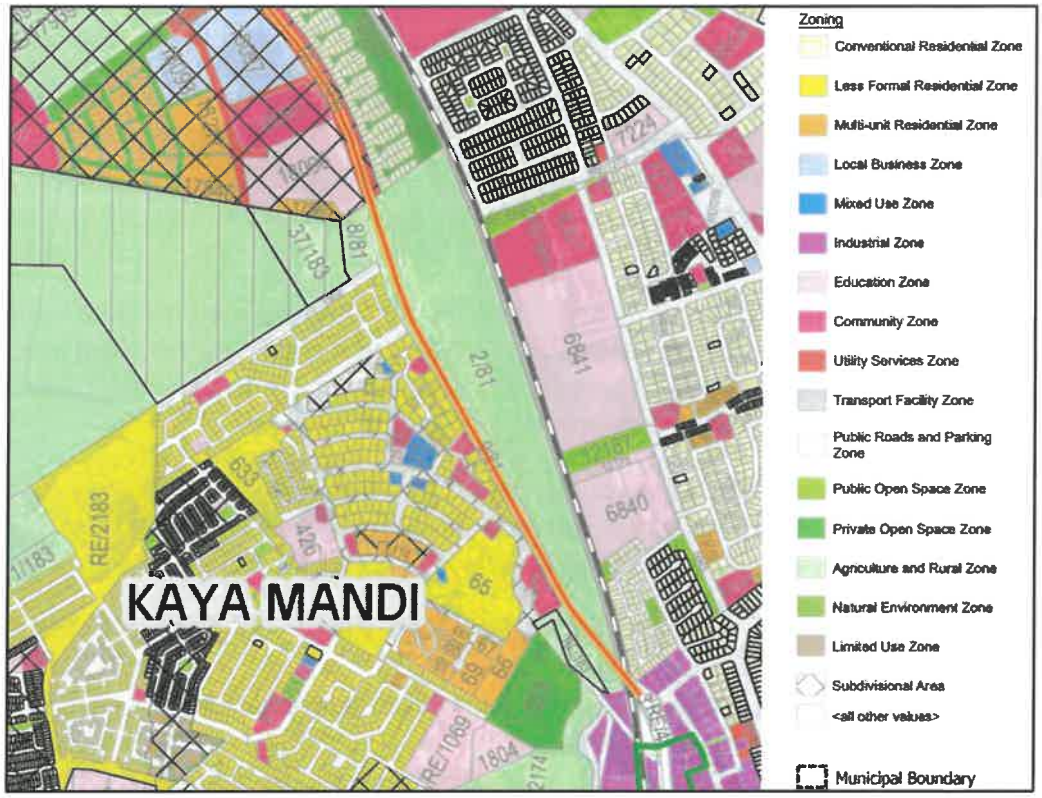


Figure 3-2: Study Area Current Zoning

3.3 SITE ACCESS

The development will gain direct access from R304, a main road running along the southern boundary of the site through Mount Simon Drive. The site has at least two main gated access points, a North Gatehouse and a South Gatehouse. These likely serve as controlled entry points for vehicles and pedestrians.

The site features an internal road network that connects the residential blocks, retail spaces, creche, clubhouse, and recreational areas. Pedestrian pathways and a designated pedestrian walkway enhance walkability within the development. A suggested pedestrian bridge is planned over the river and railway line, providing additional connectivity for residents. An existing neighbouring development access is incorporated into the site plan, allowing connectivity with adjacent residential areas.

The access should be designed as follows:

- 3,0 m wide ingress lane.
- 3,0 m wide egress lane.
- The proposed access to accommodate both heavy and light vehicles.
- The access control device should be set back at least 12,0 m from the kerb line.
- The access should comprise of a separate pedestrian access gate.
- 2,0 m wide sidewalks on each side of the access

3.4 PROVINCIAL ROADS PLANNING

According to the Stellenbosch Municipality Roads Master Plan 2022 update, traffic modelling results indicate that the R304 (Koelenhof Road) requires upgrading to a dual carriageway between the R44 and Bottelary Road.

3.4.1 PLANNED UPGRADES

The Western Cape Provincial Government commissioned the preparation of road layout plans for the dualling of the R304 from the Adam Tas (R44) intersection in the CBD to Klipheuwel, north of the N1. The implementation timeline is color-coded to indicate the approximate years for construction.

Subsequent to this, a conceptual design for the dual carriageway section of the R304 from the Adam Tas intersection to the Welgevonden Boulevard intersection was developed, confirming the following geometric design aspects:

- **Road Reserve:** Varies from the Adam Tas Road intersection to the Plankenburg River bridge.
- **Bridge Widening:** Expansion of the Plankenburg River bridge.
- **Road Reserve Widths:**
  - 40 m from the Masitandane Road intersection to the local access road leading to Mount Simon Estate and Portion 4 of Farm No. 81.
  - 50 m from this local access road to the N1, beyond the planning limits.
- **Cross-Section Design:**
  - Two 3.4 m lanes per direction.
  - A median island.
  - On-street parking in certain town sections.
  - Surfaced sidewalks.
- **Intersection Improvements:** Various turning lane configurations.
- **Access Management:** Limited/consolidated Left-in, Left-out (LILO) access points.

The current implementation status of these upgrades could not be verified at this stage.

4 SITE INVESTIGATION

A site investigation was conducted on the 17th and 18th of February 2025 to obtain a better understanding of the project area. During the investigation, seven intersections were identified that are to be analysed in support of the traffic impact assessment report.

4.1 ROAD DETAILS

Details regarding the intersections identified during the site visit, as well as the surrounding road networks that were observed, are provided in Table 4-1. The table presents the roads that would be affected by the proposed residential development. The road classification was conducted using the *Stellenbosch Municipality Roads Master Plan 2022.*

Table 4-1: Road classification details.

ROAD/STREET NAMES	DESCRIPTION	CLASS	ROAD RESERVE (m)	CONDITION
R304	Single carriageway with one lane in each direction	U2	30	Good
Mount Simon Drive	Single carriageway with one lane in each direction	U4 (a)	15	Fair
Welgevonden Boulevard	Single carriageway with one lane in each direction	U3	30	Fair
R44	Double carriageway with two lanes in each direction	U2	40	Good
Sokuqala Street	Single carriageway with one lane in each direction	U5	15	Fair
Masitandane Road	Single carriageway with one lane in each direction	U5	15	Fair
Taxi Rank Access	Single carriageway with one lane in each direction	U5	10	Fair
Porter Road	Single carriageway with one lane in each direction	U5	15	Fair
Bell Road	Single carriageway with one lane in each direction	U5	15	Fair

4.2 CRITICAL INTERSECTIONS

Seven critical intersections within 1200 m of the proposed development were identified and listed below.

1) Intersection of the R304, Welgevonden Boulevard and Farm Access Road

2) Intersection of the R304, Newinbosch Access and Unnamed Road A
3) Intersection of the R304, Sokuqala Street and Mount Simon Drive
4) Intersection of the R304 and Masitandane Road
5) Intersection of the R304, Taxi Rank Access and Unnamed Road B
6) Intersection of the R304, Bell Road and Porter Road
7) Intersection of the R304 and the R310

The locations of these intersections are illustrated on Figure 4-1 below.

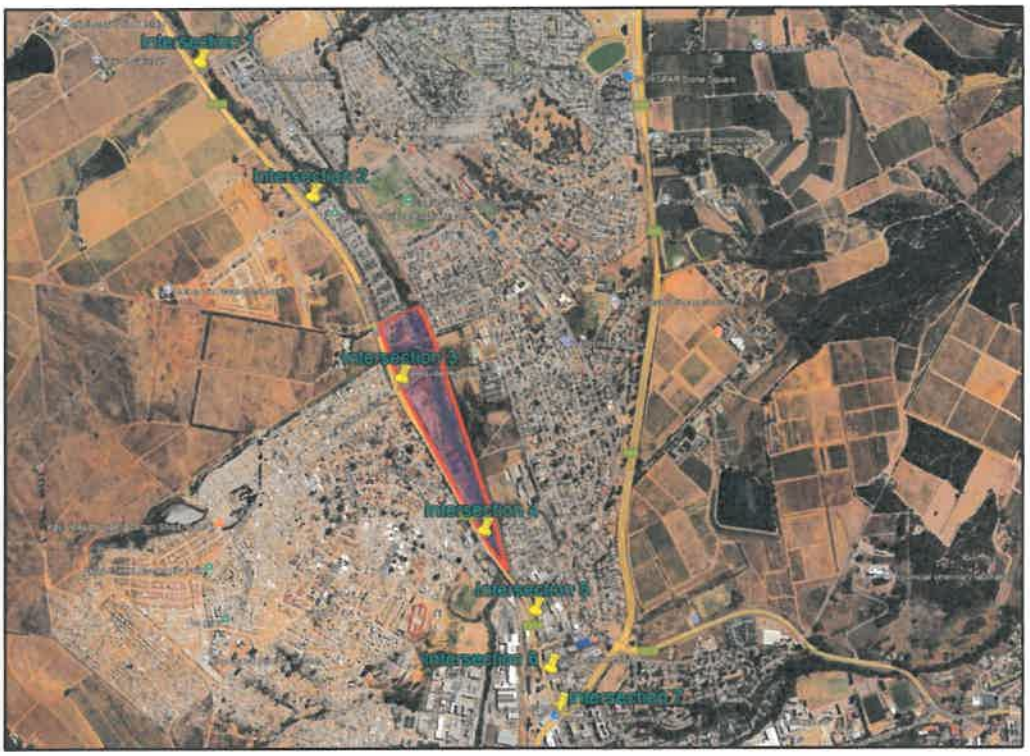


Figure 4-1: Critical intersections.

4.3 ROAD SAFETY CONDITIONS

A basic road condition and safety assessment of the road sections were conducted according to the requirements of the *South African Road Safety Audit Manual*. Note that no guarantee is made that every deficiency has been identified. In addition, should all the deficiencies identified during this assessment not be addressed, or should none of the recommendations be adopted for implementation, this would not imply or confirm that the road is safe. However, addressing the deficiencies and adopting the recommendations should improve the level of safety of the roads. The intersections discussed below and listed in **Section 4.1** were inspected during the site visit.

4.3.1 Intersection of the R304, Welgevonden Boulevard and Farm Access Road

This is a four-legged, signalised intersection. Figure 4-2 shows the existing geometry and condition of this intersection.

- The R304 consists of a single carriageway with one lane in each direction.
- Welgevonden Boulevard consists of a single carriageway with one lane in each direction.
- The road marking is visible along the R304 and faint on the Welgevonden Boulevard.
- The intersection provides pedestrian crossings.



Figure 4-2: Intersection of the R304, Welgevonden Boulevard and Farm Access Road

4.3.2 Intersection of the R304, Newinbosch Access and Unnamed Road A

This is a four-legged, signalised intersection. Figure 4-3 shows the existing geometry and the condition of this intersection.

- The R304 consists of a single carriageway with one lane in each direction.
- The unnamed A road consists of a dual carriageway with two lanes in each direction.
- The road markings are visible at this intersection.
- The intersection provides pedestrian crossings.



Figure 4-3: Intersection of the R304, Newinbosch Access and Unnamed Road A

4.3.3 Intersection of the R304, Sokuqala Street and Mount Simon Drive

This is a four-legged, signalised intersection. Figure 4-4 shows the existing geometry and the condition of this intersection.

- The R304 consists of a single carriageway with one lane in each direction.
- Mount Simon Drive consists of a single carriageway with one lane in each direction.
- The road markings are visible on all roads.
- The intersection provides pedestrian crossings.



Figure 4-4: The R304 and Mount Simon Drive Intersection.

4.3.4 Intersection of the R304 And Masitandane Road

This is a T-junction, signalised intersection. Figure 4-5 shows the existing geometry and the condition of this intersection.

- The R304 consists of a single carriageway with one lane in each direction.
- Masitandane road consists of a single carriageway with two lanes in each direction.
- The road markings are visible at this intersection.
- The intersection provides pedestrian crossings.



Figure 4-5:Intersection of the R304 and Masitandane Road.

4.3.5 Intersection of the R304, Taxi Rank Access and Unnamed Road B

This is intersection a four-legged priority controlled intersection, with priority given to the R304. Figure 4-6 shows the existing geometry and the condition of the intersection.

- The R304 consists of a single carriageway with one lane in each direction.
- The Taxi Rank Access and the Unnamed Road B consists of a single carriageway with no road markings.
- The road markings on the R304 are visible.
- The intersection does not provide pedestrian crossings.



Figure 4-6: Intersection of the R304, Taxi Rank Access and Unnamed Road B

4.3.6 Intersection of the R304, Bell Road and Porter Road

This is intersection a four-legged, priority controlled intersection, with priority given to the R304. Figure 4-7shows the existing geometry and the condition of this intersection.

- The R304 consists of a single carriageway with one lane in each direction.
- Porter Road and Bell Road consist of a single carriageway with one lane in each direction.
- The road markings are visible on both roads.
- The intersection does not provide pedestrian crossings.



Figure 4-7: The R304, Bell Road and Porter Road

4.3.7 Intersection of the R304 And the R310

This is a four-legged, signalised intersection. Figure 4-8 shows the existing geometry and the condition of this intersection.

- The R304 consists of a single carriageway with one lane in each direction.
- The R310 consists of a dual carriageway with two lanes in each direction.
- The road markings are visible on both roads.
- The intersection provides pedestrian crossings.



Figure 4-8: The R304 and the R310 Intersection.

5 TRAFFIC COUNTS AND FLOW DATA

The traffic counts were conducted on Thursday, 20 February 2025, at the intersections identified in Section 4.2.

5.1 BASE YEAR VOLUMES (2025)

AM and PM peak hours were identified once the traffic counts were completed and the data was analysed. According to *TMH 16 Volume 2, The South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual*, the peak period should be a single hour, assuming that the peak 15-minute traffic volume occurs over the duration of the full hour.

12-hour counting sessions were conducted for each identified critical intersection to ensure accurate traffic capacity calculations. Light vehicles, taxis and heavy vehicle data were obtained during the count.

5.1.1 BASE YEAR AM PEAK HOUR

The AM peak hour for the existing traffic flow for each identified intersection differed and can be observed in Table 5-1 below.

Table 5-1: Base year (2025) AM peak hours.

NO.	INTERSECTION	AM PEAK HOUR – TIME PERIOD
1	Intersection of the R304, Welgevonden Boulevard and Farm Access Road	06:30– 07:30
2	Intersection of the R304, Newinbosch Access and Unnamed Road A	06:15– 07:15
3	Intersection of the R304, Sokuqala Street and Mount Simon Drive	06:15– 07:15
4	Intersection of the R304 and Masitandane Road	06:15– 07:15
5	Intersection of the R304, Taxi Rank Access and Unnamed Road B	06:15– 07:15
6	Intersection of the R304, Bell Road and Porter Road	06:30– 07:30
7	Intersection of the R304 and the R310	06:30– 07:30

5.1.2 BASE YEAR PM PEAK HOUR

The PM peak hour for the existing traffic flow for each identified intersection differed and can be observed in Table 5-2 below.

Table 5-2: Base year (2025) PM peak hours.

NO.	INTERSECTION	PM PEAK HOUR – TIME PERIOD
1	Intersection of the R304, Welgevonden Boulevard and Farm Access Road	15:00 – 16:00
2	Intersection of the R304, Newinbosch Access and Unnamed Road A	15:15 – 16:15
3	Intersection of the R304, Sokuqala Street and Mount Simon Drive	15:00 – 16:00
4	Intersection of the R304 and Masitandane Road	15:00 – 16:00
5	Intersection of the R304, Taxi Rank Access and Unnamed Road B	15:00 – 16:00
6	Intersection of the R304, Bell Road and Porter Road	15:00 – 16:00
7	Intersection of the R304 and the R310	15:00 – 16:00

5.2 HORIZON YEAR VOLUMES

The *Manual for Traffic Impact Studies (TRH 16, Vol. 1)* states that transportation improvements must be designed for a five-year horizon. Therefore, it was decided to use a five-year horizon for the development.

The *TMH 17 (South African Trip Data Manual)* specifies that the typical growth rate for an area with an expected above-average traffic growth falls within a range of 0 % to 3.0 %. To make provision for traffic growth on the affected provisional roads, it was considered appropriate to apply a 3.0 % per annum growth factor.

5.2.1 HORIZON YEAR (2030) AM & PM PEAK HOUR

The horizon year (2030) volumes were calculated according to the peak hour traffic volumes in Section 5.1. The 3.0 % annual traffic growth rate was applied over a 5-year period to the existing traffic volumes to estimate the 2030 background volumes, which can be observed in Appendix B:.

6 TRIP GENERATION, DISTRIBUTION AND ASSIGNMENT

The traffic demand as a result of the change in land use for the proposed residential development was calculated using the *TMH 17, South African Trip Data Manual*. This section of the report illustrates the effect the change in land use will have on the surrounding road network.

6.1 ADJUSTMENT FACTORS

Various trip adjustment factors have been introduced into the COTO document to allow for trip reductions. These adjustment factors are discussed briefly below.

6.1.1 Low Vehicle Ownership (LVO) & VLVO (Very Low Vehicle Ownership)

According to COTO "the vehicle ownership in areas with high levels of vehicle ownership varies between one or two per household. In areas with a low level of vehicle ownership, the majority of the households (more than 50%) do not own a vehicle and relies on public transport for transportation. In areas with very low level of vehicle ownership, nearly all households (more than 90%) do not own a vehicle and rely on public transportation." This study considered low vehicle ownership, and the reduction factors which have been applied are listed in Table 6-1 below. Note, Pv = Reduction factor for vehicle ownership.

6.1.1.1 Transit Node or Corridors

According to COTO "the transit reduction factors are applicable to developments that are located within a reasonable walking distance from a major transit node or stops on a major transit corridor." The applied reduction factor for transit node or corridors is shown in Table 6-1 below.

Table 6-1: Adjustment factors applied for trip reductions.

TMH 17 USE	CODE	UNITS/AREA	AREA/ UNITS/ STUDENTS/ SEAS	MIXED-USE (PM)	LOW VEHICLE OWNERSHIP (PV)	TRANSIT NODES OR CORRIDORS (PT)	COMBINED REDUCTION FACTOR (PC)
Apartments and Flats (North)	**220**	**436**	**units**	**0%**	30%	**15%**	40%
Apartments and Flats (South)	**220**	**380**	**units**	**0%**	30%	**15%**	40%

6.2 TRIP SUMMARY

The South African Trip Data Manual, (TMH17 Version 1.01, September 2013) was used to estimate the trip generation for the proposed residential development on Erven 81/2 and 81/9, Stellenbosch.

The analysis was conducted for the weekday AM and PM peak hours. The expected development generated trips for the AM and PM peak hours are indicated in Table 6-2 and Table 6-3. The proposed development is expected to generate approximately 316 trips during the AM and PM peak hours. The detailed trip generation is contained in Appendix B.

Table 6-2: Weekday AM Trip Generation

TMH 17 USE	CODE	RATE AM	TRIPS	ADJUSTMENT FACTOR	ADUSTED AM TRIPS
Apartments and Flats (North)	**220**	**0,65**	283	60%	169
Apartments and Flats (South)	**220**	**0,65**	247	60%	147

Table 6-3: Weekday PM Trip Generation

TMH 17 USE	CODE	RATE PM	TRIPS	ADJUSTMENT FACTOR	ADUSTED PM TRIPS
Apartments and Flats (North)	**220**	**0,65**	283	60%	169
Apartments and Flats (South)	**220**	**0,65**	247	60%	147

The TMH17 document recommends the following trip generation for apartments and flats:

- AM peak hour: 0.65 trips per dwelling unit, with a 25/75 in and out split shown in Table 6-4 below.
- PM peak hour: 0.65 trips per dwelling unit, with a 70/30 in and out split shown in Table 6-5 below.

Table 6-4: Weekday AM Trip Generation Split

LAND USE (TMH17)	CODE	AM TRIPS	AM SPLIT		AM SPLIT	
			IN %	OUT %	IN TRIPS	OUT TRIPS
Apartments and Flats (North)	**220**	169	25%	75%	42	126
Apartments and Flats (South)	**220**	147	25%	75%	37	110

Table 6-5: Weekday PM Trip Generation Split

LAND USE (TMH17)	CODE	PM TRIPS	PM SPLIT		PM SPLIT	
			IN %	OUT %	IN TRIPS	OUT TRIPS
Apartments and Flats (North)	**220**	169	70%	30%	118	51

LAND USE (TMH17)	CODE	PM TRIPS	PM SPLIT		PM SPLIT	
			IN %	OUT %	IN TRIPS	OUT TRIPS
Apartments and Flats (South)	**220**	147	70%	30%	103	44

6.3 GROWTH RATE

The TMH 16 Volume 1 requires that a five-year horizon be considered for developments that generate more than 50 trips. The TMH 17 recommends growth rates for development as shown in Table 6-6.

Table 6-6: Typical traffic growth rates.

DEVELOPMENT AREA	GROWTH RATES
Low growth areas	0-3%
Average growth areas	3-4%
Above average growth areas	4-6%
Fast growing areas	6-8%
Exceptionally high growth areas	>8%

To determine the 2030 background traffic volumes, a growth rate of 3% per annum was applied to the 2025 weekday traffic volumes.

6.4 TRIP DISTRIBURION AND ASSIGNMENT

Assumptions with respect to the expected trip distribution were based on the location of the site access in relation to the surrounding road network, the existing traffic volumes, travel patterns as well as the land use nature of the proposed development.

The expected trip distribution and development generated traffic for the proposed development can be seen in Appendix B:. The 2025 existing peak hour traffic volumes and the 2030 background plus development generated peak hour traffic volumes are presented Appendix B:.

7 TRAFFIC FLOW ANALYSIS AND MITIGATION MEASURES

SIDRA Intersection 9.1.2.202 software package was used to determine the level of service (LOS), V/C ratios and the total delay experienced at the analysed intersections. The analysis was performed based on the method dictated in the *Highway Capacity Manual (2010)*. The minimum required Level of Service (LOS) for an intersection is D, according to *The South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual*.

During the traffic analysis, three scenarios were tested. Table 7-1 below illustrates the LOS outcome for each of the two key intersections for each scenario.

- A detailed lane summary for the 2025 base year peak hour traffic on the existing 2025 road network can be observed in Appendix C:
- A detailed lane summary for the 2030 background traffic with growth peak hours on the existing 2025 road network can be observed in Appendix D:.
- A detailed lane summary for the 2030 background growth traffic and the development demand peak hour on the 2025 road network can be observed in Appendix E:
- A detailed lane summary for the 2030 background growth traffic and the development demand peak hour on the proposed 2030 road network can be observed in Appendix E:

Table 7-1: Level of Service Descriptions

LEVEL OF SERVICE	AVERAGE CONTROL DELAY (SEC/VEHICLE)	DESCRIPTION
A	≤ 10	Free Flow
B	> 10 – 35	Stable Flow (slight delay)
C	>20 – 35	Stable Flow (acceptable delays)
D	>35 – 55	Approaching Unstable Flow (tolerable delay)
E	>55 – 80	Unstable Flow (intolerable delay)
F	>80	Forced Flow (congested and queues fail to clear)

Table 7-2: Intersections traffic analysis summary.

SCENARIO	TRAFFI SCENARIO	ROAD NETWORK	INTERSECTION													
			1		2		3		4		5		6		7	
			LEVEL OF SERVICE													
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Existing 2025 peak hour	Existing 2025 road geometry	C	C	C	C	D	D	D	D	E	F	F	F	D	D
2	Horizon 2030 peak hour with growth in background traffic	Existing 2025 road geometry	C	D	C	C	D	D	D	D	F	F	F	F	D	E
3	Horizon 2030 peak hour with growth in background traffic and the proposed development demand	Existing 2025 road geometry	D	D	C	C	D	D	D	D	F	F	F	F	D	F
4	Horizon 2030 peak hour with growth in background traffic and the proposed development demand	Proposed 2030 road geometry	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	C	D	D	D	D	D

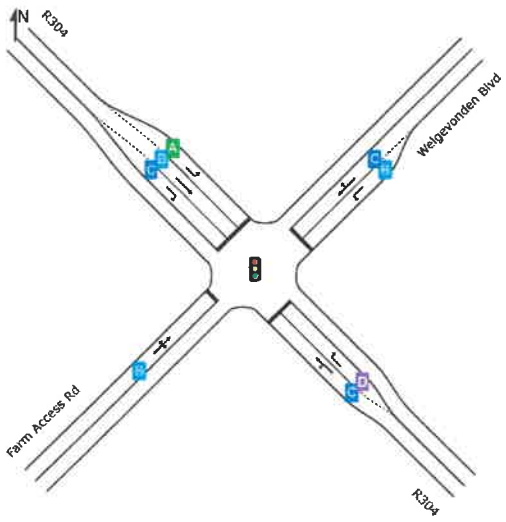
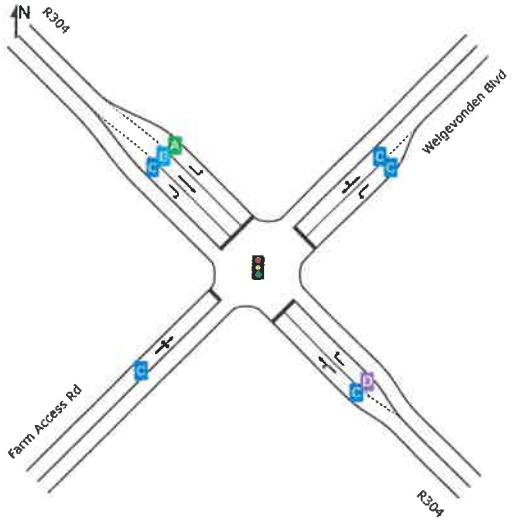
**N/A – Uncongested operations. The intersections do not require mitigation measures as they are functioning at acceptable LOS.*

7.1 TRAFFIC ANALYSIS SUMMARY AND MITIGATION MEASURES

Each critical intersection indicated different results across the various scenarios, as summarised below. The intersection analysis results indicate that Intersections 1, 2, 3, and 4 operate at an acceptable Level of Service (LOS) for the development. However, Intersections 5, 6 and 7 are operating at an unacceptable Level of Service (LOS), requiring upgrades. Table 7-7, Table 7-8 and Table 7-9 details the necessary improvements to enhance its performance to an acceptable LOS. The summaries of the intersection lane analysis are presented in Table 7-3 to Table 7-9.

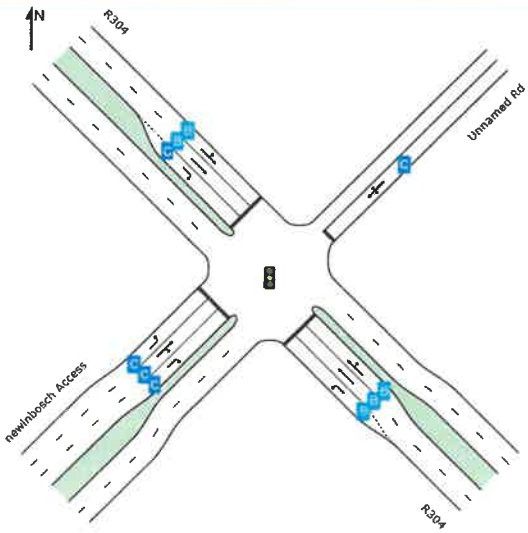
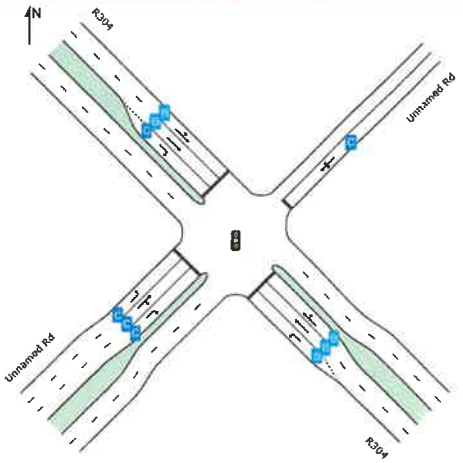
7.1.1 Intersection 1 – Traffic Analysis Summary

Table 7-3: Intersection 1 Traffic analysis summary

2025 EXISTING INTERSECTION LAYOUT	2030 DEVELOPMENT TRAFFIC MITIGATION MEASURES
	 **Upgrade:** The existing road geometry layout can accommodate the background and development traffic. No mitigation measures are required for this intersection.

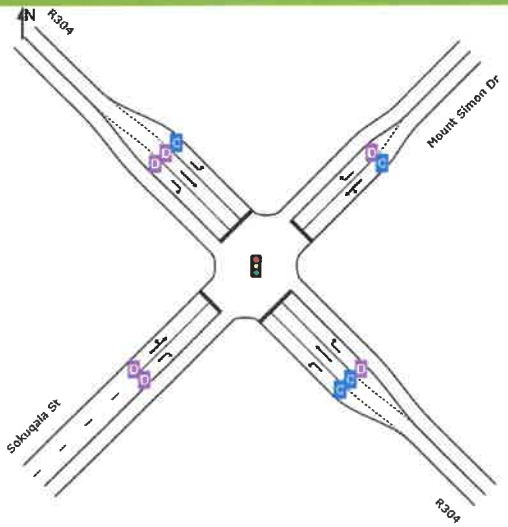
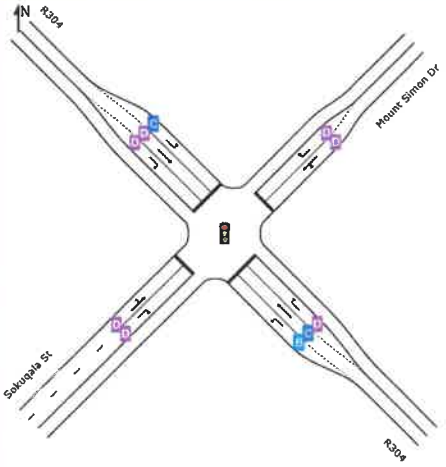
7.1.2 Intersection 2 – Traffic Analysis Summary

Table 7-4: Intersection 2 Traffic analysis summary

2025 EXISTING INTERSECTION LAYOUT	2030 DEVELOPMENT TRAFFIC MITIGATION MEASURES
	 **Upgrade:** The existing road geometry layout can accommodate the background and development traffic. No mitigation measures are required for this intersection.

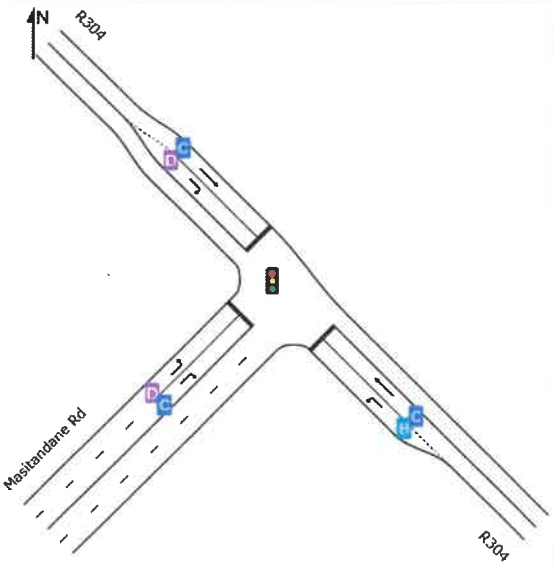
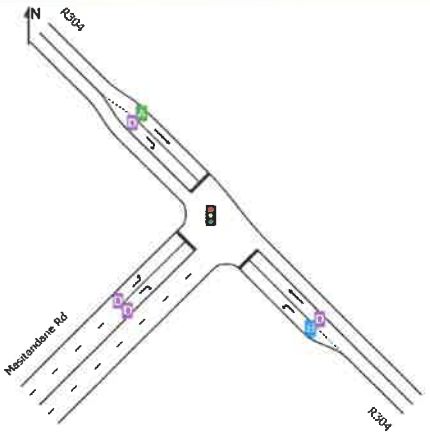
7.1.3 Intersection 3– Traffic Analysis Summary

Table 7-5: Intersection 3 Traffic analysis summary

2025 EXISTING INTERSECTION LAYOUT	2030 DEVELOPMENT TRAFFIC MITIGATION MEASURES
	 **Upgrade:** The existing road geometry layout can accommodate the background and development traffic. No mitigation measures are required for this intersection.

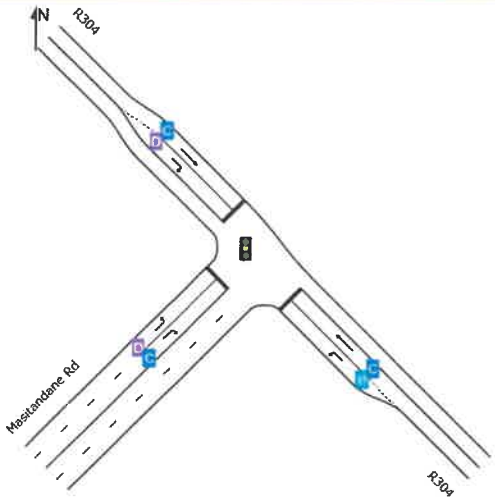
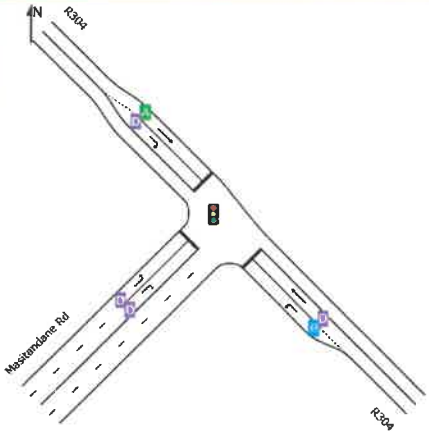
7.1.4 Intersection 4 – Traffic Analysis Summary

Table 7-6: Intersection 4 Traffic analysis summary

2025 EXISTING INTERSECTION LAYOUT	2030 DEVELOPMENT TRAFFIC MITIGATION MEASURES
	 **Upgrade:** The existing road geometry layout can accommodate the background and development traffic. No mitigation measures are required for this intersection.

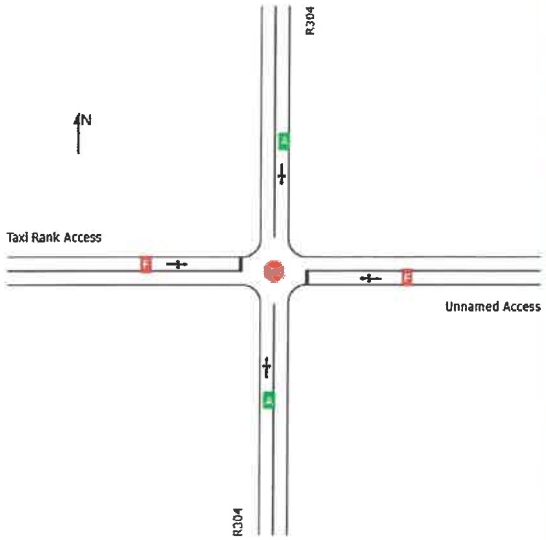
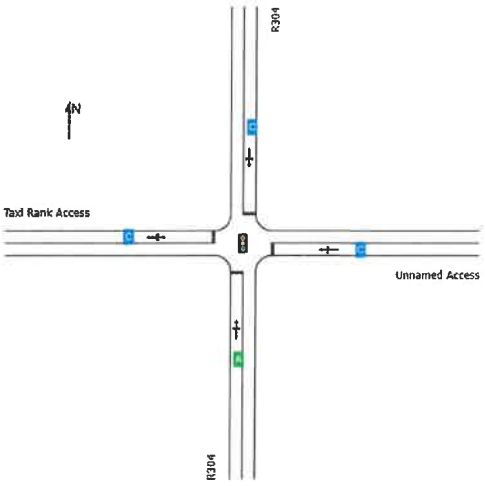
7.1.5 Intersection 5 – Traffic Analysis Summary

Table 7-7: Intersection 5 Traffic analysis summary

2025 EXISTING INTERSECTION LAYOUT	2030 DEVELOPMENT TRAFFIC MITIGATION MEASURES
	 **Upgrade:** A traffic signal must be implemented.

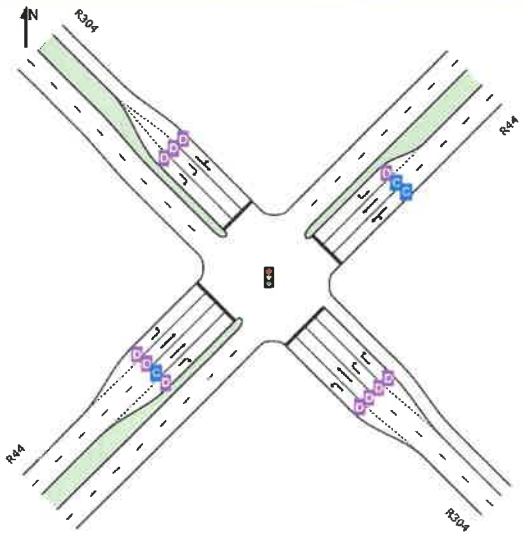
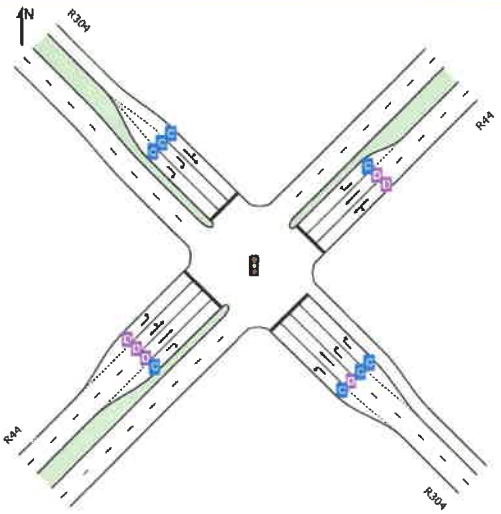
7.1.6 Intersection 6 – Traffic Analysis Summary

Table 7-8: Intersection 6 Traffic analysis summary

2025 EXISTING INTERSECTION LAYOUT	2030 DEVELOPMENT TRAFFIC MITIGATION MEASURES
	 **Upgrade:** A traffic signal must be implemented.

7.1.7 Intersection 7 – Traffic Analysis Summary

Table 7-9: Intersection 7 Traffic analysis summary

2025 EXISTING INTERSECTION LAYOUT	2030 DEVELOPMENT TRAFFIC MITIGATION MEASURES
	 **<u>Upgrade:</u>** A revised signal timing plan must be introduced. Modify a through movement lane on the southwestern leg to function as a shared through and left-turn lane.

8 PARKING DEMAND ANALYSIS

8.1 ON SITE PARKING

As per the Stellenbosch Municipality Zoning Scheme By-Law, 2019 (as amended by Council on 24 May 2023, 29 September 2023, and 30 July 2024), the Less Formal Residential (LFR) zone is represented in yellow (colour code 255, 255, 3) on the zoning map, as shown in Figure 8-1 below. Since the study area does not fall within the LFR zone, the land use category **"Flats in all zones except LFR"** will be applied for off-street parking requirements.

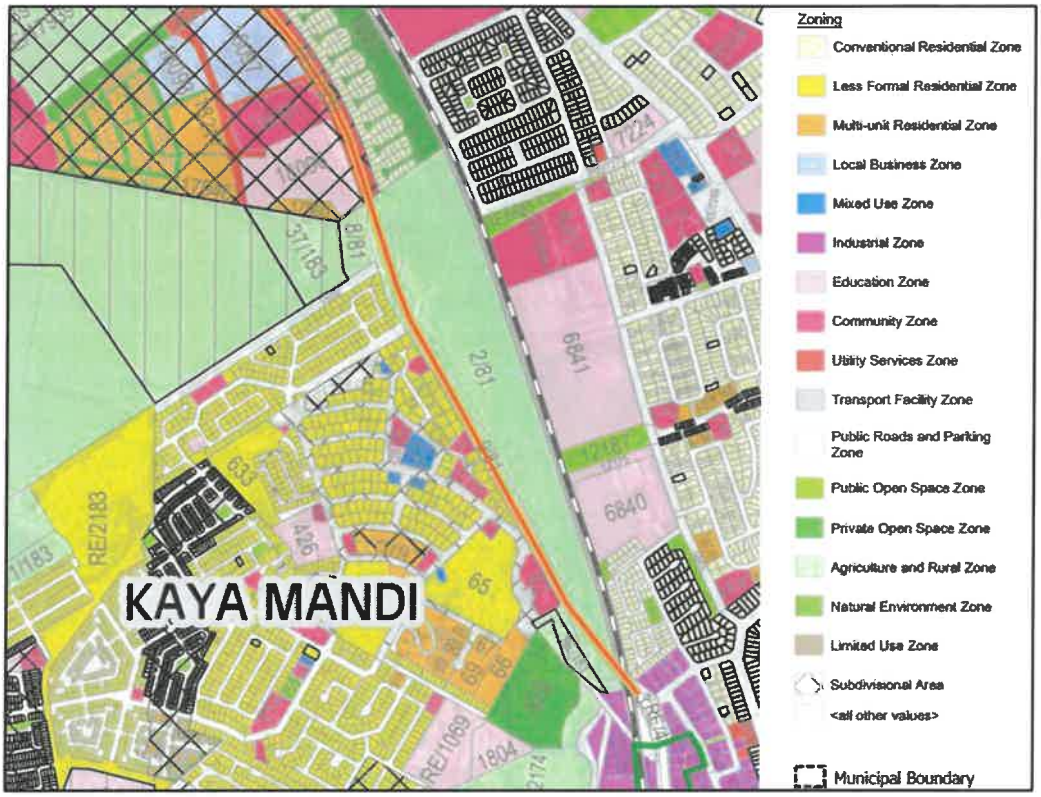


Figure 8-1: Stellenbosch current zoning

According to the land use scheme, the required parking ratio is 1 covered parking bay per unit and 0.5 parking bay per unit for visitors. The parking schedule requirements and calculations are presented in Table 8-1 below.

Table 8-1: Required parking bays.

LAND USE	DEVELOPABLE SITE	EXTENT	PARKING RATIO	PARKING REQUIRED
Flats in all zones	Site A (Northen site)	436 units	1 bay/dwelling unit (normal parking)	436 bays

LAND USE	DEVELOPABLE SITE	EXTENT	PARKING RATIO	PARKING REQUIRED
			0,5 bay/dwelling unit (additional parking reserved for visitors)	218 bays
	Site B (Southern site)	380 units	1 bay/unit plus 0.5 bays for visitors	380 bays
			0,5 bay/dwelling unit (additional parking reserved for visitors)	190 bays
	Total	816 units	**Total**	1224 bays

There are 411 parking bays provided for the proposed development and there are 1224 parking bays required according to the Stellenbosch Municipality Zoning Scheme By-Law, 2019. The number of parking bays provided will not be sufficient, there is a shortage of 813 parking bays. Therefore, 813 additional parking bays are required.

9 ACCESS QUEUE LENGTHS

The traffic volumes into the development will split into two site accesses. The 118 and 103 inbound vehicles per hour are expected to split to the northern site and southern site respectively. The northern site and the southern site are illustrated on Figure 9-1 below. The split of the traffic between the two site accesses requires that the queuing or stacking lengths, as determined by the flow and the number of access lanes be calculated. The inbound throat to the development must be of sufficient length to allow the access intersection to operate efficiently and safely. The proposed access gates are to be access controlled. Access control involves using some form of gate or boom to control access to a development.

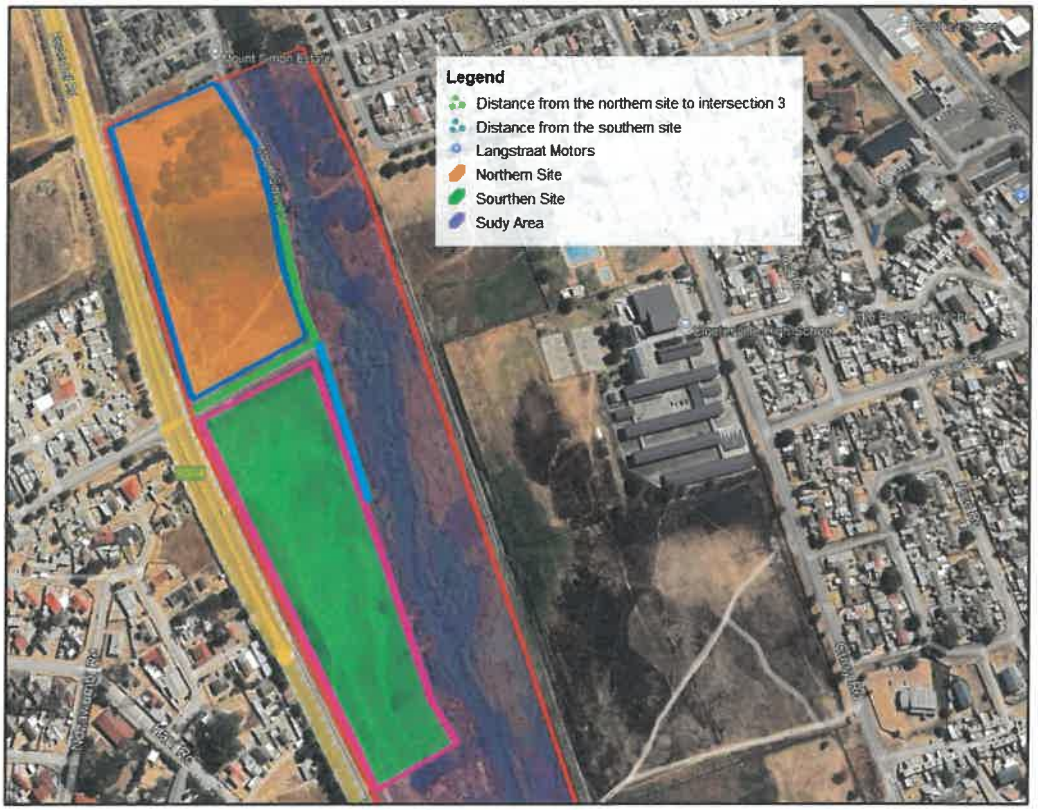


Figure 9-1: Northen Site and Southern Site

The PM peak hour inbound trips determine the queuing as it is the highest hourly volume. The queuing in the AM peak hour takes place inside the development and does not affect the R304. The 118 and 103 inbound vehicles per hour are expected to split to the northern site and southern site respectively.

For the determination of the storage length, a traffic ratio over all channels were determined using the following formula:

$$Traffic\ Ratio\ (v/c) = \frac{Total\ Volumes\ /\ PHF}{Service\ Flow\ Rate} * 100$$

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

Figure 9-2: Service Flow Rates

The required queue length is determined using the following formula:

$$L_{Throat} = N_{Que} * S_{Veh} \qquad L_{Throat} \geq L_{Min}$$

With: L_{Throat} = Required queue length to prevent spillback (m)
N_{Que} = 95th percentile queue length (no. of vehicles per channel)
S_{Veh} = Stopped spacing of vehicles
L_{Min} = Minimum queue length

The queue lengths must be determined for the 95th percentile queue length. A stopped spacing of 6.5 m may be used for light vehicles.

Storage (Vehs)	Traffic ratio for Number of Channels (Percentage)					
N_{Que}	1 Channel	2 Channel	3 Channel	4 Channel	5 Channel	6 Channel
1	22	55	92	131	176	220
2	38	91	150	213	282	351
3	48	113	183	256	336	414
4	55	127	202	281	364	446
5	60	136	214	295	380	463
6	64	142	222	305	390	475
7	67	147	228	311	397	482
8	69	150	233	316	403	488
9	71	153	236	320	407	492
10	73	155	239	323	410	495

Figure 9-3: 95th percentile storage length (vehicles per channel) at controlled access

Development	Class 1	Class 2	Class 3	Class 4a	Class 4b	Class 5a	Class 5b	Driveway
Service Station	75 m	50 m	25 m	15 m	15 m	10 m	10 m	N/A
Other developments	150 m	100 m	75 m	25 m	15 m	15	6.5 m	6.5 m

Figure 9-4: Minimum queueing lengths

9.1 CODED-CARD READER / SWIPE MAGNETIC CARD

The previous Traffic Impact Assessment (TIA) report, prepared by *CHRISEN (Reference: 704-161220, dated May 2021),* indicated that the preferred access control method would be a card-coded reader system. Consequently, the required access queue length was determined based on the operational characteristics and service flow rate of this specific access control type.

9.1.1 Northern Site Access

Table 9-1: Queue Length Parameters

PARAMETERS	INTERSECTION 3
Total Volume	118 vehicles
PHF (Peak Hour Factor)	0.65
Service Flow Rate (Swipe Magnetic Card)	480 vph
Traffic Ratio (v/c)	24.6
95th Percentile Queue Length (N_{Que})	2
Stopped Spacing of Vehicles (S_{veh})	6.5 m
Required Queue Length (L_{Throat})	13 m
Road Class	4a
Minimum Queue Length (L_{min})	25 m
Channel	1

The AM peak hour inbound volumes for the northern site are 221 vehicles. The ratio demand to service flow rate is **(118/480) *100 = 24.6**. This results in a 95th percentile queue length of 2 vehicles if 2 channels are provided. The spacing of the vehicles is taken to be 6.5 m as per TMH16.

Therefore, the required queue length = **2 * 6.5 = 13 m**

A minimum queue length of 25 m is required, and according to the *TMH 16 Vol. 2*, where queue lengths are only provided per approach and not by lane, the queue lengths must be divided by the number of lanes on the approach to establish the average queue length per lane. Therefore, 2 channels are provided, and the minimum required length is 12.5 m. The two provided channels will be adequate.

9.1.2 Southern Site Access

Table 9-2: Queue Length Parameters

PARAMETERS	INTERSECTION 3
Total Volume	103 vehicles
PHF (Peak Hour Factor)	0.65

PARAMETERS	INTERSECTION 3
Service Flow Rate (Swipe Magnetic Card)	480 vph
Traffic Ratio (v/c)	21.5
95th Percentile Queue Length (N_{Que})	1
Stopped Spacing of Vehicles (S_{veh})	6.5 m
Required Queue Length (L_{Throat})	6.5 m
Road Class	4a
Minimum Queue Length (L_{min})	25 m
Channel	1

The AM peak hour inbound volumes for the southern site are 103 vehicles. The ratio demand to service flow rate is **(103/480) *100 = 21.5**. This results in a 95th percentile queue length of 2 vehicles if 2 channels are provided. The spacing of the vehicles is taken to be 6.5 m as per TMH16.

Therefore, the required queue length = **1 * 6.5 = 6.5 m**

A minimum queue length of 25 m is required, and according to the *TMH 16 Vol. 2*, where queue lengths are only provided per approach and not by lane, the queue lengths must be divided by the number of lanes on the approach to establish the average queue length per lane. Therefore, 2 channels are provided, and the minimum required length is 12.5 m. The two provided channels will be adequate.

The distance between the two site accesses and Intersection 3 is 371 meters as shown in Figure 9-5. As a result, any spillover or traffic queue from the accesses will not impact the operations of Intersection 3.



Figure 9-5: Distance from the accesses to intersection 3

10 PUBLIC TRANSPORT

10.1 BACKGROUND

In terms of the *TMH 16, South African Traffic Impact and Site Traffic Assessment Manual (Vol. 1 & 2)*, it is a requirement that an assessment of public transport be included in a traffic impact assessment report. The TIA must evaluate the availability and adequacy of public transport facilities, particularly when a development is expected to generate significant pedestrian or commuter demand. The *South African Non-Motorised Transport (NMT) Guidelines* further emphasize that developments should integrate with existing public transport infrastructure to promote accessibility and reduce private vehicle dependence.

10.2 EXISTING PUBLIC TRANSPORT SERVICES

According to *TMH 16 Volumes 1 and 2*, as well as the *South African Non-Motorised Transport (NMT) Guidelines*, accessibility to public transport is a critical factor in assessing the adequacy of transport infrastructure for new developments. The area surrounding the development site is currently served by the following public transport services:

10.3 THE KAYAMANDI TAXI RANK

The Kayamandi Taxi Rank, located at the intersection of the R304 and Masitandane Road, approximately 700 meters from the proposed Mount Simon Precinct, provides minibus taxi services, which are a primary mode of public transport in South Africa. This distance falls within the acceptable walking distance to public transport facilities, as outlined in *TMH 16 Vol. 2*, which suggests that a walking distance of up to 800 meters is considered reasonable for pedestrian access to public transport nodes.



Figure 10-1: Kayamandi Taxi Rank

10.4 DU TOIT TRAIN STATION

Additionally, the Du Toit Train Station, situated approximately 1,290 meters from the proposed development, enhances accessibility by offering rail transport services for longer commuting distances.



Figure 10-2: Du Toit Train Station

11 NON-MOTORISED TRANSPORT (NMT)

The TMH 16 Volume 1 emphasizes the importance of integrating site and township facilities with the surrounding transportation system, particularly public transport. This integration ensures that developments are accessible and support various modes of transport, including NMT users.

There are existing discontinuous sidewalks along the northeastern side of the R304 area as indicated on Figure 11-1 below.



Figure 11-1: Existing and Proposed Pedestrian walkways

It is recommended that the pedestrian sidewalks be extended to seamlessly connect with the existing sidewalks along the R304 as indicated by yellow a colour on Figure 11-1 above. This extension will enhance pedestrian mobility, ensuring a continuous and accessible walkway for all users. Additionally, integrating the new sidewalks with the existing network will improve safety, encourage walking as a viable mode of transport, and support NMT initiatives. Proper design considerations, such as adequate width, surface quality, and the inclusion of pedestrian-friendly features like lighting and signage, should be incorporated to accommodate diverse users, including individuals with disabilities. A typical layout of the pedestrian sidewalks is shown on Figure 11-2 below.

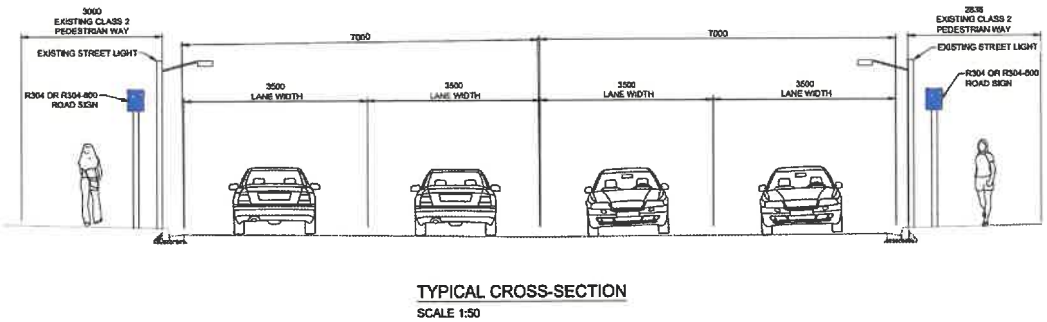


Figure 11-2: NMT Facilities Schematic Layout

12 CONCLUSION

The Traffic Impact Assessment (TIA) for the proposed residential development (3-4 storey walk up flats) on Erven 81/2 and 81/9, Stellenbosch, conducted by Delta Built Environment Consultants (Delta BEC), aimed to assess the traffic impacts of the development and provide recommendations to enhance mobility, safety, and operational efficiency within the study area.

The analysis revealed that the current road network and intersections generally operate at acceptable levels of service (LOS), except for intersections 5, 6 and 7, which is performing at an unacceptable LOS. The following mitigation measures are recommended. However, the developer is not responsible for these upgrades, as the intersections are already operated at an unacceptable level of service (LOS F) without the development volumes.

- Intersection 5 mitigation measures.
  - The traffic signal is recommended.
- Intersection 6 mitigation measures.
  - The traffic signal is recommended.
- Intersection 7 mitigation measures.
  - A revised signal timing plan must be introduced. Modify a through movement lane on the southwestern leg to function as a shared through and left-turn lane.
- It is recommended that the pedestrian sidewalks be extended to seamlessly connect with the existing sidewalks along the R304

In conclusion, Delta BEC recommends that the proposed development under Stellenbosch Municipality be approved, provided that the proposed mitigation measures and recommendations are implemented

13 REFERENCES

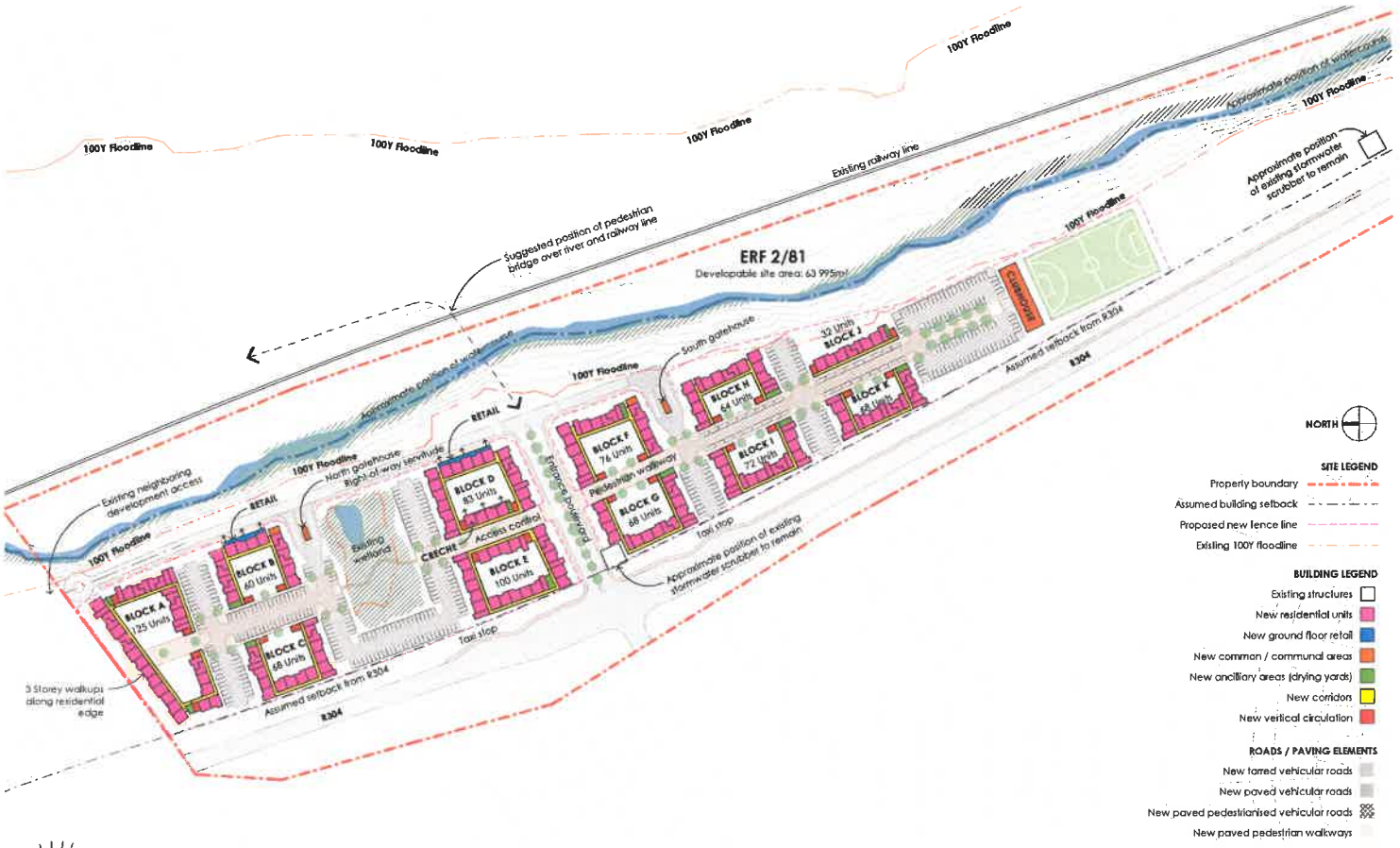
Department of Transport (DOT), 1985. *South African parking standards.* 2nd ed. Department of Transport.

Stellenbosch Municipality, 2019. *Zoning scheme by-law* (as amended by Council, 2025). Stellenbosch: Stellenbosch Municipality.

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Committee of Transport Officials (COTO), 2013. *TMH 17 Volume 1: South African trip data manual.* Version 1.01. Committee of Transport Officials.

APPENDIX A: SITE DEVELOPMENT PLAN



GAPP

STELLENBOSCH HOUSING TENDER BSM 26/21

PAGE 1 - PROPOSED SITE LAYOUT

johannesburg 97 second avenue melville 2092 | po box 31133 braamfontein 2017 | +27 11 482 1648 | office@jhb.gapp.net
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GAPP architects & urban designers (pty) ltd | reg no. 1993/003667/07 | www.gapp.net

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UNIT YIELD

UNIT TYPE	UNIT AREA	No. UNITS	UNITS MIX
Studio Unit Type 1	29.5m²	40	5%
Studio Unit Type 2	29.5m²	135	17%
One Bedroom Type 1	31m²	66	8%
One Bedroom Type 2	35m²	130	16%
Two Bedroom Type 1	42m²	81	10%
Two Bedroom Type 2	45m²	243	30%
Two Bedroom Type 3	48m²	121	15%
	Total units	816	100%

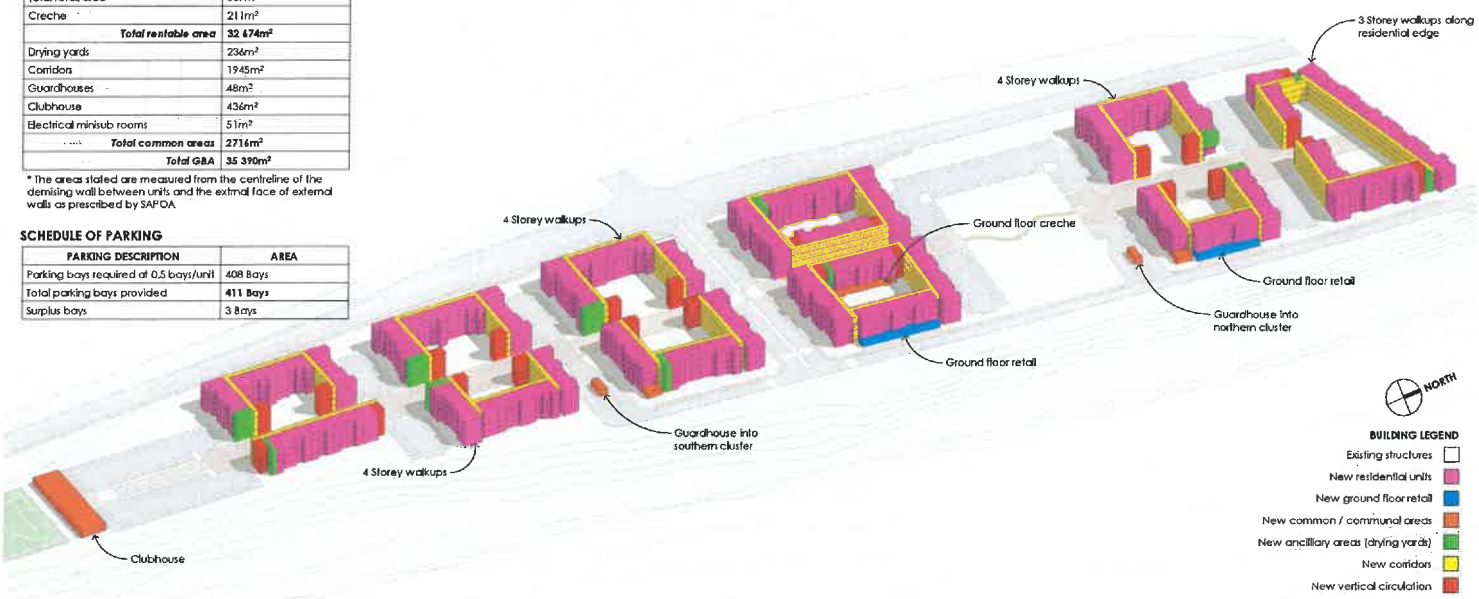
SCHEDULE OF AREAS

AREA DESCRIPTION	AREA
Total residential unit areas*	31 926m²
Total retail area	537m²
Creche	211m²
Total rentable area	**32 674m²**
Drying yards	236m²
Corridors	1945m²
Guardhouses	48m²
Clubhouse	436m²
Electrical minisub rooms	51m²
Total common areas	**2716m²**
Total GBA	**35 390m²**

* The areas stated are measured from the centreline of the demising wall between units and the extmal face of external walls as prescribed by SAPOA

SCHEDULE OF PARKING

PARKING DESCRIPTION	AREA
Parking bays required at 0.5 bays/unit	408 Bays
Total parking bays provided	**411 Bays**
Surplus bays	3 Bays



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STELLENBOSCH HOUSING TENDER BSM 26/21

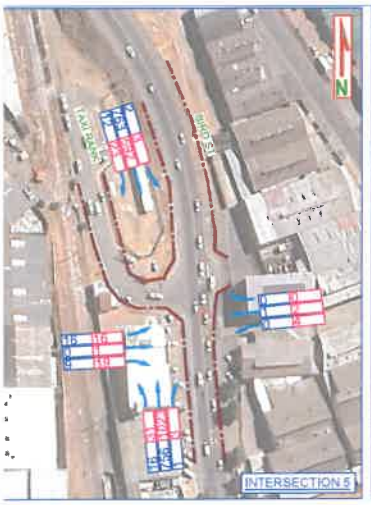
PAGE 2 - 3D CONCEPT MASSING MODEL

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cape town 150 longmarket st cape town 8001 | po box 15998 vlaeberg 8018 | +27 21 424 2390 | office@ctn.gapp.net
GAPP architects & urban designers (pty) ltd | reg no. 1998/003667/07 | www.gapp.net

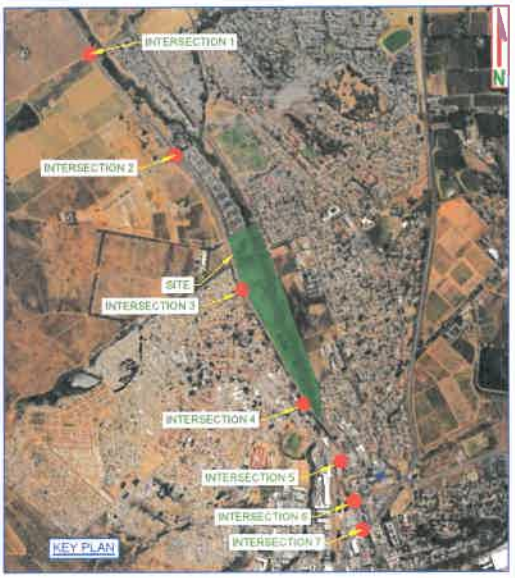
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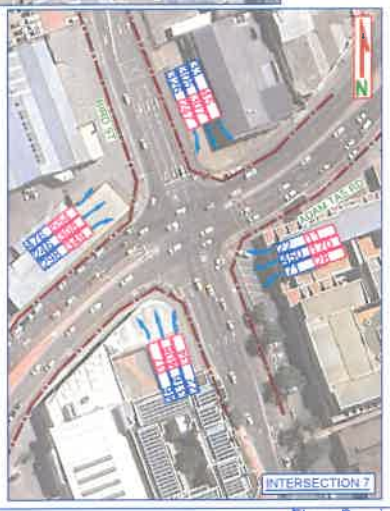
APPENDIX B: TRAFFIC FLOWS


INTERSECTION 1
INTERSECTION 2
INTERSECTION 3
INTERSECTION 4
KEY PLAN
SITE
INTERSECTION 5
INTERSECTION 6
INTERSECTION 7
LEGEND:
ROAD
SITES
LEFT
STRAIGHT
RIGHT
AM 1000
PM 1000
Project
P25004 STELLENBOSCH TIA
Figure Description
2025 EXISTING TRAFFIC VOLUMES AM & PM
Sheet
1
S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\DWG\P25004-TF-02-01_2024 EXISTING TRAFFIC VOLUMES AM & PM









LEGEND:

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DELTA

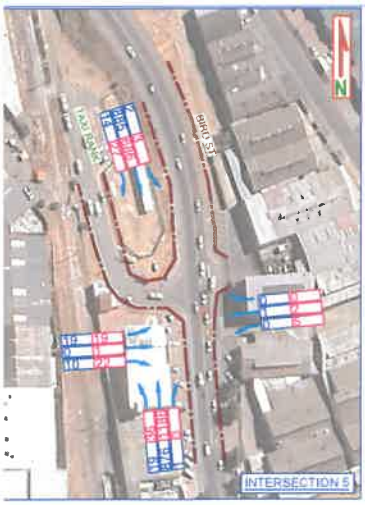
Project: P25004 STELLENBOSCH TIA

Figure Description: 2025 EXISTING TRAFFIC VOLUMES AM & PM

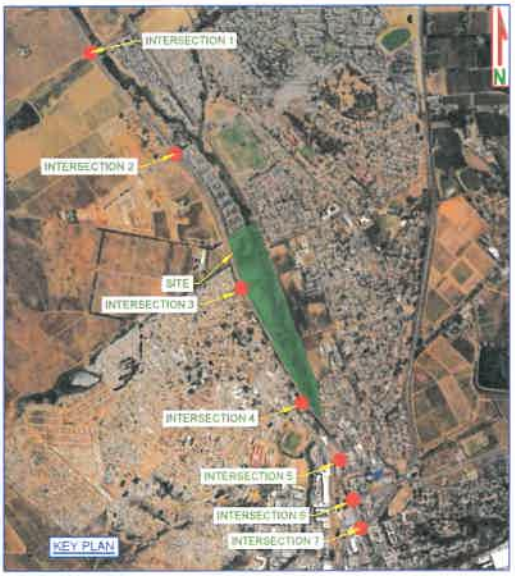
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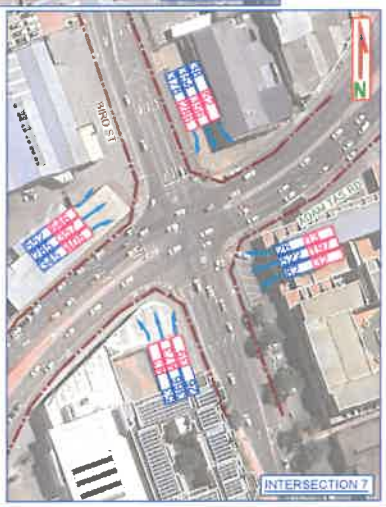
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INTERSECTION 1
INTERSECTION 2
INTERSECTION 3
INTERSECTION 4
INTERSECTION 5
INTERSECTION 6
INTERSECTION 7
SITE
KEY PLAN
LEGEND:
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Project
P25004 STELLENBOSCH TIA
Figure Description
2030 BACKGROUND TRAFFIC VOLUMES AM & PM
Sheet
3
S:\P25004 STELLENBOSCH TIA\DESIGN\C\MLI\TRAFFIC\DWG\P25004-TF-02-02_2030 BACKGROUND TRAFFIC VOLUMES AM & PM









LEGEND:

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AM	1000
PM	1000

Project	Figure Description	Sheet
P25004 STELLENBOSCH TIA	2030 BACKGROUND TRAFFIC VOLUMES AM & PM	4

S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\DWG\P25004-TF-02-02_2030 BACKGROUND TRAFFIC VOLUMES AM & PM



DELTA

Project: P25004 STELLENBOSCH TIA

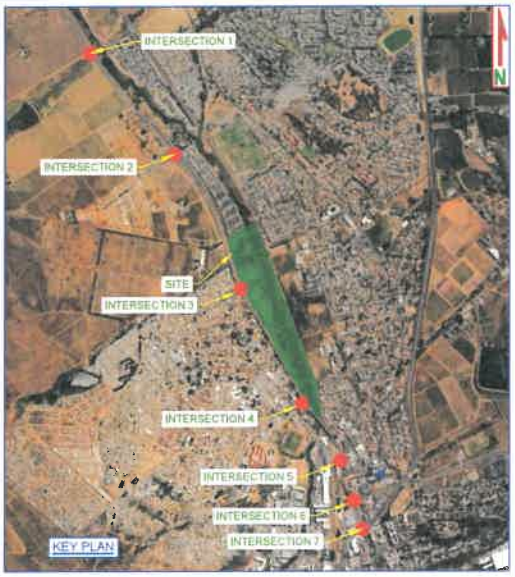
Figure Description: DEVELOPMENT TRIP DISTRIBUTIONS AM INBOUND & OUTBOUND

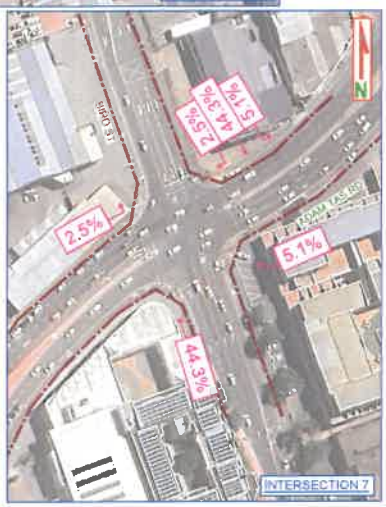
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S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\DWG\P25004-TF-02-04_DEVELOPMENT TRIP DISTRIBUTIONS AM INBOUND & OUTBOUND TRIPS PERCENTAGE









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OUTBOUND TRIPS %

DELTA

Project: P25004 STELLENBOSCH TIA

Figure Description: DEVELOPMENT TRIP DISTRIBUTIONS AM INBOUND & OUTBOUND

Sheet: 6

S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\DWG\P25004-TF-02-04__DEVELOPMENT TRIP DISTRIBUTIONS AM INBOUND & OUTBOUND TRIPS PERCENTAGE



DELTA

Project: P25004 STELLENBOSCH TIA

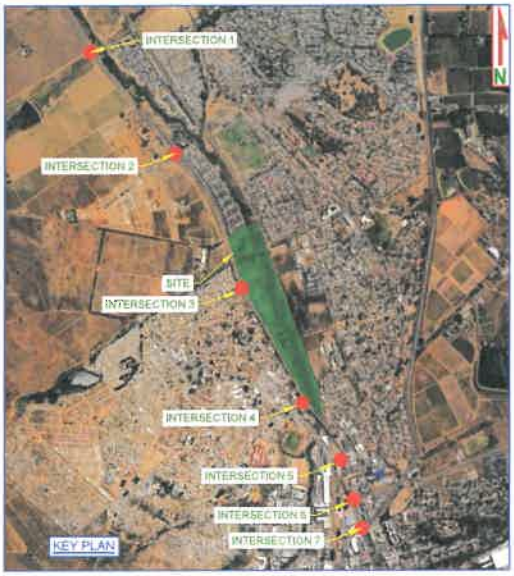
Figure Description: DEVELOPMENT TRIP DISTRIBUTIONS PM INBOUND & OUTBOUND

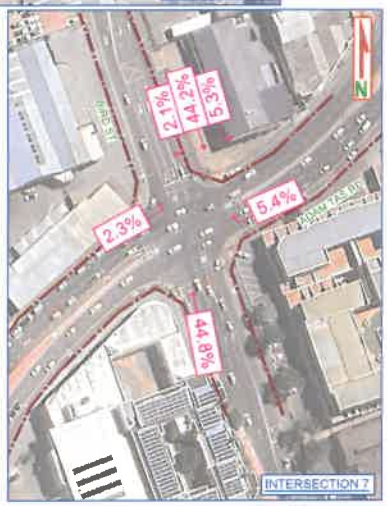
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S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\DWG\P25004-TF-02-05_DEVELOPMENT TRIP DISTRIBUTIONS PM INBOUND & OUTBOUND TRIPS PERCENTAGE









LEGEND:
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INBOUND TRIPS %
OUTBOUND TRIPS %

DELTA

Project: P25004 STELLENBOSCH TIA

Figure Description: DEVELOPMENT TRIP DISTRIBUTIONS PM INBOUND & OUTBOUND

Sheet: 8

S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\DWG\P25004-TF-02-05_DEVELOPMENT TRIP DISTRIBUTIONS PM INBOUND & OUTBOUND TRIPS PERCENTAGE



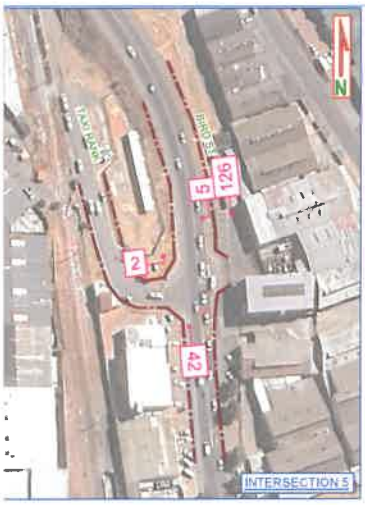
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Project: P25004 STELLENBOSCH TIA

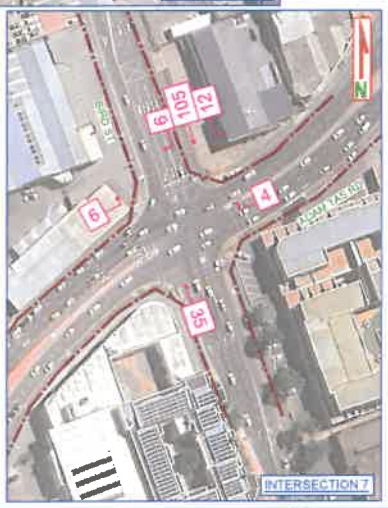
Figure Description: DEVELOPMENT TRIP ASSIGNMENT AM INBOUND & OUTBOUND

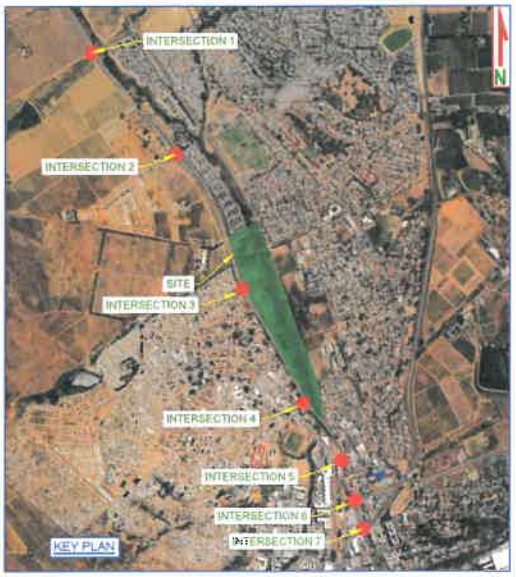
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LEGEND:
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INBOUND TRIPS %
OUTBOUND TRIPS %

DELTA

Project: P25004 STELLENBOSCH TIA

Figure Description: DEVELOPMENT TRIP ASSIGNMENT AM INBOUND & OUTBOUND

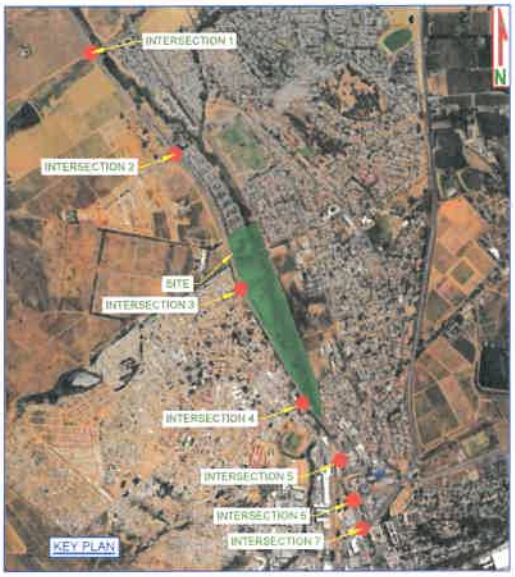
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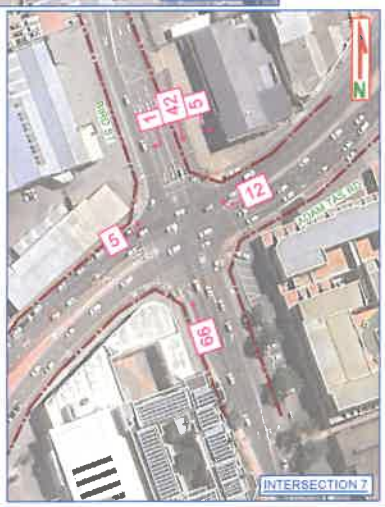
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INTERSECTION 1
INTERSECTION 2
INTERSECTION 3
INTERSECTION 4
INTERSECTION 5
INTERSECTION 6
INTERSECTION 7
SITE
KEY PLAN
LEGEND:
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INBOUND TRIPS
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Project
P25004 STELLENBOSCH TIA
Figure Description
DEVELOPMENT TRIP ASSIGNMENT PM INBOUND & OUTBOUND TRIPS
Sheet
11
S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\DWG\P25004-TF-02-05_DEVELOPMENT TRIP ASSIGNMENT PM INBOUND & OUTBOUND TRIPS









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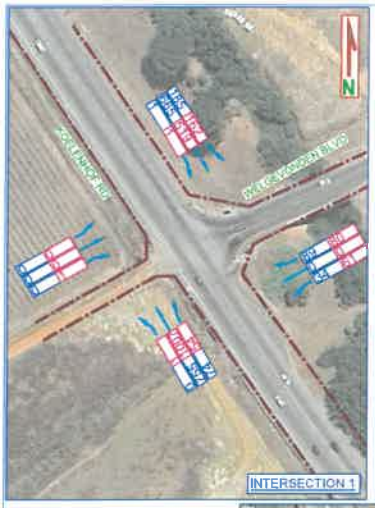
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Project: P25004 STELLENBOSCH TIA

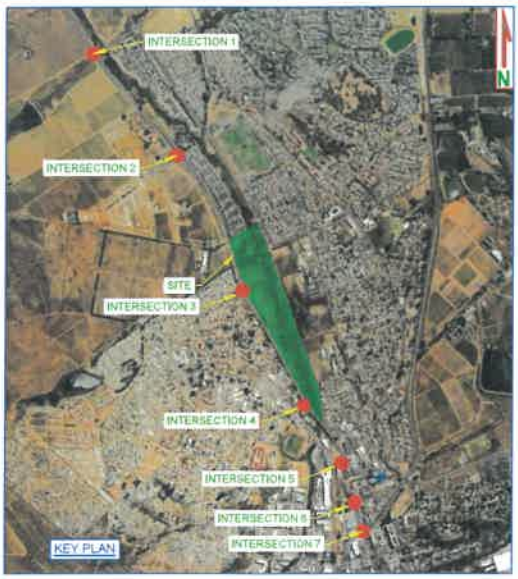
Figure Description: DEVELOPMENT TRIP ASSIGNMENT PM INBOUND & OUTBOUND

Sheet: 12

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LEGEND:

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PM	1000

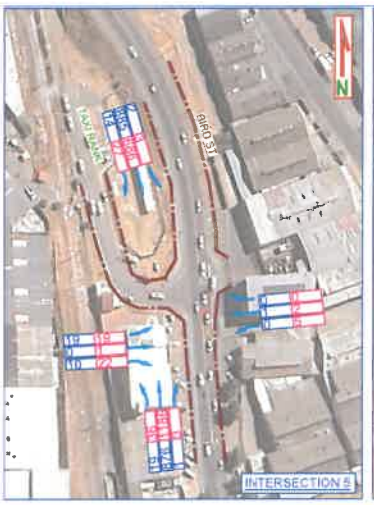
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Project: P25004 STELLENBOSCH TIA

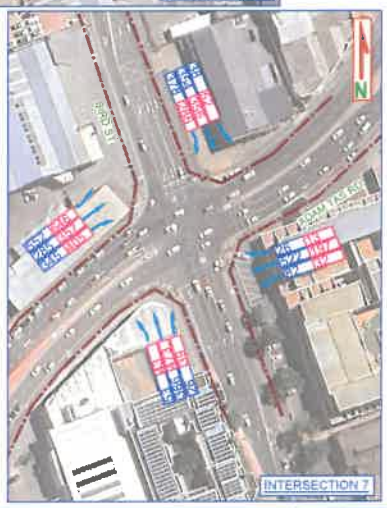
Figure Description: 2030 BACKGROUND AND DEVELOPMENT TRAFFIC VOLUMES AM & PM

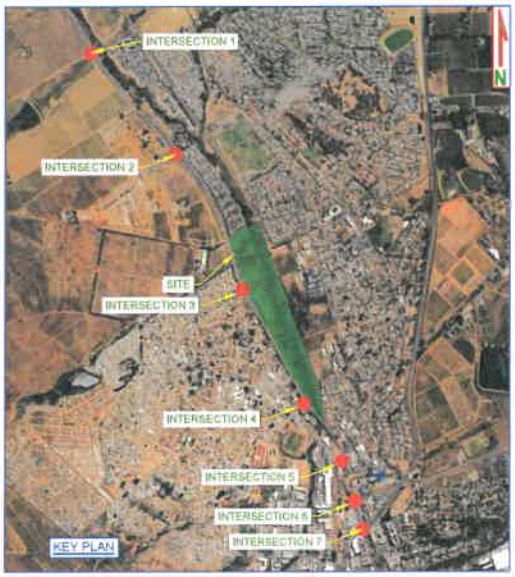
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S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\DWG\P25004-TF-02-03_2030 BACKGROUND AND DEVELOPMENT TRAFFIC VOLUMES AM & PM









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Project	Figure Description	Sheet
P25004 STELLENBOSCH TIA	2030 BACKGROUND AND DEVELOPMENT TRAFFIC VOLUMES AM & PM	14

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APPENDIX C: 2025 EXISTING LANE SUMMARY ON AN EXISTING ROAD GEOMETRY

LANE SUMMARY

Site: 1 [Intersection 1_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 58 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	652	5.0	652	5.0	736[1]	0.885	100	22.8	LOS C	18.5	135.3	Full	500	0.0	0.0
Lane 2	64	25.0	64	25.0	163	0.392	100	35.4	LOS D	1.9	15.8	Short	60	0.0	NA
Approach	716	6.8	716	6.8		0.885		23.9	LOS C	18.5	135.3				
NorthEast: Welgevonden Blvd															
Lane 1	29	14.0	29	14.0	553	0.052	100	18.5	LOS B	0.6	4.5	Short	50	0.0	NA
Lane 2	78	4.9	78	4.9	248	0.315	100	30.0	LOS C	2.1	15.5	Full	500	0.0	0.0
Approach	107	7.4	107	7.4		0.315		26.9	LOS C	2.1	15.5				
NorthWest: R304															
Lane 1	160	21.0	160	21.0	863	0.185	100	7.7	LOS A	1.4	11.7	Short	170	0.0	NA
Lane 2	574	8.0	574	8.0	735	0.781	100	17.6	LOS B	14.6	108.9	Full	500	0.0	0.0
Lane 3	1	0.0	1	0.0	192	0.005	100	29.8	LOS C	0.0	0.2	Short	120	0.0	NA
Approach	735	10.8	735	10.8		0.781		15.5	LOS B	14.6	108.9				
SouthWest: Farm Access Rd															
Lane 1	3	0.0	3	0.0	128	0.023	100	19.8	LOS B	0.1	0.4	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.023		19.8	LOS B	0.1	0.4				
All Vehicles	1561	8.7	1561	8.7		0.885		20.1	LOS C	18.5	135.3				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	651	-	652	5.0	736[1]	0.885	100	NA	NA
Lane 2	-	-	64	64	25.0	163	0.392	100	0.0	1
Approach	1	651	64	716	6.8		0.885			

NorthEast: Welgevonden Blvd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	29	-	-	29	14.0	553	0.052	100	0.0	2

Lane 2	-	1	77	78	4.9	248	0.315	100	NA	NA
Approach	29	1	77	107	7.4		0.315			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	160	-	-	160	21.0	863	0.185	100	0.0	2
Lane 2	-	574	-	574	8.0	735	0.781	100	NA	NA
Lane 3	-	-	1	1	0.0	192	0.005	100	0.0	2
Approach	160	574	1	735	10.8		0.781			
SouthWest: Farm Access Rd										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	128	0.023	100	NA	NA
Approach	1	1	1	3	0.0		0.023			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1561	8.7	0.885

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Farm Access Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 1 [Intersection 1_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 50 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	870	2.0	870	2.0	986[1]	0.882	100	16.0	LOS B	20.5	146.1	Full	500	0.0	0.0
Lane 2	47	26.0	47	26.0	188	0.250	100	29.8	LOS C	1.1	9.7	Short	60	0.0	NA
Approach	917	3.2	917	3.2		0.882		16.7	LOS B	20.5	146.1				
NorthEast: Welgevonden Blvd															
Lane 1	53	36.0	53	36.0	562	0.094	100	15.0	LOS B	0.9	7.8	Short	50	0.0	NA
Lane 2	70	34.5	70	34.5	239	0.293	100	25.6	LOS C	1.6	14.7	Full	500	0.0	0.0
Approach	123	35.1	123	35.1		0.293		21.0	LOS C	1.6	14.7				
NorthWest: R304															
Lane 1	140	24.0	140	24.0	729	0.192	100	8.4	LOS A	1.2	10.5	Short	170	0.0	NA
Lane 2	448	3.0	448	3.0	574	0.781	100	18.7	LOS B	10.4	74.8	Full	500	0.0	0.0
Lane 3	1	100.0	1	100.0	132	0.008	100	26.7	LOS C	0.0	0.3	Short	120	0.0	NA
Approach	589	8.2	589	8.2		0.781		16.2	LOS B	10.4	74.8				
SouthWest: Farm Access Rd															
Lane 1	3	0.0	3	0.0	113	0.026	100	28.4	LOS C	0.1	0.5	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.026		28.4	LOS C	0.1	0.5				
All Vehicles	1632	7.4	1632	7.4		0.882		16.9	LOS B	20.5	146.1				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	869	-	870	2.0	986[1]	0.882	100	NA	NA
Lane 2	-	-	47	47	26.0	188	0.250	100	0.0	1
Approach	1	869	47	917	3.2		0.882			

NorthEast: Welgevonden Blvd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	53	-	-	53	36.0	562	0.094	100	0.0	2

Lane 2	-	1	69	70	34.5	239	0.293	100	NA	NA
Approach	53	1	69	123	35.1		0.293			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	140	-	-	140	24.0	729	0.192	100	0.0	2
Lane 2	-	448	-	448	3.0	574	0.781	100	NA	NA
Lane 3	-	-	1	1	100.0	132	0.008	100	0.0	2
Approach	140	448	1	589	8.2		0.781			
SouthWest: Farm Access Rd										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	113	0.026	100	NA	NA
Approach	1	1	1	3	0.0		0.026			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	1632	7.4	0.882							

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Farm Access Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 2 [Intersection 2_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 57 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	12	0.0	12	0.0	717	0.017	100	15.3	LOS B	0.2	1.4	Short	115	0.0	NA
Lane 2	326	7.0	326	7.0	720	0.453	100	14.9	LOS B	6.9	51.2	Full	500	0.0	0.0
Lane 3	335	7.0	335	7.0	738	0.453	100	18.3	LOS B	8.3	61.8	Full	500	0.0	0.0
Approach	673	6.9	673	6.9		0.453		16.6	LOS B	8.3	61.8				
NorthEast: Unnamed Rd (a)															
Lane 1	3	0.0	3	0.0	132	0.023	100	30.9	LOS C	0.1	0.6	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.023		30.9	LOS C	0.1	0.6				
NorthWest: R304															
Lane 1	317	7.0	317	7.0	720	0.440	100	14.8	LOS B	6.7	49.4	Full	500	0.0	0.0
Lane 2	317	7.0	317	7.0	720	0.440	100	14.8	LOS B	6.7	49.4	Full	500	0.0	0.0
Lane 3	6	50.0	6	50.0	72	0.083	100	34.9	LOS C	0.2	1.8	Short	120	0.0	NA
Approach	640	7.4	640	7.4		0.440		15.0	LOS B	6.7	49.4				
SouthWest: Newinbosch Access															
Lane 1	20	4.0	20	4.0	285	0.070	100	26.9	LOS C	0.5	3.6	Full	500	0.0	0.0
Lane 2	14	3.7	14	3.7	287	0.047	100	26.3	LOS C	0.3	2.4	Full	500	0.0	0.0
Lane 3	13	4.0	13	4.0	285	0.047	100	26.6	LOS C	0.3	2.4	Full	500	0.0	0.0
Approach	47	3.9	47	3.9		0.070		26.7	LOS C	0.5	3.6				
All Vehicles	1363	7.0	1363	7.0		0.453		16.2	LOS B	8.3	61.8				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	12	-	-	12	0.0	717	0.017	100	0.0	2
Lane 2	-	326	-	326	7.0	720	0.453	100	NA	NA
Lane 3	-	334	1	335	7.0	738	0.453	100	NA	NA
Approach	12	660	1	673	6.9		0.453			

NorthEast: Unnamed Rd (a)

Mov. From NE	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

To Exit:	SE	SW	NW							
Lane 1	1	1	1	3	0.0	132	0.023	100	NA	NA
Approach	1	1	1	3	0.0		0.023			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	316	-	317	7.0	720	0.440	100	NA	NA
Lane 2	-	317	-	317	7.0	720	0.440	100	NA	NA
Lane 3	-	-	6	6	50.0	72	0.083	100	0.0	2
Approach	1	633	6	640	7.4		0.440			

SouthWest: Newinbosch Access

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	20	-	-	20	4.0	285	0.070	100	NA	NA
Lane 2	-	1	13	14	3.7	287	0.047	100	NA	NA
Lane 3	-	-	13	13	4.0	285	0.047	100	NA	NA
Approach	20	1	26	47	3.9		0.070			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1363	7.0	0.453

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	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
SouthEast: 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
NorthEast: Unnamed Rd (a)				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Newinbosch Access				
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

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Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 2\Intersection 2_Stellenbosch.sip9

LANE SUMMARY

Site: 2 [Intersection 2_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 57 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	12	8.0	12	8.0	678	0.018	100	15.4	LOS B	0.2	1.5	Short	115	0.0	NA
Lane 2	440	4.0	440	4.0	734	0.599	100	16.0	LOS B	10.0	72.4	Full	500	0.0	0.0
Lane 3	453	4.0	453	4.0	756	0.599	100	19.4	LOS B	10.1	73.4	Full	500	0.0	0.0
Approach	905	4.0	905	4.0		0.599		17.7	LOS B	10.1	73.4				
NorthEast: Unnamed Rd (a)															
Lane 1	3	0.0	3	0.0	132	0.023	100	30.9	LOS C	0.1	0.6	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.023		30.9	LOS C	0.1	0.6				
NorthWest: R304															
Lane 1	251	7.0	251	7.0	720	0.349	100	14.2	LOS B	5.1	37.5	Full	500	0.0	0.0
Lane 2	252	7.0	252	7.0	720	0.349	100	14.2	LOS B	5.1	37.5	Full	500	0.0	0.0
Lane 3	9	0.0	9	0.0	98	0.092	100	34.1	LOS C	0.3	1.8	Short	120	0.0	NA
Approach	512	6.9	512	6.9		0.349		14.5	LOS B	5.1	37.5				
SouthWest: Newinbosch Access															
Lane 1	13	8.0	13	8.0	277	0.047	100	26.8	LOS C	0.3	2.4	Full	500	0.0	0.0
Lane 2	21	9.1	21	9.1	277	0.076	100	26.6	LOS C	0.5	3.9	Full	500	0.0	0.0
Lane 3	21	10.0	21	10.0	274	0.076	100	26.9	LOS C	0.5	3.9	Full	500	0.0	0.0
Approach	55	9.2	55	9.2		0.076		26.7	LOS C	0.5	3.9				
All Vehicles	1475	5.2	1475	5.2		0.599		17.0	LOS B	10.1	73.4				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	12	-	-	12	8.0	678	0.018	100	0.0	2
Lane 2	-	440	-	440	4.0	734	0.599	100	NA	NA
Lane 3	-	452	1	453	4.0	756	0.599	100	NA	NA
Approach	12	892	1	905	4.0		0.599			

NorthEast: Unnamed Rd (a)

Mov. From NE	L2	T1	R2	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

To Exit:	SE	SW	NW							
Lane 1	1	1	1	3	0.0	132	0.023	100	NA	NA
Approach	1	1	1	3	0.0		0.023			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	250	-	251	7.0	720	0.349	100	NA	NA
Lane 2	-	252	-	252	7.0	720	0.349	100	NA	NA
Lane 3	-	-	9	9	0.0	98	0.092	100	0.0	2
Approach	1	502	9	512	6.9		0.349			

SouthWest: Newinbosch Access

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	13	-	-	13	8.0	277	0.047	100	NA	NA
Lane 2	-	2	19	21	9.1	277	0.076	100	NA	NA
Lane 3	-	-	21	21	10.0	274	0.076	100	NA	NA
Approach	13	2	40	55	9.2		0.076			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1475	5.2	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 %	Opposing Flow Rate 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
SouthEast: 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
NorthEast: Unnamed Rd (a)				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Newinbosch Access				
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

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Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 2\Intersection 2_Stellenbosch.sip9

LANE SUMMARY

Site: 3 [Intersection 3_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 74 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	107	3.0	107	3.0	663	0.161	100	21.2	LOS C	2.6	18.8	Short	140	0.0	NA
Lane 2	575	6.0	575	6.0	681[1]	0.844	100	27.4	LOS C	19.5	143.3	Full	500	0.0	0.0
Lane 3	22	9.0	22	9.0	142	0.155	100	43.4	LOS D	0.8	6.0	Short	70	0.0	NA
Approach	704	5.6	704	5.6		0.844		26.9	LOS C	19.5	143.3				
NorthEast: Mount Simon Dr															
Lane 1	11	18.2	11	18.2	270	0.041	100	32.8	LOS C	0.3	2.8	Full	500	0.0	0.0
Lane 2	13	0.0	13	0.0	226	0.058	100	36.2	LOS D	0.4	3.0	Short	40	0.0	NA
Approach	24	8.3	24	8.3		0.058		34.6	LOS C	0.4	3.0				
NorthWest: R304															
Lane 1	5	20.0	5	20.0	593	0.008	100	28.9	LOS C	0.1	0.9	Short	55	0.0	NA
Lane 2	636	5.0	636	5.0	687[1]	0.926	100	39.9	LOS D	25.3	184.4	Full	500	0.0	0.0
Lane 3	19	95.0	19	95.0	90	0.212	100	48.0	LOS D	0.7	9.1	Short	70	0.0	NA
Approach	660	7.7	660	7.7		0.926		40.0	LOS D	25.3	184.4				
SouthWest: Sokuqala St															
Lane 1	143	10.8	143	10.8	280	0.511	100	36.5	LOS D	5.0	37.9	Full	500	0.0	0.0
Lane 2	59	2.0	59	2.0	223	0.265	100	37.8	LOS D	2.0	14.5	Full	500	0.0	0.0
Approach	202	8.3	202	8.3		0.511		36.9	LOS D	5.0	37.9				
All Vehicles	1590	6.9	1590	6.9		0.926		33.8	LOS C	25.3	184.4				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	107	-	-	107	3.0	663	0.161	100	0.0	2
Lane 2	-	575	-	575	6.0	681[1]	0.844	100	NA	NA
Lane 3	-	-	22	22	9.0	142	0.155	100	0.0	2
Approach	107	575	22	704	5.6		0.844			

NorthEast: Mount Simon Dr

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	1	-	11	18.2	270	0.041	100	NA	NA
Lane 2	-	-	13	13	0.0	226	0.058	100	0.0	1
Approach	10	1	13	24	8.3		0.058			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	-	-	5	20.0	593	0.008	100	0.0	2
Lane 2	-	636	-	636	5.0	687[1]	0.926	100	NA	NA
Lane 3	-	-	19	19	95.0	90	0.212	100	0.0	2
Approach	5	636	19	660	7.7		0.926			
SouthWest: Sokuqala St										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	141	2	-	143	10.8	280	0.511	100	NA	NA
Lane 2	-	-	59	59	2.0	223	0.265	100	NA	NA
Approach	141	2	59	202	8.3		0.511			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1590	6.9	0.926

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	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
SouthEast: 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
NorthEast: Mount Simon Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Sokuqala St				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 3 [Intersection 3_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 74 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	116	4.0	116	4.0	659	0.176	100	21.3	LOS C	2.9	20.7	Short	140	0.0	NA
Lane 2	664	5.0	664	5.0	677[1]	0.981	100	54.0	LOS D	33.7	246.3	Full	500	0.0	0.0
Lane 3	42	0.0	42	0.0	151	0.279	100	47.9	LOS D	1.5	10.7	Short	70	0.0	NA
Approach	822	4.6	822	4.6		0.981		49.1	LOS D	33.7	246.3				
NorthEast: Mount Simon Dr															
Lane 1	18	0.0	18	0.0	302	0.060	100	32.9	LOS C	0.6	3.9	Full	500	0.0	0.0
Lane 2	13	0.0	13	0.0	226	0.058	100	36.2	LOS D	0.4	3.0	Short	40	0.0	NA
Approach	31	0.0	31	0.0		0.060		34.3	LOS C	0.6	3.9				
NorthWest: R304															
Lane 1	6	17.0	6	17.0	604	0.010	100	24.5	LOS C	0.1	1.1	Short	55	0.0	NA
Lane 2	528	6.0	528	6.0	683[1]	0.773	100	28.3	LOS C	17.1	126.2	Full	500	0.0	0.0
Lane 3	20	0.0	20	0.0	151	0.133	100	40.6	LOS D	0.7	5.0	Short	70	0.0	NA
Approach	554	5.9	554	5.9		0.773		28.7	LOS C	17.1	126.2				
SouthWest: Sokuqala St															
Lane 1	197	10.9	197	10.9	279	0.705	100	37.9	LOS D	7.1	54.3	Full	500	0.0	0.0
Lane 2	77	2.0	77	2.0	223	0.346	100	38.3	LOS D	2.7	19.2	Full	500	0.0	0.0
Approach	274	8.4	274	8.4		0.705		38.0	LOS D	7.1	54.3				
All Vehicles	1681	5.6	1681	5.6		0.981		40.3	LOS D	33.7	246.3				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	116	-	-	116	4.0	659	0.176	100	0.0	2
Lane 2	-	664	-	664	5.0	677[1]	0.981	100	NA	NA
Lane 3	-	-	42	42	0.0	151	0.279	100	0.0	2
Approach	116	664	42	822	4.6		0.981			

NorthEast: Mount Simon Dr

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	1	-	18	0.0	302	0.060	100	NA	NA
Lane 2	-	-	13	13	0.0	226	0.058	100	0.0	1
Approach	17	1	13	31	0.0		0.060			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	6	-	-	6	17.0	604	0.010	100	0.0	2
Lane 2	-	528	-	528	6.0	683[1]	0.773	100	NA	NA
Lane 3	-	-	20	20	0.0	151	0.133	100	0.0	2
Approach	6	528	20	554	5.9		0.773			

SouthWest: Sokuqala St

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	196	1	-	197	10.9	279	0.705	100	NA	NA
Lane 2	-	-	77	77	2.0	223	0.346	100	NA	NA
Approach	196	1	77	274	8.4		0.705			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1681	5.6	0.981

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	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
SouthEast: 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
NorthEast: Mount Simon Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Sokuqala St				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 4 [Intersection 4_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 67 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	147	11.0	147	11.0	1208	0.122	100	13.5	LOS B	1.6	11.9	Short	50	0.0	NA
Lane 2	625	5.0	625	5.0	686[1]	0.912	100	31.7	LOS C	21.7	158.1	Full	500	0.0	0.0
Approach	772	6.1	772	6.1		0.912		28.2	LOS C	21.7	158.1				
NorthWest: R304															
Lane 1	639	5.0	639	5.0	742[1]	0.861	100	25.9	LOS C	19.9	145.1	Full	500	0.0	0.0
Lane 2	66	14.0	66	14.0	202	0.327	100	39.8	LOS D	2.1	16.6	Short	60	0.0	NA
Approach	705	5.8	705	5.8		0.861		27.2	LOS C	19.9	145.1				
SouthWest: Masitandane Rd															
Lane 1	79	10.0	79	10.0	207	0.382	100	35.7	LOS D	2.5	19.3	Full	500	0.0	0.0
Lane 2	140	11.0	140	11.0	360	0.389	100	29.9	LOS C	4.1	31.4	Full	500	0.0	0.0
Approach	219	10.6	219	10.6		0.389		32.0	LOS C	4.1	31.4				
All Vehicles	1696	6.6	1696	6.6		0.912		28.3	LOS C	21.7	158.1				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	147	-	147	11.0	1208	0.122	100	0.0	2
Lane 2	-	625	625	5.0	686[1]	0.912	100	NA	NA
Approach	147	625	772	6.1		0.912			

NorthWest: R304

Mov. From NW To Exit:	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	639	-	639	5.0	742[1]	0.861	100	NA	NA
Lane 2	-	66	66	14.0	202	0.327	100	0.0	1
Approach	639	66	705	5.8		0.861			

SouthWest: Masitandane Rd

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From SW To Exit:	NW	SE			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	79	-	79	10.0	207	0.382	100	NA	NA
Lane 2	-	140	140	11.0	360	0.389	100	NA	NA
Approach	79	140	219	10.6		0.389			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1696	6.6	0.912

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 pcu/h	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Masitandane Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 4 [Intersection 4_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 62 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	183	5.0	183	5.0	1330	0.138	100	12.7	LOS B	1.6	11.5	Short	50	0.0	NA
Lane 2	850	4.0	850	4.0	873[1]	0.973	100	42.9	LOS D	37.3	270.1	Full	500	0.0	0.0
Approach	1033	4.2	1033	4.2		0.973		37.6	LOS D	37.3	270.1				
NorthWest: R304															
Lane 1	524	6.0	524	6.0	969	0.541	100	11.4	LOS B	10.7	79.0	Full	500	0.0	0.0
Lane 2	40	13.0	40	13.0	164	0.243	100	34.4	LOS C	1.2	9.4	Short	60	0.0	NA
Approach	564	6.5	564	6.5		0.541		13.0	LOS B	10.7	79.0				
SouthWest: Masitandane Rd															
Lane 1	69	9.0	69	9.0	169	0.409	100	35.0	LOS D	2.1	16.1	Full	500	0.0	0.0
Lane 2	94	1.0	94	1.0	268	0.351	100	31.4	LOS C	2.7	19.1	Full	500	0.0	0.0
Approach	163	4.4	163	4.4		0.409		33.0	LOS C	2.7	19.1				
All Vehicles	1760	4.9	1760	4.9		0.973		29.3	LOS C	37.3	270.1				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	183	-	183	5.0	1330	0.138	100	0.0	2
Lane 2	-	850	850	4.0	873[1]	0.973	100	NA	NA
Approach	183	850	1033	4.2		0.973			

NorthWest: R304

Mov. From NW To Exit:	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	524	-	524	6.0	969	0.541	100	NA	NA
Lane 2	-	40	40	13.0	164	0.243	100	0.0	1
Approach	524	40	564	6.5		0.541			

SouthWest: Masitandane Rd

Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From SW To Exit:	NW	SE			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	69	-	69	9.0	169	0.409	100	NA	NA
Lane 2	-	94	94	1.0	268	0.351	100	NA	NA
Approach	69	94	163	4.4		0.409			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1760	4.9	0.973

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 pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Masitandane Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 5 [Intersection 5_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: R304															
Lane 1	773	7.4	773	7.4	1845	0.419	100	0.1	LOS A	0.1	0.8	Full	500	0.0	0.0
Approach	773	7.4	773	7.4		0.419		0.1	NA	0.1	0.8				
East: Unnamed Rd (b)															
Lane 1	3	0.0	3	0.0	120	0.025	100	33.3	LOS D	0.1	0.5	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.025		33.3	LOS D	0.1	0.5				
North: R304															
Lane 1	777	5.0	777	5.0	1838	0.423	100	0.4	LOS A	0.3	2.4	Full	500	0.0	0.0
Approach	777	5.0	777	5.0		0.423		0.4	NA	0.3	2.4				
West: Taxi Rank Access															
Lane 1	26	15.6	26	15.6	86	0.301	100	49.5	LOS E	0.7	5.3	Full	500	0.0	0.0
Approach	26	15.6	26	15.6		0.301		49.5	LOS E	0.7	5.3				
All Vehicles	1579	6.3	1579	6.3		0.423		1.2	NA	0.7	5.3				

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.
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: R304

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	16	756	1	773	7.4	1845	0.419	100	NA	NA
Approach	16	756	1	773	7.4		0.419			

East: Unnamed Rd (b)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	120	0.025	100	NA	NA
Approach	1	1	1	3	0.0		0.025			

North: R304

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	2	763	12	777	5.0	1838	0.423	100	NA	NA
Approach	2	763	12	777	5.0		0.423			
West: Taxi Rank Access										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	16	1	9	26	15.6	86	0.301	100	NA	NA
Approach	16	1	9	26	15.6		0.301			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1579	6.3	0.423

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	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: R304				
Lane 1	0.0	0.0	0.0	0.0
East: Unnamed Rd (b)				
Lane 1	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
West: Taxi Rank Access				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 5 [Intersection 5_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: R304															
Lane 1	1057	4.0	1057	4.0	1891	0.559	100	0.2	LOS A	0.1	0.9	Full	500	0.0	0.0
Approach	1057	4.0	1057	4.0		0.559		0.2	NA	0.1	0.9				
East: Unnamed Rd (b)															
Lane 1	7	42.9	7	42.9	20	0.347	100	116.5	LOS F	0.8	8.0	Full	500	0.0	0.0
Approach	7	42.9	7	42.9		0.347		116.5	LOS F	0.8	8.0				
North: R304															
Lane 1	618	5.9	618	5.9	1622	0.381	100	1.9	LOS A	0.9	6.5	Full	500	0.0	0.0
Approach	618	5.9	618	5.9		0.381		1.9	NA	0.9	6.5				
West: Taxi Rank Access															
Lane 1	36	8.5	36	8.5	43	0.837	100	123.2	LOS F	2.0	15.2	Full	500	0.0	0.0
Approach	36	8.5	36	8.5		0.837		123.2	LOS F	2.0	15.2				
All Vehicles	1718	5.0	1718	5.0		0.837		3.8	NA	2.0	15.2				

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: R304

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	31	1023	3	1057	4.0	1891	0.559	100	NA	NA
Approach	31	1023	3	1057	4.0		0.559			

East: Unnamed Rd (b)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	4	2	1	7	42.9	20	0.347	100	NA	NA
Approach	4	2	1	7	42.9		0.347			

North: R304

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	3	592	23	618	5.9	1622	0.381	100	NA	NA
Approach	3	592	23	618	5.9		0.381			

West: Taxi Rank Access

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	16	1	19	36	8.5	43	0.837	100	NA	NA
Approach	16	1	19	36	8.5		0.837			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1718	5.0	0.837

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 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: R304				
Lane 1	0.0	0.0	0.0	0.0
East: Unnamed Rd (b)				
Lane 1	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
West: Taxi Rank Access				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 6 [Intersection 6_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	960	3.0	960	3.0	1909	0.503	100	0.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	42	7.0	42	7.0	759	0.055	100	7.2	LOS A	0.2	1.6	Short	60	0.0	NA
Approach	1002	3.1	1002	3.1		0.503		0.7	NA	0.2	1.6				
NorthEast: Bell Rd															
Lane 1	159	4.7	159	4.7	53	3.015	100	3700.1	LOS F	134.8	982.1	Full	500	0.0	31.3
Approach	159	4.7	159	4.7		3.015		3700.1	LOS F	134.8	982.1				
NorthWest: R304															
Lane 1	678	16.4	678	16.4	1463	0.463	100	5.1	LOS A	2.8	22.5	Full	500	0.0	0.0
Approach	678	16.4	678	16.4		0.463		5.1	NA	2.8	22.5				
SouthWest: Porter Rd															
Lane 1	29	31.2	29	31.2	26	1.120	100	332.0	LOS F	6.4	57.1	Full	500	0.0	0.0
Approach	29	31.2	29	31.2		1.120		332.0	LOS F	6.4	57.1				
All Vehicles	1868	8.5	1868	8.5		3.015		322.3	NA	134.8	982.1				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	41	919	-	960	3.0	1909	0.503	100	NA	NA
Lane 2	-	-	42	42	7.0	759	0.055	100	0.0	1
Approach	41	919	42	1002	3.1		0.503			

NorthEast: Bell Rd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	93	1	65	159	4.7	53	3.015	100	NA	NA

Approach	93	1	65	159	4.7		3.015			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	73	567	38	678	16.4	1463	0.463	100	NA	NA
Approach	73	567	38	678	16.4		0.463			
SouthWest: Porter Rd										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	24	1	4	29	31.2	26	1.120	100	NA	NA
Approach	24	1	4	29	31.2		1.120			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	1868	8.5	3.015							

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 Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Bell Rd				
Lane 1	0.0	106.3	7254.8	NA
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
SouthWest: Porter Rd				
Lane 1	0.0	3.1	430.3	NA

LANE SUMMARY

Site: 6 [Intersection 6_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	945	3.3	945	3.3	1905	0.496	100	0.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	31	19.0	31	19.0	776	0.040	100	7.0	LOS A	0.2	1.2	Short	60	0.0	NA
Approach	976	3.8	976	3.8		0.496		0.6	NA	0.2	1.2				
NorthEast: Bell Rd															
Lane 1	162	3.5	162	3.5	68	2.389	100	2572.1	LOS F	120.3	867.9	Full	500	0.0	24.9
Approach	162	3.5	162	3.5		2.389		2572.1	LOS F	120.3	867.9				
NorthWest: R304															
Lane 1	615	5.1	615	5.1	1599	0.385	100	3.3	LOS A	1.3	9.6	Full	500	0.0	0.0
Approach	615	5.1	615	5.1		0.385		3.3	NA	1.3	9.6				
SouthWest: Porter Rd															
Lane 1	52	15.3	52	15.3	63	0.829	100	101.1	LOS F	2.6	20.8	Full	500	0.0	0.0
Approach	52	15.3	52	15.3		0.829		101.1	LOS F	2.6	20.8				
All Vehicles	1805	4.6	1805	4.6		2.389		235.2	NA	120.3	867.9				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	26	919	-	945	3.3	1905	0.496	100	NA	NA
Lane 2	-	-	31	31	19.0	776	0.040	100	0.0	1
Approach	26	919	31	976	3.8		0.496			

NorthEast: Bell Rd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	82	1	79	162	3.5	68	2.389	100	NA	NA

Approach	82	1	79	162	3.5		2.389			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	89	501	25	615	5.1	1599	0.385	100	NA	NA
Approach	89	501	25	615	5.1		0.385			
SouthWest: Porter Rd										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	35	1	16	52	15.3	63	0.829	100	NA	NA
Approach	35	1	16	52	15.3		0.829			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1805	4.6	2.389

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 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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Bell Rd				
Lane 1	0.0	94.2	5000.6	NA
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
SouthWest: Porter Rd				
Lane 1	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 7 [Intersection 7_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 95 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	46	11.0	46	11.0	344	0.134	100	43.4	LOS D	1.8	13.6	Short	50	0.0	NA
Lane 2	316	3.0	316	3.0	375[1]	0.844	100	46.8	LOS D	14.5	104.2	Full	500	0.0	0.0
Lane 3	11	14.0	11	14.0	231	0.048	100	43.6	LOS D	0.5	3.5	Full	500	0.0	0.0
Lane 4	11	14.0	11	14.0	231	0.048	100	43.6	LOS D	0.5	3.5	Short	80	0.0	NA
Approach	384	4.6	384	4.6		0.844		46.2	LOS D	14.5	104.2				
NorthEast: R310															
Lane 1	259	2.5	259	2.5	578	0.448	100	30.9	LOS C	9.7	69.6	Full	500	0.0	0.0
Lane 2	262	3.0	262	3.0	584	0.448	100	29.9	LOS C	9.8	70.6	Full	500	0.0	0.0
Lane 3	22	23.0	22	23.0	302	0.073	100	39.0	LOS D	0.9	7.1	Short	70	0.0	NA
Approach	543	3.5	543	3.5		0.448		30.7	LOS C	9.8	70.6				
NorthWest: R304															
Lane 1	338	6.9	338	6.9	371	0.912	100	45.8	LOS D	16.5	122.6	Full	500	0.0	0.0
Lane 2	163	5.0	163	5.0	245	0.664	100	48.5	LOS D	7.5	54.7	Short	100	0.0	NA
Lane 3	163	5.0	163	5.0	245	0.664	100	48.5	LOS D	7.5	54.7	Short	60	0.0	NA
Approach	664	5.9	664	5.9		0.912		47.1	LOS D	16.5	122.6				
SouthWest: R310															
Lane 1	476	3.0	476	3.0	514[1]	0.927	100	54.7	LOS D	23.9	171.9	Short	60	0.0	NA
Lane 2	123	11.0	123	11.0	556	0.221	100	36.9	LOS D	4.3	32.6	Full	500	0.0	0.0
Lane 3	123	11.0	123	11.0	556	0.221	100	27.5	LOS C	4.3	32.6	Full	500	0.0	0.0
Lane 4	298	7.0	298	7.0	335	0.889	100	48.0	LOS D	14.3	106.0	Short	100	0.0	NA
Approach	1020	6.1	1020	6.1		0.927		47.3	LOS D	23.9	171.9				
All Vehicles	2611	5.3	2611	5.3		0.927		43.7	LOS D	23.9	171.9				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	46	-	-	46	11.0	344	0.134	100	0.0	2
Lane 2	-	316	-	316	3.0	375[1]	0.844	100	NA	NA

Lane 3	-	-	11	11	14.0	231	0.048	100	NA	NA
Lane 4	-	-	11	11	14.0	231	0.048	100	0.0	3
Approach	46	316	22	384	4.6		0.844			

NorthEast: R310

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	71	188	-	259	2.5	578	0.448	100	NA	NA
Lane 2	-	262	-	262	3.0	584	0.448	100	NA	NA
Lane 3	-	-	22	22	23.0	302	0.073	100	0.0	2
Approach	71	450	22	543	3.5		0.448			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	33	305	-	338	6.9	371	0.912	100	NA	NA
Lane 2	-	-	163	163	5.0	245	0.664	100	0.0	1
Lane 3	-	-	163	163	5.0	245	0.664	100	0.0	2
Approach	33	305	326	664	5.9		0.912			

SouthWest: R310

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	476	-	-	476	3.0	514[1]	0.927	100	100.0	2
Lane 2	-	123	-	123	11.0	556	0.221	100	NA	NA
Lane 3	-	123	-	123	11.0	556	0.221	100	NA	NA
Lane 4	-	-	298	298	7.0	335	0.889	100	10.2	3
Approach	476	246	298	1020	6.1		0.927			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2611	5.3	0.927

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 pcu/h 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
SouthEast: 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 4	0.0	0.0	0.0	0.0
NorthEast: R310				
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
NorthWest: 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
SouthWest: R310				
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 4	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 7 [Intersection 7_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 102 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	37	27.0	37	27.0	809	0.046	100	29.1	LOS C	0.9	7.7	Short	50	0.0	NA
Lane 2	408	2.0	408	2.0	489[1]	0.834	100	52.5	LOS D	19.4	138.2	Full	500	0.0	0.0
Lane 3	17	21.0	17	21.0	174	0.098	100	50.4	LOS D	0.8	6.5	Full	500	0.0	0.0
Lane 4	17	21.0	17	21.0	174	0.098	100	50.4	LOS D	0.8	6.5	Short	80	0.0	NA
Approach	479	5.3	479	5.3		0.834		50.5	LOS D	19.4	138.2				
NorthEast: R310															
Lane 1	100	6.3	100	6.3	484	0.206	100	33.6	LOS C	3.9	28.5	Full	500	0.0	0.0
Lane 2	98	6.0	98	6.0	478	0.206	100	33.5	LOS C	3.9	28.5	Full	500	0.0	0.0
Lane 3	11	9.0	11	9.0	376	0.029	100	38.2	LOS D	0.4	3.3	Short	70	0.0	NA
Approach	209	6.3	209	6.3		0.206		33.8	LOS C	3.9	28.5				
NorthWest: R304															
Lane 1	352	4.0	352	4.0	504	0.698	100	38.1	LOS D	15.9	115.3	Full	500	0.0	0.0
Lane 2	124	8.0	124	8.0	189	0.652	100	54.3	LOS D	6.2	46.4	Short	100	0.0	NA
Lane 3	124	8.0	124	8.0	189	0.652	100	54.3	LOS D	6.2	46.4	Short	60	0.0	NA
Approach	599	5.7	599	5.7		0.698		44.8	LOS D	15.9	115.3				
SouthWest: R310															
Lane 1	557	2.0	557	2.0	665[1]	0.837	100	44.7	LOS D	25.0	178.2	Short	60	0.0	NA
Lane 2	154	9.0	154	9.0	470	0.328	100	45.2	LOS D	6.3	47.4	Full	500	0.0	0.0
Lane 3	154	9.0	154	9.0	470	0.328	100	34.8	LOS C	6.3	47.4	Full	500	0.0	0.0
Lane 4	349	4.0	349	4.0	389	0.896	100	49.8	LOS D	17.9	129.7	Short	100	0.0	NA
Approach	1214	4.4	1214	4.4		0.896		45.0	LOS D	25.0	178.2				
All Vehicles	2501	5.0	2501	5.0		0.896		45.1	LOS D	25.0	178.2				

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 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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	37	-	-	37	27.0	809	0.046	100	0.0	2
Lane 2	-	408	-	408	2.0	489[1]	0.834	100	NA	NA

Lane 3	-	-	17	17	21.0	174	0.098	100	NA	NA
Lane 4	-	-	17	17	21.0	174	0.098	100	0.0	3
Approach	37	408	34	479	5.3		0.834			

NorthEast: R310

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	28	72	-	100	6.3	484	0.206	100	NA	NA
Lane 2	-	98	-	98	6.0	478	0.206	100	NA	NA
Lane 3	-	-	11	11	9.0	376	0.029	100	0.0	2
Approach	28	170	11	209	6.3		0.206			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	45	307	-	352	4.0	504	0.698	100	NA	NA
Lane 2	-	-	124	124	8.0	189	0.652	100	0.0	1
Lane 3	-	-	124	124	8.0	189	0.652	100	0.0	2
Approach	45	307	247	599	5.7		0.698			

SouthWest: R310

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	557	-	-	557	2.0	665[1]	0.837	100	100.0	2
Lane 2	-	154	-	154	9.0	470	0.328	100	NA	NA
Lane 3	-	154	-	154	9.0	470	0.328	100	NA	NA
Lane 4	-	-	349	349	4.0	389	0.896	100	28.6	3
Approach	557	308	349	1214	4.4		0.896			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2501	5.0	0.896

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 pcu/h	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
SouthEast: 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 4	0.0	0.0	0.0	0.0
NorthEast: R310				
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
NorthWest: 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
SouthWest: R310				
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 4	0.0	0.0	0.0	0.0

APPENDIX D: 2030 BACKGROUND LANE SUMMARY ON AN EXISTING ROAD GEOMETRY

LANE SUMMARY

Site: 1 [Intersection 1_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 62 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	756	5.0	756	5.0	793[1]	0.954	100	35.3	LOS D	28.7	209.5	Full	500	0.0	0.0
Lane 2	74	25.0	74	25.0	153	0.485	100	41.3	LOS D	2.3	19.8	Short	60	0.0	NA
Approach	830	6.8	830	6.8		0.954		35.8	LOS D	28.7	209.5				
NorthEast: Welgevonden Blvd															
Lane 1	34	14.0	34	14.0	517	0.066	100	20.6	LOS C	0.7	5.8	Short	50	0.0	NA
Lane 2	90	4.9	90	4.9	232	0.389	100	32.7	LOS C	2.7	19.4	Full	500	0.0	0.0
Approach	124	7.4	124	7.4		0.389		29.4	LOS C	2.7	19.4				
NorthWest: R304															
Lane 1	185	21.0	185	21.0	912	0.203	100	7.5	LOS A	1.7	13.7	Short	170	0.0	NA
Lane 2	665	8.0	665	8.0	807	0.824	100	17.6	LOS B	18.0	135.0	Full	500	0.0	0.0
Lane 3	1	0.0	1	0.0	180	0.006	100	32.0	LOS C	0.0	0.2	Short	120	0.0	NA
Approach	851	10.8	851	10.8		0.824		15.4	LOS B	18.0	135.0				
SouthWest: Farm Access Rd															
Lane 1	3	0.0	3	0.0	120	0.025	100	21.7	LOS C	0.1	0.5	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.025		21.7	LOS C	0.1	0.5				
All Vehicles	1808	8.7	1808	8.7		0.954		25.7	LOS C	28.7	209.5				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	755	-	756	5.0	793[1]	0.954	100	NA	NA
Lane 2	-	-	74	74	25.0	153	0.485	100	0.0	1
Approach	1	755	74	830	6.8		0.954			

NorthEast: Welgevonden Blvd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	34	-	-	34	14.0	517	0.066	100	0.0	2
Lane 2	-	1	89	90	4.9	232	0.389	100	NA	NA
Approach	34	1	89	124	7.4		0.389			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	185	-	-	185	21.0	912	0.203	100	0.0	2
Lane 2	-	665	-	665	8.0	807	0.824	100	NA	NA
Lane 3	-	-	1	1	0.0	180	0.006	100	0.0	2
Approach	185	665	1	851	10.8		0.824			

SouthWest: Farm Access Rd

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	120	0.025	100	NA	NA
Approach	1	1	1	3	0.0		0.025			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1808	8.7	0.954

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Farm Access Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 1 [Intersection 1_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 58 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	1008	2.0	1008	2.0	1064[1]	0.948	100	28.6	LOS C	35.5	253.0	Full	500	0.0	0.0
Lane 2	54	26.0	54	26.0	216	0.250	100	35.1	LOS D	1.5	12.5	Short	60	0.0	NA
Approach	1062	3.2	1062	3.2		0.948		28.9	LOS C	35.5	253.0				
NorthEast: Welgevonden Blvd															
Lane 1	61	36.0	61	36.0	586	0.104	100	16.1	LOS B	1.1	10.1	Short	50	0.0	NA
Lane 2	81	34.6	81	34.6	257	0.315	100	28.4	LOS C	2.1	19.4	Full	500	0.0	0.0
Approach	142	35.2	142	35.2		0.315		23.1	LOS C	2.1	19.4				
NorthWest: R304															
Lane 1	162	24.0	162	24.0	547	0.296	100	19.5	LOS B	3.4	29.0	Short	170	0.0	NA
Lane 2	519	3.0	519	3.0	660	0.787	100	19.7	LOS B	13.6	97.6	Full	500	0.0	0.0
Lane 3	1	100.0	1	100.0	108	0.009	100	33.3	LOS C	0.0	0.4	Short	120	0.0	NA
Approach	682	8.1	682	8.1		0.787		19.7	LOS B	13.6	97.6				
SouthWest: Farm Access Rd															
Lane 1	3	0.0	3	0.0	98	0.031	100	33.1	LOS C	0.1	0.6	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.031		33.1	LOS C	0.1	0.6				
All Vehicles	1889	7.4	1889	7.4		0.948		25.2	LOS C	35.5	253.0				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1007	-	1008	2.0	1064[1]	0.948	100	NA	NA
Lane 2	-	-	54	54	26.0	216	0.250	100	0.0	1
Approach	1	1007	54	1062	3.2		0.948			

NorthEast: Welgevonden Blvd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	61	-	-	61	36.0	586	0.104	100	0.0	2
Lane 2	-	1	80	81	34.6	257	0.315	100	NA	NA
Approach	61	1	80	142	35.2		0.315			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	162	-	-	162	24.0	547	0.296	100	0.0	2
Lane 2	-	519	-	519	3.0	660	0.787	100	NA	NA
Lane 3	-	-	1	1	100.0	108	0.009	100	0.0	2
Approach	162	519	1	682	8.1		0.787			

SouthWest: Farm Access Rd

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	98	0.031	100	NA	NA
Approach	1	1	1	3	0.0		0.031			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1889	7.4	0.948

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Farm Access Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 2 [Intersection 2_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 54 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	14	0.0	14	0.0	688	0.020	100	15.4	LOS B	0.2	1.6	Short	115	0.0	NA
Lane 2	377	7.0	377	7.0	691	0.545	100	15.4	LOS B	8.0	59.7	Full	500	0.0	0.0
Lane 3	389	7.0	389	7.0	715	0.545	100	18.7	LOS B	9.4	69.4	Full	500	0.0	0.0
Approach	780	6.9	780	6.9		0.545		17.1	LOS B	9.4	69.4				
NorthEast: Unnamed Rd (a)															
Lane 1	3	0.0	3	0.0	140	0.021	100	29.2	LOS C	0.1	0.5	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.021		29.2	LOS C	0.1	0.5				
NorthWest: R304															
Lane 1	367	7.0	367	7.0	691	0.532	100	15.3	LOS B	7.8	57.9	Full	500	0.0	0.0
Lane 2	368	7.0	368	7.0	691	0.532	100	15.3	LOS B	7.8	57.9	Full	500	0.0	0.0
Lane 3	7	50.0	7	50.0	76	0.092	100	33.1	LOS C	0.2	2.0	Short	120	0.0	NA
Approach	742	7.4	742	7.4		0.532		15.5	LOS B	7.8	57.9				
SouthWest: Newinbosch Access															
Lane 1	23	4.0	23	4.0	334	0.069	100	24.3	LOS C	0.5	3.8	Full	500	0.0	0.0
Lane 2	16	3.7	16	3.7	336	0.046	100	23.7	LOS C	0.3	2.5	Full	500	0.0	0.0
Lane 3	15	4.0	15	4.0	334	0.046	100	23.9	LOS C	0.3	2.5	Full	500	0.0	0.0
Approach	54	3.9	54	3.9		0.069		24.0	LOS C	0.5	3.8				
All Vehicles	1579	7.0	1579	7.0		0.545		16.6	LOS B	9.4	69.4				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	-	-	14	0.0	688	0.020	100	0.0	2
Lane 2	-	377	-	377	7.0	691	0.545	100	NA	NA
Lane 3	-	388	1	389	7.0	715	0.545	100	NA	NA
Approach	14	765	1	780	6.9		0.545			

NorthEast: Unnamed Rd (a)

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From NE To Exit:	SE	SW	NW			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	1	1	1	3	0.0	140	0.021	100	NA	NA
Approach	1	1	1	3	0.0		0.021			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	366	-	367	7.0	691	0.532	100	NA	NA
Lane 2	-	368	-	368	7.0	691	0.532	100	NA	NA
Lane 3	-	-	7	7	50.0	76	0.092	100	0.0	2
Approach	1	734	7	742	7.4		0.532			
SouthWest: Newinbosch Access										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	23	-	-	23	4.0	334	0.069	100	NA	NA
Lane 2	-	1	15	16	3.7	336	0.046	100	NA	NA
Lane 3	-	-	15	15	4.0	334	0.046	100	NA	NA
Approach	23	1	30	54	3.9		0.069			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1579	7.0	0.545

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	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
SouthEast: 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
NorthEast: Unnamed Rd (a)				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Newinbosch Access				
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

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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:30:12
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 2\Intersection 2_Stellenbosch.sip9

LANE SUMMARY

Site: 2 [Intersection 2_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 55 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	14	8.0	14	8.0	671	0.021	100	15.2	LOS B	0.2	1.8	Short	115	0.0	NA
Lane 2	509	4.0	509	4.0	726	0.701	100	16.5	LOS B	11.8	85.6	Full	500	0.0	0.0
Lane 3	526	4.0	526	4.0	751	0.701	100	19.7	LOS B	12.1	87.4	Full	500	0.0	0.0
Approach	1049	4.0	1049	4.0		0.701		18.1	LOS B	12.1	87.4				
NorthEast: Unnamed Rd (a)															
Lane 1	3	0.0	3	0.0	137	0.022	100	29.8	LOS C	0.1	0.6	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.022		29.8	LOS C	0.1	0.6				
NorthWest: R304															
Lane 1	291	7.0	291	7.0	712	0.409	100	14.3	LOS B	5.9	43.5	Full	500	0.0	0.0
Lane 2	292	7.0	292	7.0	712	0.409	100	14.3	LOS B	5.9	43.5	Full	500	0.0	0.0
Lane 3	10	0.0	10	0.0	101	0.099	100	33.0	LOS C	0.3	2.0	Short	120	0.0	NA
Approach	593	6.9	593	6.9		0.409		14.6	LOS B	5.9	43.5				
SouthWest: Newinbosch Access															
Lane 1	15	8.0	15	8.0	319	0.047	100	24.7	LOS C	0.3	2.6	Full	500	0.0	0.0
Lane 2	24	9.2	24	9.2	318	0.076	100	24.5	LOS C	0.6	4.2	Full	500	0.0	0.0
Lane 3	24	10.0	24	10.0	315	0.076	100	24.8	LOS C	0.6	4.2	Full	500	0.0	0.0
Approach	63	9.2	63	9.2		0.076		24.6	LOS C	0.6	4.2				
All Vehicles	1708	5.2	1708	5.2		0.701		17.1	LOS B	12.1	87.4				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	-	-	14	8.0	671	0.021	100	0.0	2
Lane 2	-	509	-	509	4.0	726	0.701	100	NA	NA
Lane 3	-	525	1	526	4.0	751	0.701	100	NA	NA
Approach	14	1034	1	1049	4.0		0.701			

NorthEast: Unnamed Rd (a)

Mov.	L2	T1	R2	Total	%HV	Deg.	Lane	Prob.	Ov.

From NE To Exit:	SE	SW	NW			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	1	1	1	3	0.0	137	0.022	100	NA	NA
Approach	1	1	1	3	0.0		0.022			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	290	-	291	7.0	712	0.409	100	NA	NA
Lane 2	-	292	-	292	7.0	712	0.409	100	NA	NA
Lane 3	-	-	10	10	0.0	101	0.099	100	0.0	2
Approach	1	582	10	593	6.9		0.409			
SouthWest: Newinbosch Access										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	15	-	-	15	8.0	319	0.047	100	NA	NA
Lane 2	-	2	22	24	9.2	318	0.076	100	NA	NA
Lane 3	-	-	24	24	10.0	315	0.076	100	NA	NA
Approach	15	2	46	63	9.2		0.076			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1708	5.2	0.701

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	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
SouthEast: 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
NorthEast: Unnamed Rd (a)				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Newinbosch Access				
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

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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:30:13
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 2\Intersection 2_Stellenbosch.sip9

LANE SUMMARY

Site: 3 [Intersection 3_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 71 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	125	3.0	125	3.0	743	0.168	100	18.4	LOS B	2.8	19.8	Short	140	0.0	NA
Lane 2	667	6.0	667	6.0	760[1]	0.878	100	27.6	LOS C	22.6	166.1	Full	500	0.0	0.0
Lane 3	26	9.0	26	9.0	123	0.212	100	44.8	LOS D	0.9	7.0	Short	70	0.0	NA
Approach	818	5.6	818	5.6		0.878		26.8	LOS C	22.6	166.1				
NorthEast: Mount Simon Dr															
Lane 1	13	16.9	13	16.9	236	0.055	100	33.4	LOS C	0.4	3.2	Full	500	0.0	0.0
Lane 2	15	0.0	15	0.0	183	0.082	100	37.1	LOS D	0.5	3.5	Short	40	0.0	NA
Approach	28	7.9	28	7.9		0.082		35.4	LOS D	0.5	3.5				
NorthWest: R304															
Lane 1	6	20.0	6	20.0	664	0.009	100	26.7	LOS C	0.1	1.0	Short	55	0.0	NA
Lane 2	737	5.0	737	5.0	768[1]	0.960	100	45.3	LOS D	32.4	236.4	Full	500	0.0	0.0
Lane 3	22	95.0	22	95.0	78	0.282	100	49.2	LOS D	0.8	10.4	Short	70	0.0	NA
Approach	765	7.7	765	7.7		0.960		45.2	LOS D	32.4	236.4				
SouthWest: Sokuqala St															
Lane 1	165	10.9	165	10.9	243	0.679	100	37.7	LOS D	5.8	44.2	Full	500	0.0	0.0
Lane 2	63	2.0	63	2.0	181	0.349	100	38.7	LOS D	2.2	15.5	Full	500	0.0	0.0
Approach	228	8.4	228	8.4		0.679		38.0	LOS D	5.8	44.2				
All Vehicles	1839	6.9	1839	6.9		0.960		36.0	LOS D	32.4	236.4				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	125	-	-	125	3.0	743	0.168	100	0.0	2
Lane 2	-	667	-	667	6.0	760[1]	0.878	100	NA	NA
Lane 3	-	-	26	26	9.0	123	0.212	100	0.0	2
Approach	125	667	26	818	5.6		0.878			
NorthEast: Mount Simon Dr										

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	12	1	-	13	16.9	236	0.055	100	NA	NA
Lane 2	-	-	15	15	0.0	183	0.082	100	0.0	1
Approach	12	1	15	28	7.9		0.082			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	6	-	-	6	20.0	664	0.009	100	0.0	2
Lane 2	-	737	-	737	5.0	768[1]	0.960	100	NA	NA
Lane 3	-	-	22	22	95.0	78	0.282	100	0.0	2
Approach	6	737	22	765	7.7		0.960			

SouthWest: Sokuqala St

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	163	2	-	165	10.9	243	0.679	100	NA	NA
Lane 2	-	-	63	63	2.0	181	0.349	100	NA	NA
Approach	163	2	63	228	8.4		0.679			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1839	6.9	0.960

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	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
SouthEast: 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
NorthEast: Mount Simon Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Sokuqala St				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 3 [Intersection 3_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 73 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	134	4.0	134	4.0	767	0.175	100	18.0	LOS B	3.0	21.5	Short	140	0.0	NA
Lane 2	770	5.0	770	5.0	784[1]	0.982	100	54.9	LOS D	40.0	291.9	Full	500	0.0	0.0
Lane 3	49	0.0	49	0.0	127	0.385	100	50.1	LOS D	1.8	12.7	Short	70	0.0	NA
Approach	953	4.6	953	4.6		0.982		49.5	LOS D	40.0	291.9				
NorthEast: Mount Simon Dr															
Lane 1	21	0.0	21	0.0	255	0.082	100	34.7	LOS C	0.7	4.7	Full	500	0.0	0.0
Lane 2	15	0.0	15	0.0	178	0.084	100	38.2	LOS D	0.5	3.6	Short	40	0.0	NA
Approach	36	0.0	36	0.0		0.084		36.2	LOS D	0.7	4.7				
NorthWest: R304															
Lane 1	7	17.0	7	17.0	703	0.010	100	22.0	LOS C	0.1	1.1	Short	55	0.0	NA
Lane 2	612	6.0	612	6.0	794[1]	0.771	100	25.7	LOS C	18.9	138.8	Full	500	0.0	0.0
Lane 3	23	0.0	23	0.0	127	0.181	100	43.3	LOS D	0.8	5.8	Short	70	0.0	NA
Approach	642	5.9	642	5.9		0.771		26.3	LOS C	18.9	138.8				
SouthWest: Sokuqala St															
Lane 1	228	11.0	228	11.0	236	0.966	100	47.7	LOS D	9.7	74.5	Full	500	0.0	0.0
Lane 2	89	2.0	89	2.0	176	0.507	100	40.7	LOS D	3.2	23.0	Full	500	0.0	0.0
Approach	317	8.4	317	8.4		0.966		45.7	LOS D	9.7	74.5				
All Vehicles	1948	5.6	1948	5.6		0.982		41.0	LOS D	40.0	291.9				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	134	-	-	134	4.0	767	0.175	100	0.0	2
Lane 2	-	770	-	770	5.0	784[1]	0.982	100	NA	NA
Lane 3	-	-	49	49	0.0	127	0.385	100	0.0	2
Approach	134	770	49	953	4.6		0.982			
NorthEast: Mount Simon Dr										

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	20	1	-	21	0.0	255	0.082	100	NA	NA
Lane 2	-	-	15	15	0.0	178	0.084	100	0.0	1
Approach	20	1	15	36	0.0		0.084			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	7	-	-	7	17.0	703	0.010	100	0.0	2
Lane 2	-	612	-	612	6.0	794[1]	0.771	100	NA	NA
Lane 3	-	-	23	23	0.0	127	0.181	100	0.0	2
Approach	7	612	23	642	5.9		0.771			

SouthWest: Sokuqala St

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	227	1	-	228	11.0	236	0.966	100	NA	NA
Lane 2	-	-	89	89	2.0	176	0.507	100	NA	NA
Approach	227	1	89	317	8.4		0.966			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1948	5.6	0.982

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	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
SouthEast: 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
NorthEast: Mount Simon Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Sokuqala St				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 4 [Intersection 4_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 71 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	170	11.0	170	11.0	1261	0.135	100	15.4	LOS B	1.7	13.2	Short	50	0.0	NA
Lane 2	725	5.0	725	5.0	748[1]	0.969	100	47.8	LOS D	34.1	248.7	Full	500	0.0	0.0
Approach	895	6.1	895	6.1		0.969		41.7	LOS D	34.1	248.7				
NorthWest: R304															
Lane 1	741	5.0	741	5.0	816[1]	0.908	100	31.2	LOS C	26.7	194.9	Full	500	0.0	0.0
Lane 2	77	14.0	77	14.0	214	0.360	100	43.8	LOS D	2.6	20.3	Short	60	0.0	NA
Approach	818	5.8	818	5.8		0.908		32.4	LOS C	26.7	194.9				
SouthWest: Masitandane Rd															
Lane 1	92	10.0	92	10.0	220	0.419	100	37.2	LOS D	3.1	23.7	Full	500	0.0	0.0
Lane 2	162	11.0	162	11.0	364	0.445	100	31.7	LOS C	5.1	38.9	Full	500	0.0	0.0
Approach	254	10.6	254	10.6		0.445		33.7	LOS C	5.1	38.9				
All Vehicles	1967	6.6	1967	6.6		0.969		36.8	LOS D	34.1	248.7				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	170	-	170	11.0	1261	0.135	100	0.0	2
Lane 2	-	725	725	5.0	748[1]	0.969	100	NA	NA
Approach	170	725	895	6.1		0.969			

NorthWest: R304

Mov. From NW To Exit:	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	741	-	741	5.0	816[1]	0.908	100	NA	NA
Lane 2	-	77	77	14.0	214	0.360	100	0.0	1
Approach	741	77	818	5.8		0.908			

SouthWest: Masitandane Rd

Mov. From SW To Exit:	L2 NW	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	92	-	92	10.0	220	0.419	100	NA	NA
Lane 2	-	162	162	11.0	364	0.445	100	NA	NA
Approach	92	162	254	10.6		0.445			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1967	6.6	0.969

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 pcu/h	Follow-up Headway sec	Lane Flow Rate sec	Capacity veh/h	Deg. Satn veh/h	Min. Delay v/c	Merge Delay sec	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Masitandane Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 4 [Intersection 4_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 65 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	212	5.0	212	5.0	1407	0.151	100	12.1	LOS B	1.6	11.9	Short	50	0.0	NA
Lane 2	985	4.0	985	4.0	1000[1]	0.985	100	50.9	LOS D	50.4	365.2	Full	500	0.0	0.0
Approach	1197	4.2	1197	4.2		0.985		44.0	LOS D	50.4	365.2				
NorthWest: R304															
Lane 1	607	6.0	607	6.0	1126	0.539	100	8.6	LOS A	11.4	84.0	Full	500	0.0	0.0
Lane 2	46	13.0	46	13.0	157	0.293	100	36.4	LOS D	1.5	11.5	Short	60	0.0	NA
Approach	653	6.5	653	6.5		0.539		10.6	LOS B	11.4	84.0				
SouthWest: Masitandane Rd															
Lane 1	80	9.0	80	9.0	161	0.497	100	37.2	LOS D	2.6	19.8	Full	500	0.0	0.0
Lane 2	109	1.0	109	1.0	227	0.480	100	34.9	LOS C	3.4	24.3	Full	500	0.0	0.0
Approach	189	4.4	189	4.4		0.497		35.9	LOS D	3.4	24.3				
All Vehicles	2039	4.9	2039	4.9		0.985		32.6	LOS C	50.4	365.2				

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 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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	212	-	212	5.0	1407	0.151	100	0.0	2
Lane 2	-	985	985	4.0	1000[1]	0.985	100	NA	NA
Approach	212	985	1197	4.2		0.985			

NorthWest: R304

Mov. From NW To Exit:	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	607	-	607	6.0	1126	0.539	100	NA	NA
Lane 2	-	46	46	13.0	157	0.293	100	0.0	1
Approach	607	46	653	6.5		0.539			

SouthWest: Masitandane Rd

Mov. From SW To Exit:	L2 NW	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	80	-	80	9.0	161	0.497	100	NA	NA
Lane 2	-	109	109	1.0	227	0.480	100	NA	NA
Approach	80	109	189	4.4		0.497			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2039	4.9	0.985

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Masitandane Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 5 [Intersection 5_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: R304															
Lane 1	896	7.4	896	7.4	1841	0.487	100	0.2	LOS A	0.2	1.3	Full	500	0.0	0.0
Approach	896	7.4	896	7.4		0.487		0.2	NA	0.2	1.3				
East: Unnamed Rd (b)															
Lane 1	3	0.0	3	0.0	63	0.047	100	56.8	LOS F	0.1	0.9	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.047		56.8	LOS F	0.1	0.9				
North: R304															
Lane 1	901	5.0	901	5.0	1818	0.496	100	0.7	LOS A	0.7	4.8	Full	500	0.0	0.0
Approach	901	5.0	901	5.0		0.496		0.7	NA	0.7	4.8				
West: Taxi Rank Access															
Lane 1	30	15.6	30	15.6	39	0.769	100	79.6	LOS F	1.5	11.5	Full	500	0.0	0.0
Approach	30	15.6	30	15.6		0.769		79.6	LOS F	1.5	11.5				
All Vehicles	1830	6.3	1830	6.3		0.769		1.9	NA	1.5	11.5				

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.
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: R304

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	19	876	1	896	7.4	1841	0.487	100	NA	NA
Approach	19	876	1	896	7.4		0.487			

East: Unnamed Rd (b)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	63	0.047	100	NA	NA
Approach	1	1	1	3	0.0		0.047			

North: R304

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	2	885	14	901	5.0	1818	0.496	100	NA	NA
Approach	2	885	14	901	5.0		0.496			

West: Taxi Rank Access

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	1	10	30	15.6	39	0.769	100	NA	NA
Approach	19	1	10	30	15.6		0.769			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1830	6.3	0.769

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	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: R304				
Lane 1	0.0	0.0	0.0	0.0
East: Unnamed Rd (b)				
Lane 1	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
West: Taxi Rank Access				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 5 [Intersection 5_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: R304															
Lane 1	1225	4.0	1225	4.0	1890	0.648	100	0.2	LOS A	0.2	1.4	Full	500	0.0	0.0
Approach	1225	4.0	1225	4.0		0.648		0.2	NA	0.2	1.4				
East: Unnamed Rd (b)															
Lane 1	8	40.6	8	40.6	8	1.061	100	415.2	LOS F	2.8	26.8	Full	500	0.0	0.0
Approach	8	40.6	8	40.6		1.061		415.2	LOS F	2.8	26.8				
North: R304															
Lane 1	716	5.9	716	5.9	1454	0.492	100	7.0	LOS A	3.5	25.9	Full	500	0.0	0.0
Approach	716	5.9	716	5.9		0.492		7.0	NA	3.5	25.9				
West: Taxi Rank Access															
Lane 1	42	8.5	42	8.5	23	1.787	100	1561.7	LOS F	25.5	191.3	Full	500	0.0	0.0
Approach	42	8.5	42	8.5		1.787		1561.7	LOS F	25.5	191.3				
All Vehicles	1991	5.0	1991	5.0		1.787		37.2	NA	25.5	191.3				

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.
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: R304

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	36	1186	3	1225	4.0	1890	0.648	100	NA	NA
Approach	36	1186	3	1225	4.0		0.648			

East: Unnamed Rd (b)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	2	1	8	40.6	8	1.061	100	NA	NA
Approach	5	2	1	8	40.6		1.061			

North: R304

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	3	686	27	716	5.9	1454	0.492	100	NA	NA
Approach	3	686	27	716	5.9		0.492			

West: Taxi Rank Access

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	19	1	22	42	8.5	23	1.787	100	NA	NA
Approach	19	1	22	42	8.5		1.787			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1991	5.0	1.787

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 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: R304				
Lane 1	0.0	0.0	0.0	0.0
East: Unnamed Rd (b)				
Lane 1	0.0	0.5	219.9	NA
North: R304				
Lane 1	0.0	0.0	0.0	0.0
West: Taxi Rank Access				
Lane 1	0.0	18.5	2834.9	NA

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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:31:29
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 5\Intersection 5_Stellenbosch.sip9

LANE SUMMARY

Site: 6 [Intersection 6_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	1113	3.0	1113	3.0	1909	0.583	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	49	7.0	49	7.0	625	0.078	100	8.5	LOS A	0.3	2.1	Short	60	0.0	NA
Approach	1162	3.1	1162	3.1		0.583		0.9	NA	0.3	2.1				
NorthEast: Bell Rd															
Lane 1	184	4.7	184	4.7	23	7.979	100	12707.1	LOS F	202.6	1476.1	Full	500	0.0	100.0
Approach	184	4.7	184	4.7		7.979		12707.1	LOS F	202.6	1476.1				
NorthWest: R304															
Lane 1	786	16.4	786	16.4	1311	0.599	100	15.8	LOS C	9.4	75.0	Full	500	0.0	0.0
Approach	786	16.4	786	16.4		0.599		15.8	NA	9.4	75.0				
SouthWest: Porter Rd															
Lane 1	34	32.0	34	32.0	27	1.243	100	522.8	LOS F	10.6	94.6	Full	500	0.0	0.0
Approach	34	32.0	34	32.0		1.243		522.8	LOS F	10.6	94.6				
All Vehicles	2166	8.5	2166	8.5		7.979		1093.9	NA	202.6	1476.1				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	1065	-	1113	3.0	1909	0.583	100	NA	NA
Lane 2	-	-	49	49	7.0	625	0.078	100	0.0	1
Approach	48	1065	49	1162	3.1		0.583			

NorthEast: Bell Rd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	108	1	75	184	4.7	23	7.979	100	NA	NA

Approach	108	1	75	184	4.7		7.979			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	85	657	44	786	16.4	1311	0.599	100	NA	NA
Approach	85	657	44	786	16.4		0.599			
SouthWest: Porter Rd										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	28	1	5	34	32.0	27	1.243	100	NA	NA
Approach	28	1	5	34	32.0		1.243			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	2166	8.5		7.979						

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 Flow Rate sec 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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Bell Rd				
Lane 1	0.0	160.9	25124.7	NA
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
SouthWest: Porter Rd				
Lane 1	0.0	6.6	875.3	NA

LANE SUMMARY

Site: 6 [Intersection 6_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	1095	3.3	1095	3.3	1905	0.575	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	36	19.0	36	19.0	666	0.054	100	8.0	LOS A	0.2	1.6	Short	60	0.0	NA
Approach	1131	3.8	1131	3.8		0.575		0.7	NA	0.2	1.6				
NorthEast: Bell Rd															
Lane 1	175	3.8	175	3.8	31	5.602	100	8405.8	LOS F	181.3	1310.6	Full	500	0.0	57.2
Approach	175	3.8	175	3.8		5.602		8405.8	LOS F	181.3	1310.6				
NorthWest: R304															
Lane 1	705	5.1	705	5.1	1447	0.487	100	9.3	LOS A	4.7	34.0	Full	500	0.0	0.0
Approach	705	5.1	705	5.1		0.487		9.3	NA	4.7	34.0				
SouthWest: Porter Rd															
Lane 1	61	15.3	61	15.3	33	1.855	100	1668.8	LOS F	37.7	298.9	Full	500	0.0	0.0
Approach	61	15.3	61	15.3		1.855		1668.8	LOS F	37.7	298.9				
All Vehicles	2072	4.6	2072	4.6		5.602		762.6	NA	181.3	1310.6				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	30	1065	-	1095	3.3	1905	0.575	100	NA	NA
Lane 2	-	-	36	36	19.0	666	0.054	100	0.0	1
Approach	30	1065	36	1131	3.8		0.575			

NorthEast: Bell Rd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	95	1	79	175	3.8	31	5.602	100	NA	NA

Approach	95	1	79	175	3.8		5.602			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	95	581	29	705	5.1	1447	0.487	100	NA	NA
Approach	95	581	29	705	5.1		0.487			
SouthWest: Porter Rd										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	41	1	19	61	15.3	33	1.855	100	NA	NA
Approach	41	1	19	61	15.3		1.855			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	2072	4.6		5.602						

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 Flow Rate sec 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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Bell Rd				
Lane 1	0.0	143.8	16568.0	NA
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
SouthWest: Porter Rd				
Lane 1	0.0	28.1	3079.5	NA

LANE SUMMARY

Site: 7 [Intersection 7_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	53	11.0	53	11.0	861	0.062	100	22.1	LOS C	1.2	9.1	Short	50	0.0	NA
Lane 2	366	3.0	366	3.0	452[1]	0.810	100	42.6	LOS D	15.5	111.0	Full	500	0.0	0.0
Lane 3	13	14.0	13	14.0	300	0.043	100	37.8	LOS D	0.5	3.8	Full	500	0.0	0.0
Lane 4	13	14.0	13	14.0	300	0.043	100	37.8	LOS D	0.5	3.8	Short	80	0.0	NA
Approach	445	4.6	445	4.6		0.810		39.9	LOS D	15.5	111.0				
NorthEast: R310															
Lane 1	306	2.5	306	2.5	436	0.702	100	37.1	LOS D	12.6	90.0	Full	500	0.0	0.0
Lane 2	298	3.0	298	3.0	425	0.702	100	36.9	LOS D	12.4	88.7	Full	500	0.0	0.0
Lane 3	26	23.0	26	23.0	355	0.073	100	34.4	LOS C	0.9	7.7	Short	70	0.0	NA
Approach	630	3.6	630	3.6		0.702		36.9	LOS D	12.6	90.0				
NorthWest: R304															
Lane 1	392	6.8	392	6.8	458	0.857	100	37.4	LOS D	17.0	125.7	Full	500	0.0	0.0
Lane 2	189	5.0	189	5.0	319	0.593	100	42.4	LOS D	7.9	57.6	Short	100	0.0	NA
Lane 3	189	5.0	189	5.0	319	0.593	100	42.4	LOS D	7.9	57.6	Short	60	0.0	NA
Approach	770	5.9	770	5.9		0.857		39.9	LOS D	17.0	125.7				
SouthWest: R310															
Lane 1	552	3.0	552	3.0	741[1]	0.745	100	32.9	LOS C	20.4	146.2	Short	60	0.0	NA
Lane 2	143	11.0	143	11.0	404	0.352	100	39.1	LOS D	5.4	41.2	Full	500	0.0	0.0
Lane 3	143	11.0	143	11.0	404	0.352	100	33.6	LOS C	5.4	41.2	Full	500	0.0	0.0
Lane 4	345	7.0	345	7.0	393	0.878	100	43.3	LOS D	15.4	114.3	Short	100	0.0	NA
Approach	1182	6.1	1182	6.1		0.878		36.8	LOS D	20.4	146.2				
All Vehicles	3027	5.3	3027	5.3		0.878		38.0	LOS D	20.4	146.2				

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 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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	53	-	-	53	11.0	861	0.062	100	0.0	2

Lane 2	-	366	-	366	3.0	452[1]	0.810	100	NA	NA
Lane 3	-	-	13	13	14.0	300	0.043	100	NA	NA
Lane 4	-	-	13	13	14.0	300	0.043	100	0.0	3
Approach	53	366	26	445	4.6		0.810			

NorthEast: R310

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	82	224	-	306	2.5	436	0.702	100	NA	NA
Lane 2	-	298	-	298	3.0	425	0.702	100	NA	NA
Lane 3	-	-	26	26	23.0	355	0.073	100	0.0	2
Approach	82	522	26	630	3.6		0.702			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	38	354	-	392	6.8	458	0.857	100	NA	NA
Lane 2	-	-	189	189	5.0	319	0.593	100	0.0	1
Lane 3	-	-	189	189	5.0	319	0.593	100	1.3	2
Approach	38	354	378	770	5.9		0.857			

SouthWest: R310

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	552	-	-	552	3.0	741[1]	0.745	100	88.6	2
Lane 2	-	143	-	143	11.0	404	0.352	100	NA	NA
Lane 3	-	143	-	143	11.0	404	0.352	100	NA	NA
Lane 4	-	-	345	345	7.0	393	0.878	100	17.1	3
Approach	552	285	345	1182	6.1		0.878			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3027	5.3	0.878

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	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
SouthEast: 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 4	0.0	0.0	0.0	0.0
NorthEast: R310				

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
NorthWest: 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
SouthWest: R310				
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 4	0.0	0.0	0.0	0.0

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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:32:51
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 7\Intersection 7_Stellenbosch.sip9

LANE SUMMARY

Site: 7 [Intersection 7_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 117 seconds (Site Practical Cycle Time)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	43	27.0	43	27.0	824	0.052	100	36.0	LOS D	1.2	10.2	Short	50	0.0	NA
Lane 2	473	2.0	473	2.0	601[1]	0.787	100	57.6	LOS E	24.5	174.4	Full	500	0.0	0.0
Lane 3	20	21.0	20	21.0	428	0.046	100	21.8	LOS C	0.5	4.5	Full	500	0.0	0.0
Lane 4	20	21.0	20	21.0	428	0.046	100	21.8	LOS C	0.5	4.5	Short	80	0.0	NA
Approach	555	5.3	555	5.3		0.787		53.4	LOS D	24.5	174.4				
NorthEast: R310															
Lane 1	115	6.3	115	6.3	438	0.263	100	41.4	LOS D	5.4	39.5	Full	500	0.0	0.0
Lane 2	114	6.0	114	6.0	433	0.263	100	41.3	LOS D	5.3	39.3	Full	500	0.0	0.0
Lane 3	13	9.0	13	9.0	364	0.036	100	28.4	LOS C	0.4	3.2	Short	70	0.0	NA
Approach	242	6.3	242	6.3		0.263		40.6	LOS D	5.4	39.5				
NorthWest: R304															
Lane 1	408	4.0	408	4.0	617	0.661	100	37.8	LOS D	19.9	144.3	Full	500	0.0	0.0
Lane 2	143	8.0	143	8.0	416	0.344	100	25.0	LOS C	4.3	32.5	Short	100	0.0	NA
Lane 3	143	8.0	143	8.0	416	0.344	100	25.0	LOS C	4.3	32.5	Short	60	0.0	NA
Approach	694	5.7	694	5.7		0.661		32.5	LOS C	19.9	144.3				
SouthWest: R310															
Lane 1	646	2.0	646	2.0	688[1]	0.940	100	65.9	LOS E	40.3	286.7	Short	60	0.0	NA
Lane 2	180	9.0	180	9.0	432	0.417	100	60.5	LOS E	8.8	66.4	Full	500	0.0	0.0
Lane 3	177	9.0	177	9.0	425	0.417	100	43.1	LOS D	8.7	65.4	Full	500	0.0	0.0
Lane 4	405	4.0	405	4.0	542	0.747	100	32.2	LOS C	17.6	127.3	Short	100	0.0	NA
Approach	1408	4.4	1408	4.4		0.940		52.6	LOS D	40.3	286.7				
All Vehicles	2899	5.0	2899	5.0		0.940		47.0	LOS D	40.3	286.7				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	43	-	-	43	27.0	824	0.052	100	0.0	2

Lane 2	-	473	-	473	2.0	601[1]	0.787	100	NA	NA
Lane 3	-	-	20	20	21.0	428	0.046	100	NA	NA
Lane 4	-	-	20	20	21.0	428	0.046	100	0.0	3
Approach	43	473	39	555	5.3		0.787			

NorthEast: R310

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	32	83	-	115	6.3	438	0.263	100	NA	NA
Lane 2	-	114	-	114	6.0	433	0.263	100	NA	NA
Lane 3	-	-	13	13	9.0	364	0.036	100	0.0	2
Approach	32	197	13	242	6.3		0.263			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	52	356	-	408	4.0	617	0.661	100	NA	NA
Lane 2	-	-	143	143	8.0	416	0.344	100	0.0	1
Lane 3	-	-	143	143	8.0	416	0.344	100	0.0	2
Approach	52	356	286	694	5.7		0.661			

SouthWest: R310

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	646	-	-	646	2.0	688[1]	0.940	100	100.0	2
Lane 2	-	180	-	180	9.0	432	0.417	100	NA	NA
Lane 3	-	177	-	177	9.0	425	0.417	100	NA	NA
Lane 4	-	-	405	405	4.0	542	0.747	100	26.9	3
Approach	646	357	405	1408	4.4		0.940			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2899	5.0	0.940

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 pcu/h	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
SouthEast: 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 4	0.0	0.0	0.0	0.0
NorthEast: R310				

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
NorthWest: 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
SouthWest: R310				
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 4	0.0	0.0	0.0	0.0

APPENDIX E: 2030 BACKGROUND AND DEVELOPMENT LANE SUMMARY ON AN EXISTING 2025 ROAD GEOMETRY

LANE SUMMARY

Site: 1 [Intersection 1_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 65 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	788	5.0	788	5.0	836[1]	0.943	100	33.7	LOS C	29.7	216.8	Full	500	0.0	0.0
Lane 2	77	25.0	77	25.0	145	0.529	100	44.0	LOS D	2.6	21.8	Short	60	0.0	NA
Approach	865	6.8	865	6.8		0.943		34.7	LOS C	29.7	216.8				
NorthEast: Welgevonden Blvd															
Lane 1	35	14.0	35	14.0	494	0.071	100	22.2	LOS C	0.8	6.4	Short	50	0.0	NA
Lane 2	90	4.9	90	4.9	221	0.407	100	34.5	LOS C	2.8	20.5	Full	500	0.0	0.0
Approach	125	7.5	125	7.5		0.407		31.1	LOS C	2.8	20.5				
NorthWest: R304															
Lane 1	185	21.0	185	21.0	944	0.196	100	7.3	LOS A	1.6	13.6	Short	170	0.0	NA
Lane 2	676	8.0	676	8.0	856	0.790	100	16.9	LOS B	18.4	137.9	Full	500	0.0	0.0
Lane 3	1	0.0	1	0.0	171	0.006	100	33.7	LOS C	0.0	0.2	Short	120	0.0	NA
Approach	862	10.8	862	10.8		0.790		14.9	LOS B	18.4	137.9				
SouthWest: Farm Access Rd															
Lane 1	3	0.0	3	0.0	114	0.026	100	23.2	LOS C	0.1	0.5	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.026		23.2	LOS C	0.1	0.5				
All Vehicles	1855	8.7	1855	8.7		0.943		25.2	LOS C	29.7	216.8				

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.

Approach Lane Flows (veh/h)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	787	-	788	5.0	836[1]	0.943	100	NA	NA
Lane 2	-	-	77	77	25.0	145	0.529	100	0.0	1
Approach	1	787	77	865	6.8		0.943			

NorthEast: Welgevonden Blvd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	35	-	-	35	14.0	494	0.071	100	0.0	2
Lane 2	-	1	89	90	4.9	221	0.407	100	NA	NA
Approach	35	1	89	125	7.5		0.407			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	185	-	-	185	21.0	944	0.196	100	0.0	2
Lane 2	-	676	-	676	8.0	856	0.790	100	NA	NA
Lane 3	-	-	1	1	0.0	171	0.006	100	0.0	2
Approach	185	676	1	862	10.8		0.790			

SouthWest: Farm Access Rd

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	114	0.026	100	NA	NA
Approach	1	1	1	3	0.0		0.026			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1855	8.7	0.943

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Farm Access Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 1 [Intersection 1_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 58 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	1020	2.0	1020	2.0	1063[1]	0.960	100	32.7	LOS C	38.9	276.7	Full	500	0.0	0.0
Lane 2	55	26.0	55	26.0	216	0.255	100	35.3	LOS D	1.5	12.8	Short	60	0.0	NA
Approach	1075	3.2	1075	3.2		0.960		32.8	LOS C	38.9	276.7				
NorthEast: Welgevonden Blvd															
Lane 1	64	36.0	64	36.0	586	0.109	100	16.1	LOS B	1.2	10.6	Short	50	0.0	NA
Lane 2	81	34.6	81	34.6	257	0.315	100	28.4	LOS C	2.1	19.4	Full	500	0.0	0.0
Approach	145	35.2	145	35.2		0.315		23.0	LOS C	2.1	19.4				
NorthWest: R304															
Lane 1	162	24.0	162	24.0	547	0.296	100	19.5	LOS B	3.4	29.0	Short	170	0.0	NA
Lane 2	549	3.0	549	3.0	660	0.832	100	20.2	LOS C	14.7	105.6	Full	500	0.0	0.0
Lane 3	1	100.0	1	100.0	107	0.009	100	34.3	LOS C	0.0	0.4	Short	120	0.0	NA
Approach	712	7.9	712	7.9		0.832		20.0	LOS C	14.7	105.6				
SouthWest: Farm Access Rd															
Lane 1	3	0.0	3	0.0	98	0.031	100	33.1	LOS C	0.1	0.6	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.031		33.1	LOS C	0.1	0.6				
All Vehicles	1935	7.3	1935	7.3		0.960		27.4	LOS C	38.9	276.7				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1019	-	1020	2.0	1063[1]	0.960	100	NA	NA
Lane 2	-	-	55	55	26.0	216	0.255	100	0.0	1
Approach	1	1019	55	1075	3.2		0.960			

NorthEast: Welgevonden Blvd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	64	-	-	64	36.0	586	0.109	100	0.0	2
Lane 2	-	1	80	81	34.6	257	0.315	100	NA	NA
Approach	64	1	80	145	35.2		0.315			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	162	-	-	162	24.0	547	0.296	100	0.0	2
Lane 2	-	549	-	549	3.0	660	0.832	100	NA	NA
Lane 3	-	-	1	1	100.0	107	0.009	100	0.0	2
Approach	162	549	1	712	7.9		0.832			

SouthWest: Farm Access Rd

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	98	0.031	100	NA	NA
Approach	1	1	1	3	0.0		0.031			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1935	7.3	0.960

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Welgevonden Blvd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Farm Access Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 2 [Intersection 2_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 54 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	14	0.0	14	0.0	688	0.020	100	15.4	LOS B	0.2	1.6	Short	115	0.0	NA
Lane 2	394	7.0	394	7.0	691	0.570	100	15.6	LOS B	8.5	63.1	Full	500	0.0	0.0
Lane 3	407	7.0	407	7.0	715	0.570	100	18.9	LOS B	9.8	72.6	Full	500	0.0	0.0
Approach	815	6.9	815	6.9		0.570		17.3	LOS B	9.8	72.6				
NorthEast: Unnamed Rd (a)															
Lane 1	3	0.0	3	0.0	140	0.021	100	29.2	LOS C	0.1	0.5	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.021		29.2	LOS C	0.1	0.5				
NorthWest: R304															
Lane 1	373	7.0	373	7.0	691	0.541	100	15.4	LOS B	8.0	59.1	Full	500	0.0	0.0
Lane 2	374	7.0	374	7.0	691	0.541	100	15.4	LOS B	8.0	59.1	Full	500	0.0	0.0
Lane 3	7	50.0	7	50.0	76	0.092	100	33.1	LOS C	0.2	2.0	Short	120	0.0	NA
Approach	754	7.4	754	7.4		0.541		15.6	LOS B	8.0	59.1				
SouthWest: Newinbosch Access															
Lane 1	23	4.0	23	4.0	334	0.069	100	24.3	LOS C	0.5	3.8	Full	500	0.0	0.0
Lane 2	16	3.7	16	3.7	336	0.046	100	23.7	LOS C	0.3	2.5	Full	500	0.0	0.0
Lane 3	15	4.0	15	4.0	334	0.046	100	23.9	LOS C	0.3	2.5	Full	500	0.0	0.0
Approach	54	3.9	54	3.9		0.069		24.0	LOS C	0.5	3.8				
All Vehicles	1626	7.0	1626	7.0		0.570		16.7	LOS B	9.8	72.6				

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.

Approach Lane Flows (veh/h)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	-	-	14	0.0	688	0.020	100	0.0	2
Lane 2	-	394	-	394	7.0	691	0.570	100	NA	NA
Lane 3	-	406	1	407	7.0	715	0.570	100	NA	NA
Approach	14	800	1	815	6.9		0.570			

NorthEast: Unnamed Rd (a)

Mov.	L2	T1	R2	Total	%HV	Deg.	Lane	Prob.	Ov.

From NE To Exit:	SE	SW	NW			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	1	1	1	3	0.0	140	0.021	100	NA	NA
Approach	1	1	1	3	0.0		0.021			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	372	-	373	7.0	691	0.541	100	NA	NA
Lane 2	-	374	-	374	7.0	691	0.541	100	NA	NA
Lane 3	-	-	7	7	50.0	76	0.092	100	0.0	2
Approach	1	746	7	754	7.4		0.541			
SouthWest: Newinbosch Access										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	23	-	-	23	4.0	334	0.069	100	NA	NA
Lane 2	-	1	15	16	3.7	336	0.046	100	NA	NA
Lane 3	-	-	15	15	4.0	334	0.046	100	NA	NA
Approach	23	1	30	54	3.9		0.069			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1626	7.0	0.570

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 Flow Rate sec 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
SouthEast: 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
NorthEast: Unnamed Rd (a)				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Newinbosch Access				
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

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Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 2\Intersection 2_Stellenbosch.sip9

LANE SUMMARY

Site: 2 [Intersection 2_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 55 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	14	8.0	14	8.0	671	0.021	100	15.2	LOS B	0.2	1.8	Short	115	0.0	NA
Lane 2	515	4.0	515	4.0	726	0.710	100	16.6	LOS B	12.0	87.2	Full	500	0.0	0.0
Lane 3	534	4.0	534	4.0	751	0.710	100	19.8	LOS B	12.3	89.1	Full	500	0.0	0.0
Approach	1063	4.0	1063	4.0		0.710		18.2	LOS B	12.3	89.1				
NorthEast: Unnamed Rd (a)															
Lane 1	3	0.0	3	0.0	137	0.022	100	29.8	LOS C	0.1	0.6	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.022		29.8	LOS C	0.1	0.6				
NorthWest: R304															
Lane 1	308	7.0	308	7.0	712	0.433	100	14.4	LOS B	6.3	46.5	Full	500	0.0	0.0
Lane 2	308	7.0	308	7.0	712	0.433	100	14.4	LOS B	6.3	46.5	Full	500	0.0	0.0
Lane 3	10	0.0	10	0.0	101	0.099	100	33.0	LOS C	0.3	2.0	Short	120	0.0	NA
Approach	626	6.9	626	6.9		0.433		14.7	LOS B	6.3	46.5				
SouthWest: Newinbosch Access															
Lane 1	15	8.0	15	8.0	319	0.047	100	24.7	LOS C	0.3	2.6	Full	500	0.0	0.0
Lane 2	24	9.2	24	9.2	318	0.076	100	24.5	LOS C	0.6	4.2	Full	500	0.0	0.0
Lane 3	24	10.0	24	10.0	315	0.076	100	24.8	LOS C	0.6	4.2	Full	500	0.0	0.0
Approach	63	9.2	63	9.2		0.076		24.6	LOS C	0.6	4.2				
All Vehicles	1755	5.2	1755	5.2		0.710		17.2	LOS B	12.3	89.1				

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.

Approach Lane Flows (veh/h)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	14	-	-	14	8.0	671	0.021	100	0.0	2
Lane 2	-	515	-	515	4.0	726	0.710	100	NA	NA
Lane 3	-	533	1	534	4.0	751	0.710	100	NA	NA
Approach	14	1048	1	1063	4.0		0.710			

NorthEast: Unnamed Rd (a)

Mov.	L2	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.

From NE To Exit:	SE	SW	NW			Cap. veh/h	Satn v/c	Util. %	SL Ov. %	Lane No.
Lane 1	1	1	1	3	0.0	137	0.022	100	NA	NA
Approach	1	1	1	3	0.0		0.022			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	307	-	308	7.0	712	0.433	100	NA	NA
Lane 2	-	308	-	308	7.0	712	0.433	100	NA	NA
Lane 3	-	-	10	10	0.0	101	0.099	100	0.0	2
Approach	1	615	10	626	6.9		0.433			
SouthWest: Newinbosch Access										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	15	-	-	15	8.0	319	0.047	100	NA	NA
Lane 2	-	2	22	24	9.2	318	0.076	100	NA	NA
Lane 3	-	-	24	24	10.0	315	0.076	100	NA	NA
Approach	15	2	46	63	9.2		0.076			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1755	5.2	0.710

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	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
SouthEast: 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
NorthEast: Unnamed Rd (a)				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Newinbosch Access				
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

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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:30:14
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 2\Intersection 2_Stellenbosch.sip9

LANE SUMMARY

Site: 3 [Intersection 3_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 71 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	124	3.0	124	3.0	743	0.167	100	18.3	LOS B	2.7	19.6	Short	140	0.0	NA
Lane 2	667	6.0	667	6.0	745[1]	0.895	100	29.0	LOS C	23.4	172.2	Full	500	0.0	0.0
Lane 3	89	9.0	89	9.0	123	0.724	100	47.0	LOS D	3.3	25.2	Short	70	0.0	NA
Approach	880	5.9	880	5.9		0.895		29.3	LOS C	23.4	172.2				
NorthEast: Mount Simon Dr															
Lane 1	215	15.4	215	15.4	237	0.905	100	40.4	LOS D	8.1	64.0	Full	500	0.0	0.0
Lane 2	50	0.0	50	0.0	183	0.273	100	38.3	LOS D	1.7	12.0	Short	40	0.0	NA
Approach	265	12.5	265	12.5		0.905		40.0	LOS D	8.1	64.0				
NorthWest: R304															
Lane 1	18	20.0	18	20.0	664	0.027	100	27.0	LOS C	0.4	3.0	Short	55	0.0	NA
Lane 2	737	5.0	737	5.0	761[1]	0.968	100	48.6	LOS D	34.0	247.9	Full	500	0.0	0.0
Lane 3	22	95.0	22	95.0	78	0.282	100	49.2	LOS D	0.8	10.4	Short	70	0.0	NA
Approach	777	7.9	777	7.9		0.968		48.1	LOS D	34.0	247.9				
SouthWest: Sokuqala St															
Lane 1	169	10.6	169	10.6	244	0.694	100	37.7	LOS D	5.9	45.3	Full	500	0.0	0.0
Lane 2	63	2.0	63	2.0	181	0.349	100	38.7	LOS D	2.2	15.5	Full	500	0.0	0.0
Approach	232	8.3	232	8.3		0.694		38.0	LOS D	5.9	45.3				
All Vehicles	2154	7.7	2154	7.7		0.968		38.3	LOS D	34.0	247.9				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	124	-	-	124	3.0	743	0.167	100	0.0	2
Lane 2	-	667	-	667	6.0	745[1]	0.895	100	NA	NA
Lane 3	-	-	89	89	9.0	123	0.724	100	0.0	2
Approach	124	667	89	880	5.9		0.895			

NorthEast: Mount Simon Dr

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	202	13	-	215	15.4	237	0.905	100	NA	NA
Lane 2	-	-	50	50	0.0	183	0.273	100	0.0	1
Approach	202	13	50	265	12.5		0.905			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	18	-	-	18	20.0	664	0.027	100	0.0	2
Lane 2	-	737	-	737	5.0	761[1]	0.968	100	NA	NA
Lane 3	-	-	22	22	95.0	78	0.282	100	0.0	2
Approach	18	737	22	777	7.9		0.968			
SouthWest: Sokuqala St										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	163	6	-	169	10.6	244	0.694	100	NA	NA
Lane 2	-	-	63	63	2.0	181	0.349	100	NA	NA
Approach	163	6	63	232	8.3		0.694			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2154	7.7	0.968

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	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
SouthEast: 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
NorthEast: Mount Simon Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Sokuqala St				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 3 [Intersection 3_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 81 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	134	4.0	134	4.0	1092	0.123	100	10.9	LOS B	2.2	16.1	Short	140	0.0	NA
Lane 2	770	5.0	770	5.0	801[1]	0.961	100	47.3	LOS D	39.0	284.9	Full	500	0.0	0.0
Lane 3	226	0.0	226	0.0	252	0.896	100	53.1	LOS D	9.5	66.4	Short	70	0.0	NA
Approach	1130	3.9	1130	3.9		0.961		44.1	LOS D	39.0	284.9				
NorthEast: Mount Simon Dr															
Lane 1	101	0.0	101	0.0	484	0.209	100	29.0	LOS C	3.1	21.9	Full	500	0.0	0.0
Lane 2	29	0.0	29	0.0	160	0.181	100	43.5	LOS D	1.1	7.9	Short	40	0.0	NA
Approach	130	0.0	130	0.0		0.209		32.2	LOS C	3.1	21.9				
NorthWest: R304															
Lane 1	40	17.0	40	17.0	1002	0.040	100	15.9	LOS B	0.6	5.0	Short	55	0.0	NA
Lane 2	612	6.0	612	6.0	860[1]	0.712	100	24.6	LOS C	19.3	142.4	Full	500	0.0	0.0
Lane 3	23	0.0	23	0.0	252	0.091	100	40.5	LOS D	0.8	5.7	Short	70	0.0	NA
Approach	675	6.4	675	6.4		0.712		24.6	LOS C	19.3	142.4				
SouthWest: Sokuqala St															
Lane 1	238	10.5	238	10.5	456	0.521	100	32.0	LOS C	8.2	62.4	Full	500	0.0	0.0
Lane 2	89	2.0	89	2.0	158	0.562	100	45.7	LOS D	3.6	25.8	Full	500	0.0	0.0
Approach	327	8.2	327	8.2		0.562		35.7	LOS D	8.2	62.4				
All Vehicles	2262	5.0	2262	5.0		0.961		36.4	LOS D	39.0	284.9				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	134	-	-	134	4.0	1092	0.123	100	0.0	2
Lane 2	-	770	-	770	5.0	801[1]	0.961	100	NA	NA
Lane 3	-	-	226	226	0.0	252	0.896	100	0.2	2
Approach	134	770	226	1130	3.9		0.961			
NorthEast: Mount Simon Dr										

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	96	5	-	101	0.0	484	0.209	100	NA	NA
Lane 2	-	-	29	29	0.0	160	0.181	100	0.0	1
Approach	96	5	29	130	0.0		0.209			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	40	-	-	40	17.0	1002	0.040	100	0.0	2
Lane 2	-	612	-	612	6.0	860[1]	0.712	100	NA	NA
Lane 3	-	-	23	23	0.0	252	0.091	100	0.0	2
Approach	40	612	23	675	6.4		0.712			

SouthWest: Sokuqala St

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	227	11	-	238	10.5	456	0.521	100	NA	NA
Lane 2	-	-	89	89	2.0	158	0.562	100	NA	NA
Approach	227	11	89	327	8.2		0.562			

	Total	%HV	Deg. Satn (v/c)
All Vehicles	2262	5.0	0.961

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 pcu/h	Follow-up Headway sec	Lane Flow Rate sec 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
SouthEast: 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
NorthEast: Mount Simon Dr				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: 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
SouthWest: Sokuqala St				
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: 4 [Intersection 4_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 74 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	170	11.0	170	11.0	1280	0.133	100	14.1	LOS B	1.7	13.2	Short	50	0.0	NA
Lane 2	769	5.0	769	5.0	856[1]	0.899	100	29.5	LOS C	27.7	202.2	Full	500	0.0	0.0
Approach	939	6.1	939	6.1		0.899		26.7	LOS C	27.7	202.2				
NorthWest: R304															
Lane 1	874	5.0	874	5.0	895[1]	0.976	100	51.6	LOS D	45.4	331.1	Full	500	0.0	0.0
Lane 2	134	14.0	134	14.0	205	0.652	100	49.1	LOS D	4.9	38.7	Short	60	0.0	NA
Approach	1008	6.2	1008	6.2		0.976		51.2	LOS D	45.4	331.1				
SouthWest: Masitandane Rd															
Lane 1	111	10.0	111	10.0	211	0.526	100	39.5	LOS D	4.0	30.4	Full	500	0.0	0.0
Lane 2	162	11.0	162	11.0	279	0.580	100	37.1	LOS D	5.7	43.6	Full	500	0.0	0.0
Approach	273	10.6	273	10.6		0.580		38.1	LOS D	5.7	43.6				
All Vehicles	2220	6.7	2220	6.7		0.976		39.3	LOS D	45.4	331.1				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	170	-	170	11.0	1280	0.133	100	0.0	2
Lane 2	-	769	769	5.0	856[1]	0.899	100	NA	NA
Approach	170	769	939	6.1		0.899			

NorthWest: R304

Mov. From NW To Exit:	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	874	-	874	5.0	895[1]	0.976	100	NA	NA
Lane 2	-	134	134	14.0	205	0.652	100	0.0	1
Approach	874	134	1008	6.2		0.976			

SouthWest: Masitandane Rd

Mov. From SW To Exit:	L2 NW	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	111	-	111	10.0	211	0.526	100	NA	NA
Lane 2	-	162	162	11.0	279	0.580	100	NA	NA
Approach	111	162	273	10.6		0.580			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2220	6.7	0.976

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 pcu/h	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Masitandane Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 4 [Intersection 4_2030 Background nad Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 70 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	212	5.0	212	5.0	1486	0.143	100	11.4	LOS B	1.4	10.1	Short	50	0.0	NA
Lane 2	1109	4.0	1109	4.0	1121[1]	0.989	100	55.0	LOS D	63.2	457.3	Full	500	0.0	0.0
Approach	1321	4.2	1321	4.2		0.989		48.0	LOS D	63.2	457.3				
NorthWest: R304															
Lane 1	660	6.0	660	6.0	1260	0.524	100	6.5	LOS A	11.4	83.8	Full	500	0.0	0.0
Lane 2	69	13.0	69	13.0	146	0.474	100	40.2	LOS D	2.4	19.0	Short	60	0.0	NA
Approach	729	6.7	729	6.7		0.524		9.7	LOS A	11.4	83.8				
SouthWest: Masitandane Rd															
Lane 1	133	9.0	133	9.0	150	0.889	100	42.4	LOS D	5.0	37.6	Full	500	0.0	0.0
Lane 2	109	1.0	109	1.0	211	0.517	100	38.0	LOS D	3.7	26.4	Full	500	0.0	0.0
Approach	242	5.4	242	5.4		0.889		40.4	LOS D	5.0	37.6				
All Vehicles	2292	5.1	2292	5.1		0.989		35.0	LOS D	63.2	457.3				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	212	-	212	5.0	1486	0.143	100	0.0	2
Lane 2	-	1109	1109	4.0	1121[1]	0.989	100	NA	NA
Approach	212	1109	1321	4.2		0.989			

NorthWest: R304

Mov. From NW To Exit:	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	660	-	660	6.0	1260	0.524	100	NA	NA
Lane 2	-	69	69	13.0	146	0.474	100	0.0	1
Approach	660	69	729	6.7		0.524			

SouthWest: Masitandane Rd

Mov. From SW To Exit:	L2 NW	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	133	-	133	9.0	150	0.889	100	NA	NA
Lane 2	-	109	109	1.0	211	0.517	100	NA	NA
Approach	133	109	242	5.4		0.889			
	Total	%HV	Deg.Satn (v/c)						
All Vehicles	2292	5.1		0.989					

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 pcu/h	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
SouthWest: Masitandane Rd				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 5 [Intersection 5_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: R304															
Lane 1	938	7.3	938	7.3	1832	0.512	100	0.5	LOS A	0.3	2.5	Full	500	0.0	0.0
Approach	938	7.3	938	7.3		0.512		0.5	NA	0.3	2.5				
East: Unnamed Rd (b)															
Lane 1	3	0.0	3	0.0	35	0.086	100	96.0	LOS F	0.2	1.5	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.086		96.0	LOS F	0.2	1.5				
North: R304															
Lane 1	1034	5.0	1034	5.0	1787	0.578	100	1.4	LOS A	1.5	10.8	Full	500	0.0	0.0
Approach	1034	5.0	1034	5.0		0.578		1.4	NA	1.5	10.8				
West: Taxi Rank Access															
Lane 1	32	15.4	32	15.4	33	0.961	100	198.2	LOS F	3.3	26.5	Full	500	0.0	0.0
Approach	32	15.4	32	15.4		0.961		198.2	LOS F	3.3	26.5				
All Vehicles	2007	6.2	2007	6.2		0.961		4.3	NA	3.3	26.5				

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.
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: R304

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	19	918	1	938	7.3	1832	0.512	100	NA	NA
Approach	19	918	1	938	7.3		0.512			

East: Unnamed Rd (b)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	35	0.086	100	NA	NA
Approach	1	1	1	3	0.0		0.086			

North: R304

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	2	1011	21	1034	5.0	1787	0.578	100	NA	NA
Approach	2	1011	21	1034	5.0		0.578			
West: Taxi Rank Access										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	21	1	10	32	15.4	33	0.961	100	NA	NA
Approach	21	1	10	32	15.4		0.961			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	2007	6.2		0.961						

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 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: R304				
Lane 1	0.0	0.0	0.0	0.0
East: Unnamed Rd (b)				
Lane 1	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
West: Taxi Rank Access				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 5 [Intersection 5_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: R304															
Lane 1	1343	4.0	1343	4.0	1891	0.710	100	0.2	LOS A	0.3	1.9	Full	500	0.0	0.0
Approach	1343	4.0	1343	4.0		0.710		0.2	NA	0.3	1.9				
East: Unnamed Rd (b)															
Lane 1	8	40.6	8	40.6	7	1.112	100	493.3	LOS F	3.1	29.7	Full	500	0.0	0.0
Approach	8	40.6	8	40.6		1.112		493.3	LOS F	3.1	29.7				
North: R304															
Lane 1	766	5.9	766	5.9	1291	0.593	100	23.8	LOS C	10.8	79.2	Full	500	0.0	0.0
Approach	766	5.9	766	5.9		0.593		23.8	NA	10.8	79.2				
West: Taxi Rank Access															
Lane 1	48	8.2	48	8.2	16	3.056	100	3902.5	LOS F	42.9	321.6	Full	500	0.0	0.0
Approach	48	8.2	48	8.2		3.056		3902.5	LOS F	42.9	321.6				
All Vehicles	2165	4.9	2165	4.9		3.056		96.9	NA	42.9	321.6				

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: R304

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	36	1304	3	1343	4.0	1891	0.710	100	NA	NA
Approach	36	1304	3	1343	4.0		0.710			

East: Unnamed Rd (b)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	2	1	8	40.6	7	1.112	100	NA	NA
Approach	5	2	1	8	40.6		1.112			

North: R304

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	3	736	27	766	5.9	1291	0.593	100	NA	NA
Approach	3	736	27	766	5.9		0.593			
West: Taxi Rank Access										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	1	22	48	8.2	16	3.056	100	NA	NA
Approach	25	1	22	48	8.2		3.056			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2165	4.9	3.056

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	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: R304				
Lane 1	0.0	0.0	0.0	0.0
East: Unnamed Rd (b)				
Lane 1	0.0	0.8	403.4	NA
North: R304				
Lane 1	0.0	0.0	0.0	0.0
West: Taxi Rank Access				
Lane 1	0.0	32.3	7402.4	NA

LANE SUMMARY

Site: 6vv [Intersection 6_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	1113	3.0	1113	3.0	1909	0.583	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	49	7.0	49	7.0	625	0.078	100	8.5	LOS A	0.3	2.1	Short	60	0.0	NA
Approach	1162	3.1	1162	3.1		0.583		0.9	NA	0.3	2.1				
NorthEast: Bell Rd															
Lane 1	184	4.7	184	4.7	23	7.979	100	12707.1	LOS F	202.6	1476.1	Full	500	0.0	100.0
Approach	184	4.7	184	4.7		7.979		12707.1	LOS F	202.6	1476.1				
NorthWest: R304															
Lane 1	786	16.4	786	16.4	1311	0.599	100	15.8	LOS C	9.4	75.0	Full	500	0.0	0.0
Approach	786	16.4	786	16.4		0.599		15.8	NA	9.4	75.0				
SouthWest: Porter Rd															
Lane 1	34	32.0	34	32.0	27	1.243	100	522.8	LOS F	10.6	94.6	Full	500	0.0	0.0
Approach	34	32.0	34	32.0		1.243		522.8	LOS F	10.6	94.6				
All Vehicles	2166	8.5	2166	8.5		7.979		1093.9	NA	202.6	1476.1				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	1065	-	1113	3.0	1909	0.583	100	NA	NA
Lane 2	-	-	49	49	7.0	625	0.078	100	0.0	1
Approach	48	1065	49	1162	3.1		0.583			

NorthEast: Bell Rd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	108	1	75	184	4.7	23	7.979	100	NA	NA

Approach	108	1	75	184	4.7		7.979			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	85	657	44	786	16.4	1311	0.599	100	NA	NA
Approach	85	657	44	786	16.4		0.599			
SouthWest: Porter Rd										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	28	1	5	34	32.0	27	1.243	100	NA	NA
Approach	28	1	5	34	32.0		1.243			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	2166	8.5	7.979							

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Bell Rd				
Lane 1	0.0	160.9	25124.7	NA
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
SouthWest: Porter Rd				
Lane 1	0.0	6.6	875.3	NA

LANE SUMMARY

Site: 6vv [Intersection 6_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Stop (Two-Way)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	1095	3.3	1095	3.3	1905	0.575	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	36	19.0	36	19.0	666	0.054	100	8.0	LOS A	0.2	1.6	Short	60	0.0	NA
Approach	1131	3.8	1131	3.8		0.575		0.7	NA	0.2	1.6				
NorthEast: Bell Rd															
Lane 1	175	3.8	175	3.8	31	5.602	100	8405.8	LOS F	181.3	1310.6	Full	500	0.0	57.2
Approach	175	3.8	175	3.8		5.602		8405.8	LOS F	181.3	1310.6				
NorthWest: R304															
Lane 1	705	5.1	705	5.1	1447	0.487	100	9.3	LOS A	4.7	34.0	Full	500	0.0	0.0
Approach	705	5.1	705	5.1		0.487		9.3	NA	4.7	34.0				
SouthWest: Porter Rd															
Lane 1	61	15.3	61	15.3	33	1.855	100	1668.8	LOS F	37.7	298.9	Full	500	0.0	0.0
Approach	61	15.3	61	15.3		1.855		1668.8	LOS F	37.7	298.9				
All Vehicles	2072	4.6	2072	4.6		5.602		762.6	NA	181.3	1310.6				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	30	1065	-	1095	3.3	1905	0.575	100	NA	NA
Lane 2	-	-	36	36	19.0	666	0.054	100	0.0	1
Approach	30	1065	36	1131	3.8		0.575			

NorthEast: Bell Rd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	95	1	79	175	3.8	31	5.602	100	NA	NA

Approach	95	1	79	175	3.8		5.602			
NorthWest: R304										
Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	95	581	29	705	5.1	1447	0.487	100	NA	NA
Approach	95	581	29	705	5.1		0.487			
SouthWest: Porter Rd										
Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	41	1	19	61	15.3	33	1.855	100	NA	NA
Approach	41	1	19	61	15.3		1.855			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2072	4.6	5.602

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 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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Bell Rd				
Lane 1	0.0	143.8	16568.0	NA
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
SouthWest: Porter Rd				
Lane 1	0.0	28.1	3079.5	NA

LANE SUMMARY

Site: 7 [Intersection 7_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	53	11.0	53	11.0	918	0.058	100	21.6	LOS C	1.1	8.4	Short	50	0.0	NA
Lane 2	399	3.0	399	3.0	511[1]	0.780	100	41.2	LOS D	16.4	117.9	Full	500	0.0	0.0
Lane 3	13	14.0	13	14.0	281	0.046	100	38.8	LOS D	0.5	3.8	Full	500	0.0	0.0
Lane 4	13	14.0	13	14.0	281	0.046	100	38.8	LOS D	0.5	3.8	Short	80	0.0	NA
Approach	478	4.5	478	4.5		0.780		38.9	LOS D	16.4	117.9				
NorthEast: R310															
Lane 1	306	2.5	306	2.5	393	0.778	100	39.5	LOS D	13.1	93.3	Full	500	0.0	0.0
Lane 2	298	3.0	298	3.0	383	0.778	100	39.3	LOS D	12.7	91.5	Full	500	0.0	0.0
Lane 3	30	23.0	30	23.0	355	0.085	100	34.6	LOS C	1.1	8.9	Short	70	0.0	NA
Approach	634	3.7	634	3.7		0.778		39.1	LOS D	13.1	93.3				
NorthWest: R304															
Lane 1	509	6.9	509	6.9	527	0.965	100	49.7	LOS D	27.5	204.2	Full	500	0.0	0.0
Lane 2	192	5.0	192	5.0	299	0.642	100	43.7	LOS D	8.2	59.6	Short	100	0.0	NA
Lane 3	192	5.0	192	5.0	299	0.642	100	43.7	LOS D	8.2	59.6	Short	60	0.0	NA
Approach	893	6.1	893	6.1		0.965		47.1	LOS D	27.5	204.2				
SouthWest: R310															
Lane 1	554	3.0	554	3.0	677[1]	0.819	100	37.9	LOS D	21.8	156.8	Short	60	0.0	NA
Lane 2	143	11.0	143	11.0	364	0.392	100	43.0	LOS D	5.6	42.6	Full	500	0.0	0.0
Lane 3	143	11.0	143	11.0	364	0.392	100	35.7	LOS D	5.6	42.6	Full	500	0.0	0.0
Lane 4	345	7.0	345	7.0	393	0.878	100	43.3	LOS D	15.4	114.3	Short	100	0.0	NA
Approach	1184	6.1	1184	6.1		0.878		39.8	LOS D	21.8	156.8				
All Vehicles	3189	5.4	3189	5.4		0.965		41.6	LOS D	27.5	204.2				

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 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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	53	-	-	53	11.0	918	0.058	100	0.0	2

Lane 2	-	399	-	399	3.0	511[1]	0.780	100	NA	NA
Lane 3	-	-	13	13	14.0	281	0.046	100	NA	NA
Lane 4	-	-	13	13	14.0	281	0.046	100	0.0	3
Approach	53	399	26	478	4.5		0.780			

NorthEast: R310

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	82	224	-	306	2.5	393	0.778	100	NA	NA
Lane 2	-	298	-	298	3.0	383	0.778	100	NA	NA
Lane 3	-	-	30	30	23.0	355	0.085	100	0.0	2
Approach	82	522	30	634	3.7		0.778			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	50	459	-	509	6.9	527	0.965	100	NA	NA
Lane 2	-	-	192	192	5.0	299	0.642	100	0.0	1
Lane 3	-	-	192	192	5.0	299	0.642	100	4.4	2
Approach	50	459	384	893	6.1		0.965			

SouthWest: R310

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	554	-	-	554	3.0	677[1]	0.819	100	95.6	2
Lane 2	-	143	-	143	11.0	364	0.392	100	NA	NA
Lane 3	-	143	-	143	11.0	364	0.392	100	NA	NA
Lane 4	-	-	345	345	7.0	393	0.878	100	17.1	3
Approach	554	285	345	1184	6.1		0.878			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3189	5.4	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 pcu/h	Follow-up Headway sec	Lane Flow Rate sec 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
SouthEast: 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 4	0.0	0.0	0.0	0.0
NorthEast: R310				

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
NorthWest: 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
SouthWest: R310				
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 4	0.0	0.0	0.0	0.0

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LANE SUMMARY

Site: 7 [Intersection 7_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 118 seconds (Site Practical Cycle Time)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	43	27.0	43	27.0	845	0.051	100	39.0	LOS D	1.1	9.8	Short	50	0.0	NA
Lane 2	572	2.0	572	2.0	642[1]	0.890	100	64.1	LOS E	32.1	228.3	Full	500	0.0	0.0
Lane 3	20	21.0	20	21.0	424	0.046	100	21.1	LOS C	0.5	4.3	Full	500	0.0	0.0
Lane 4	20	21.0	20	21.0	424	0.046	100	21.1	LOS C	0.5	4.3	Short	80	0.0	NA
Approach	654	4.8	654	4.8		0.890		59.9	LOS E	32.1	228.3				
NorthEast: R310															
Lane 1	115	6.3	115	6.3	403	0.286	100	43.9	LOS D	5.6	41.0	Full	500	0.0	0.0
Lane 2	114	6.0	114	6.0	398	0.286	100	43.8	LOS D	5.5	40.7	Full	500	0.0	0.0
Lane 3	25	9.0	25	9.0	361	0.069	100	30.0	LOS C	0.9	6.6	Short	70	0.0	NA
Approach	254	6.4	254	6.4		0.286		42.5	LOS D	5.6	41.0				
NorthWest: R304															
Lane 1	455	4.0	455	4.0	670	0.679	100	36.5	LOS D	22.2	160.8	Full	500	0.0	0.0
Lane 2	144	8.0	144	8.0	387	0.373	100	26.4	LOS C	4.2	31.5	Short	100	0.0	NA
Lane 3	144	8.0	144	8.0	387	0.373	100	26.4	LOS C	4.2	31.5	Short	60	0.0	NA
Approach	743	5.6	743	5.6		0.679		32.6	LOS C	22.2	160.8				
SouthWest: R310															
Lane 1	651	2.0	651	2.0	652[1]	0.998	100	102.7	LOS F	53.6	381.9	Short	60	0.0	NA
Lane 2	179	9.0	179	9.0	396	0.450	100	65.6	LOS E	9.0	68.2	Full	500	0.0	0.0
Lane 3	179	9.0	179	9.0	396	0.450	100	45.7	LOS D	9.0	68.2	Full	500	0.0	0.0
Lane 4	405	4.0	405	4.0	517	0.783	100	34.8	LOS C	18.3	132.6	Short	100	0.0	NA
Approach	1413	4.3	1413	4.3		0.998		71.3	LOS E	53.6	381.9				
All Vehicles	3064	4.9	3064	4.9		0.998		57.1	LOS E	53.6	381.9				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	43	-	-	43	27.0	845	0.051	100	0.0	2

Lane 2	-	572	-	572	2.0	642[1]	0.890	100	NA	NA
Lane 3	-	-	20	20	21.0	424	0.046	100	NA	NA
Lane 4	-	-	20	20	21.0	424	0.046	100	0.0	3
Approach	43	572	39	654	4.8		0.890			

NorthEast: R310

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	32	83	-	115	6.3	403	0.286	100	NA	NA
Lane 2	-	114	-	114	6.0	398	0.286	100	NA	NA
Lane 3	-	-	25	25	9.0	361	0.069	100	0.0	2
Approach	32	197	25	254	6.4		0.286			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	57	398	-	455	4.0	670	0.679	100	NA	NA
Lane 2	-	-	144	144	8.0	387	0.373	100	0.0	1
Lane 3	-	-	144	144	8.0	387	0.373	100	0.0	2
Approach	57	398	288	743	5.6		0.679			

SouthWest: R310

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	651	-	-	651	2.0	652[1]	0.998	100	100.0	2
Lane 2	-	179	-	179	9.0	396	0.450	100	NA	NA
Lane 3	-	179	-	179	9.0	396	0.450	100	NA	NA
Lane 4	-	-	405	405	4.0	517	0.783	100	30.7	3
Approach	651	357	405	1413	4.3		0.998			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3064	4.9	0.998

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	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
SouthEast: 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 4	0.0	0.0	0.0	0.0
NorthEast: R310				

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
NorthWest: 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
SouthWest: R310				
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 4	0.0	0.0	0.0	0.0

APPENDIX F: 2030 BACKGROUND AND DEVELOPMENT LANE SUMMARY WITH A PROPOSED SIGNAL TIMING

LANE SUMMARY

Site: 5v [Intersection 5_2030 Proposed Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 56 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: R304															
Lane 1	938	7.3	938	7.3	1155	0.812	100	9.2	LOS A	19.7	146.9	Full	500	0.0	0.0
Approach	938	7.3	938	7.3		0.812		9.2	LOS A	19.7	146.9				
East: Unnamed Rd (b)															
Lane 1	3	0.0	3	0.0	135	0.022	100	30.4	LOS C	0.1	0.6	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.022		30.4	LOS C	0.1	0.6				
North: R304															
Lane 1	1034	5.0	1034	5.0	1075	0.962	100	27.4	LOS C	39.1	285.1	Full	500	0.0	0.0
Approach	1034	5.0	1034	5.0		0.962		27.4	LOS C	39.1	285.1				
West: Taxi Rank Access															
Lane 1	32	15.4	32	15.4	120	0.267	100	33.4	LOS C	0.9	7.3	Full	500	0.0	0.0
Approach	32	15.4	32	15.4		0.267		33.4	LOS C	0.9	7.3				
All Vehicles	2007	6.2	2007	6.2		0.962		19.0	LOS B	39.1	285.1				

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.

Approach Lane Flows (veh/h)

South: R304

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	19	918	1	938	7.3	1155	0.812	100	NA	NA
Approach	19	918	1	938	7.3		0.812			

East: Unnamed Rd (b)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	1	1	3	0.0	135	0.022	100	NA	NA
Approach	1	1	1	3	0.0		0.022			

North: R304

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	2	1011	21	1034	5.0	1075	0.962	100	NA	NA
Approach	2	1011	21	1034	5.0		0.962			

West: Taxi Rank Access

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	21	1	10	32	15.4	120	0.267	100	NA	NA
Approach	21	1	10	32	15.4		0.267			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2007	6.2	0.962

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 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: R304				
Lane 1	0.0	0.0	0.0	0.0
East: Unnamed Rd (b)				
Lane 1	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
West: Taxi Rank Access				
Lane 1	0.0	0.0	0.0	0.0

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Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 5\Intersection 5_Stellenbosch.sip9

LANE SUMMARY

Site: 5v [Intersection 5_2030 Proposed Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 64 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: R304															
Lane 1	1343	4.0	1343	4.0	1385	0.970	100	31.1	LOS C	61.1	442.8	Full	500	0.0	0.0
Approach	1343	4.0	1343	4.0		0.970		31.1	LOS C	61.1	442.8				
East: Unnamed Rd (b)															
Lane 1	8	40.6	8	40.6	116	0.069	100	35.0	LOS D	0.3	2.4	Full	500	0.0	0.0
Approach	8	40.6	8	40.6		0.069		35.0	LOS D	0.3	2.4				
North: R304															
Lane 1	766	5.9	766	5.9	990	0.774	100	13.1	LOS B	19.0	139.6	Full	500	0.0	0.0
Approach	766	5.9	766	5.9		0.774		13.1	LOS B	19.0	139.6				
West: Taxi Rank Access															
Lane 1	48	8.2	48	8.2	137	0.350	100	37.1	LOS D	1.6	11.7	Full	500	0.0	0.0
Approach	48	8.2	48	8.2		0.350		37.1	LOS D	1.6	11.7				
All Vehicles	2165	4.9	2165	4.9		0.970		24.9	LOS C	61.1	442.8				

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: R304

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	36	1304	3	1343	4.0	1385	0.970	100	NA	NA
Approach	36	1304	3	1343	4.0		0.970			

East: Unnamed Rd (b)

Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	2	1	8	40.6	116	0.069	100	NA	NA
Approach	5	2	1	8	40.6		0.069			

North: R304

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	3	736	27	766	5.9	990	0.774	100	NA	NA
Approach	3	736	27	766	5.9		0.774			

West: Taxi Rank Access

Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	25	1	22	48	8.2	137	0.350	100	NA	NA
Approach	25	1	22	48	8.2		0.350			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2165	4.9	0.970

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	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: R304				
Lane 1	0.0	0.0	0.0	0.0
East: Unnamed Rd (b)				
Lane 1	0.0	0.0	0.0	0.0
North: R304				
Lane 1	0.0	0.0	0.0	0.0
West: Taxi Rank Access				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 6v [Intersection 6_2030 Proposed Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 68 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	1113	3.0	1113	3.0	1227[1]	0.907	100	20.9	LOS C	36.4	261.0	Full	500	0.0	0.0
Lane 2	49	7.0	49	7.0	413	0.119	100	29.3	LOS C	1.2	9.2	Short	60	0.0	NA
Approach	1162	3.1	1162	3.1		0.907		21.3	LOS C	36.4	261.0				
NorthEast: Bell Rd															
Lane 1	184	4.7	184	4.7	238	0.774	100	37.4	LOS D	6.3	45.9	Full	500	0.0	0.0
Approach	184	4.7	184	4.7		0.774		37.4	LOS D	6.3	45.9				
NorthWest: R304															
Lane 1	786	16.4	786	16.4	794	0.990	100	51.2	LOS D	42.0	335.0	Full	500	0.0	0.0
Approach	786	16.4	786	16.4		0.990		51.2	LOS D	42.0	335.0				
SouthWest: Porter Rd															
Lane 1	34	32.0	34	32.0	111	0.305	100	39.7	LOS D	1.2	10.5	Full	500	0.0	0.0
Approach	34	32.0	34	32.0		0.305		39.7	LOS D	1.2	10.5				
All Vehicles	2166	8.5	2166	8.5		0.990		33.8	LOS C	42.0	335.0				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	48	1065	-	1113	3.0	1227[1]	0.907	100	NA	NA
Lane 2	-	-	49	49	7.0	413	0.119	100	0.0	1
Approach	48	1065	49	1162	3.1		0.907			

NorthEast: Bell Rd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	108	1	75	184	4.7	238	0.774	100	NA	NA
Approach	108	1	75	184	4.7		0.774			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	85	657	44	786	16.4	794	0.990	100	NA	NA
Approach	85	657	44	786	16.4		0.990			

SouthWest: Porter Rd

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	28	1	5	34	32.0	111	0.305	100	NA	NA
Approach	28	1	5	34	32.0		0.305			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2166	8.5	0.990

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Bell Rd				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
SouthWest: Porter Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 6v [Intersection 6_2030 Proposed Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 73 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	1095	3.3	1095	3.3	1120[1]	0.978	100	50.2	LOS D	58.1	418.3	Full	500	0.0	0.0
Lane 2	36	19.0	36	19.0	400	0.090	100	34.4	LOS C	1.0	7.9	Short	60	0.0	NA
Approach	1131	3.8	1131	3.8		0.978		49.7	LOS D	58.1	418.3				
NorthEast: Bell Rd															
Lane 1	175	3.8	175	3.8	223	0.785	100	40.3	LOS D	6.5	46.7	Full	500	0.0	0.0
Approach	175	3.8	175	3.8		0.785		40.3	LOS D	6.5	46.7				
NorthWest: R304															
Lane 1	705	5.1	705	5.1	758	0.930	100	30.2	LOS C	28.1	205.2	Full	500	0.0	0.0
Approach	705	5.1	705	5.1		0.930		30.2	LOS C	28.1	205.2				
SouthWest: Porter Rd															
Lane 1	61	15.3	61	15.3	92	0.664	100	45.1	LOS D	2.4	19.0	Full	500	0.0	0.0
Approach	61	15.3	61	15.3		0.664		45.1	LOS D	2.4	19.0				
All Vehicles	2072	4.6	2072	4.6		0.978		42.2	LOS D	58.1	418.3				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	30	1065	-	1095	3.3	1120[1]	0.978	100	NA	NA
Lane 2	-	-	36	36	19.0	400	0.090	100	0.0	1
Approach	30	1065	36	1131	3.8		0.978			

NorthEast: Bell Rd

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	95	1	79	175	3.8	223	0.785	100	NA	NA
Approach	95	1	79	175	3.8		0.785			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	95	581	29	705	5.1	758	0.930	100	NA	NA
Approach	95	581	29	705	5.1		0.930			

SouthWest: Porter Rd

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	41	1	19	61	15.3	92	0.664	100	NA	NA
Approach	41	1	19	61	15.3		0.664			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2072	4.6	0.978

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	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
SouthEast: R304				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
NorthEast: Bell Rd				
Lane 1	0.0	0.0	0.0	0.0
NorthWest: R304				
Lane 1	0.0	0.0	0.0	0.0
SouthWest: Porter Rd				
Lane 1	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 7 [Intersection 7_2030 Proposed Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	53	11.0	53	11.0	918	0.058	100	21.6	LOS C	1.1	8.4	Short	50	0.0	NA
Lane 2	399	3.0	399	3.0	511[1]	0.780	100	41.2	LOS D	16.4	117.9	Full	500	0.0	0.0
Lane 3	13	14.0	13	14.0	281	0.046	100	38.8	LOS D	0.5	3.8	Full	500	0.0	0.0
Lane 4	13	14.0	13	14.0	281	0.046	100	38.8	LOS D	0.5	3.8	Short	80	0.0	NA
Approach	478	4.5	478	4.5		0.780		38.9	LOS D	16.4	117.9				
NorthEast: R310															
Lane 1	306	2.5	306	2.5	393	0.778	100	39.5	LOS D	13.1	93.3	Full	500	0.0	0.0
Lane 2	298	3.0	298	3.0	383	0.778	100	39.3	LOS D	12.7	91.5	Full	500	0.0	0.0
Lane 3	30	23.0	30	23.0	355	0.085	100	34.6	LOS C	1.1	8.9	Short	70	0.0	NA
Approach	634	3.7	634	3.7		0.778		39.1	LOS D	13.1	93.3				
NorthWest: R304															
Lane 1	509	6.9	509	6.9	527	0.965	100	49.7	LOS D	27.5	204.2	Full	500	0.0	0.0
Lane 2	192	5.0	192	5.0	299	0.642	100	43.7	LOS D	8.2	59.6	Short	100	0.0	NA
Lane 3	192	5.0	192	5.0	299	0.642	100	43.7	LOS D	8.2	59.6	Short	60	0.0	NA
Approach	893	6.1	893	6.1		0.965		47.1	LOS D	27.5	204.2				
SouthWest: R310															
Lane 1	400	3.0	400	3.0	727	0.550	100	26.8	LOS C	13.6	97.3	Short	60	0.0	NA
Lane 2	239	5.8	239	5.8	435	0.550	100	36.1	LOS D	9.4	68.8	Full	500	0.0	0.0
Lane 3	200	11.0	200	11.0	364	0.550	100	37.1	LOS D	8.1	62.2	Full	500	0.0	0.0
Lane 4	345	7.0	345	7.0	393	0.878	100	43.3	LOS D	15.4	114.3	Short	100	0.0	NA
Approach	1184	6.1	1184	6.1		0.878		35.2	LOS D	15.4	114.3				
All Vehicles	3189	5.4	3189	5.4		0.965		39.9	LOS D	27.5	204.2				

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 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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	53	-	-	53	11.0	918	0.058	100	0.0	2

Lane 2	-	399	-	399	3.0	511[1]	0.780	100	NA	NA
Lane 3	-	-	13	13	14.0	281	0.046	100	NA	NA
Lane 4	-	-	13	13	14.0	281	0.046	100	0.0	3
Approach	53	399	26	478	4.5		0.780			

NorthEast: R310

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	82	224	-	306	2.5	393	0.778	100	NA	NA
Lane 2	-	298	-	298	3.0	383	0.778	100	NA	NA
Lane 3	-	-	30	30	23.0	355	0.085	100	0.0	2
Approach	82	522	30	634	3.7		0.778			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	50	459	-	509	6.9	527	0.965	100	NA	NA
Lane 2	-	-	192	192	5.0	299	0.642	100	0.0	1
Lane 3	-	-	192	192	5.0	299	0.642	100	4.4	2
Approach	50	459	384	893	6.1		0.965			

SouthWest: R310

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	400	-	-	400	3.0	727	0.550	100	49.4	2
Lane 2	154	85	-	239	5.8	435	0.550	100	NA	NA
Lane 3	-	200	-	200	11.0	364	0.550	100	NA	NA
Lane 4	-	-	345	345	7.0	393	0.878	100	17.1	3
Approach	554	285	345	1184	6.1		0.878			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3189	5.4	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 pcu/h 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
SouthEast: 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 4	0.0	0.0	0.0	0.0
NorthEast: R310				

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
NorthWest: 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
SouthWest: R310				
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 4	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: 7 [Intersection 7_2030 Proposed Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 117 seconds (Site User-Given Phase Times)

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: R304															
Lane 1	43	27.0	43	27.0	958	0.045	100	30.6	LOS C	0.9	8.2	Short	50	0.0	NA
Lane 2	572	2.0	572	2.0	729[1]	0.785	100	52.2	LOS D	28.5	203.0	Full	500	0.0	0.0
Lane 3	20	21.0	20	21.0	344	0.057	100	22.7	LOS C	0.6	4.7	Full	500	0.0	0.0
Lane 4	20	21.0	20	21.0	344	0.057	100	22.7	LOS C	0.6	4.7	Short	80	0.0	NA
Approach	654	4.8	654	4.8		0.785		49.0	LOS D	28.5	203.0				
NorthEast: R310															
Lane 1	115	6.3	115	6.3	406	0.284	100	43.4	LOS D	5.5	40.5	Full	500	0.0	0.0
Lane 2	114	6.0	114	6.0	401	0.284	100	43.2	LOS D	5.5	40.3	Full	500	0.0	0.0
Lane 3	25	9.0	25	9.0	409	0.061	100	27.5	LOS C	0.8	6.2	Short	70	0.0	NA
Approach	254	6.4	254	6.4		0.284		41.8	LOS D	5.5	40.5				
NorthWest: R304															
Lane 1	455	4.0	455	4.0	758	0.601	100	31.2	LOS C	20.4	147.4	Full	500	0.0	0.0
Lane 2	144	8.0	144	8.0	295	0.488	100	27.8	LOS C	4.6	34.3	Short	100	0.0	NA
Lane 3	144	8.0	144	8.0	295	0.488	100	27.8	LOS C	4.6	34.3	Short	60	0.0	NA
Approach	743	5.6	743	5.6		0.601		29.9	LOS C	20.4	147.4				
SouthWest: R310															
Lane 1	386	2.0	386	2.0	521[1]	0.742	100	49.1	LOS D	19.5	139.0	Short	60	0.0	NA
Lane 2	325	3.3	325	3.3	439[1]	0.742	100	53.4	LOS D	17.0	122.6	Full	500	0.0	0.0
Lane 3	296	9.0	296	9.0	400	0.742	100	48.8	LOS D	16.0	121.0	Full	500	0.0	0.0
Lane 4	405	4.0	405	4.0	568	0.712	100	31.3	LOS C	17.2	124.6	Short	100	0.0	NA
Approach	1413	4.3	1413	4.3		0.742		44.9	LOS D	19.5	139.0				
All Vehicles	3064	4.9	3064	4.9		0.785		41.9	LOS D	28.5	203.0				

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)

SouthEast: R304

Mov. From SE To Exit:	L2 SW	T1 NW	R2 NE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	43	-	-	43	27.0	958	0.045	100	0.0	2

Lane 2	-	572	-	572	2.0	729[1]	0.785	100	NA	NA
Lane 3	-	-	20	20	21.0	344	0.057	100	NA	NA
Lane 4	-	-	20	20	21.0	344	0.057	100	0.0	3
Approach	43	572	39	654	4.8		0.785			

NorthEast: R310

Mov. From NE To Exit:	L2 SE	T1 SW	R2 NW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	32	83	-	115	6.3	406	0.284	100	NA	NA
Lane 2	-	114	-	114	6.0	401	0.284	100	NA	NA
Lane 3	-	-	25	25	9.0	409	0.061	100	0.0	2
Approach	32	197	25	254	6.4		0.284			

NorthWest: R304

Mov. From NW To Exit:	L2 NE	T1 SE	R2 SW	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	57	398	-	455	4.0	758	0.601	100	NA	NA
Lane 2	-	-	144	144	8.0	295	0.488	100	0.0	1
Lane 3	-	-	144	144	8.0	295	0.488	100	0.0	2
Approach	57	398	288	743	5.6		0.601			

SouthWest: R310

Mov. From SW To Exit:	L2 NW	T1 NE	R2 SE	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	386	-	-	386	2.0	521[1]	0.742	100	83.7	2
Lane 2	265	61	-	325	3.3	439[1]	0.742	100	NA	NA
Lane 3	-	296	-	296	9.0	400	0.742	100	NA	NA
Lane 4	-	-	405	405	4.0	568	0.712	100	25.0	3
Approach	651	357	405	1413	4.3		0.742			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3064	4.9	0.785

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	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
SouthEast: 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 4	0.0	0.0	0.0	0.0
NorthEast: R310				

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
NorthWest: 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
SouthWest: R310				
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 4	0.0	0.0	0.0	0.0

APPENDIX G: 2025 EXISTING PHASING SUMMARIES

PHASING SUMMARY

Site: 1 [Intersection 1_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 58 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

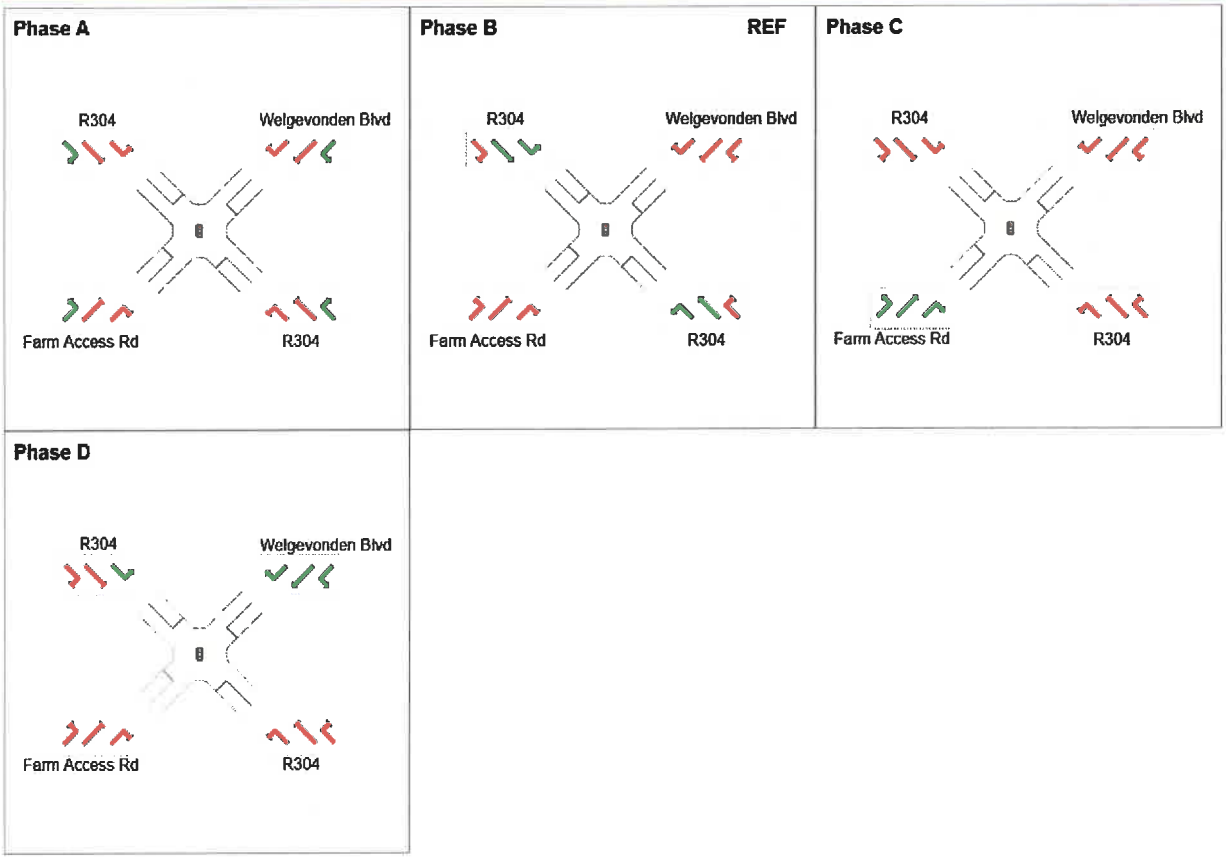
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	47	0	28	36
Green Time (sec)	6	23	3	8
Phase Time (sec)	11	28	6	13
Phase Split	19%	48%	10%	22%
Phase Frequency (%)	100.0	100.0	54.5[2]	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

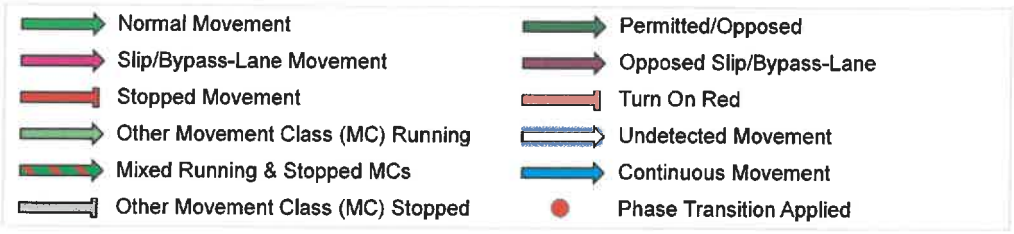
2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



PHASING SUMMARY

Site: 1 [Intersection 1_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 50 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

Phase Timing Summary

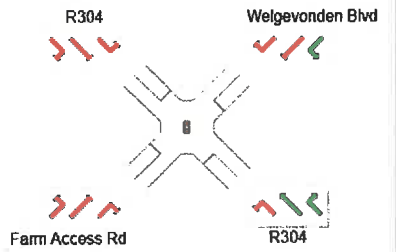
Phase	A	B	C	D
Phase Change Time (sec)	39	0	20	28
Green Time (sec)	6	15	3	8
Phase Time (sec)	11	20	6	13
Phase Split	22%	40%	12%	26%
Phase Frequency (%)	100.0	100.0	54.5[2]	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

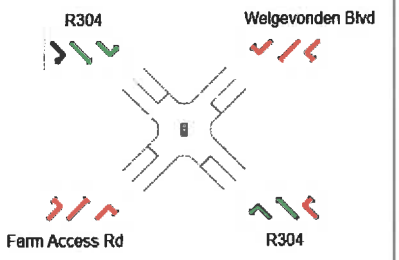
2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence

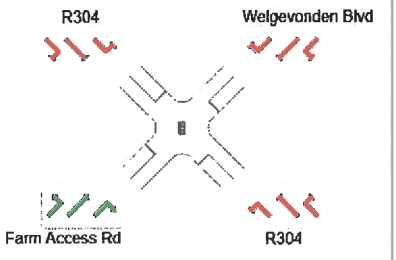
Phase A



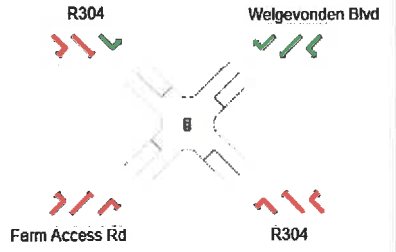
Phase B **REF**



Phase C

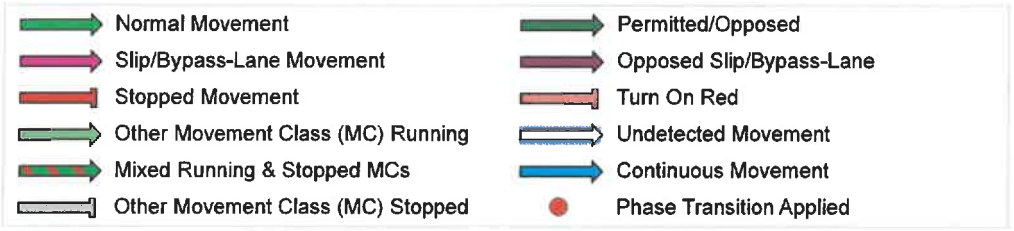


Phase D



REF: Reference Phase

VAR: Variable Phase



PHASING SUMMARY

Site: 2 [Intersection 2_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 57 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

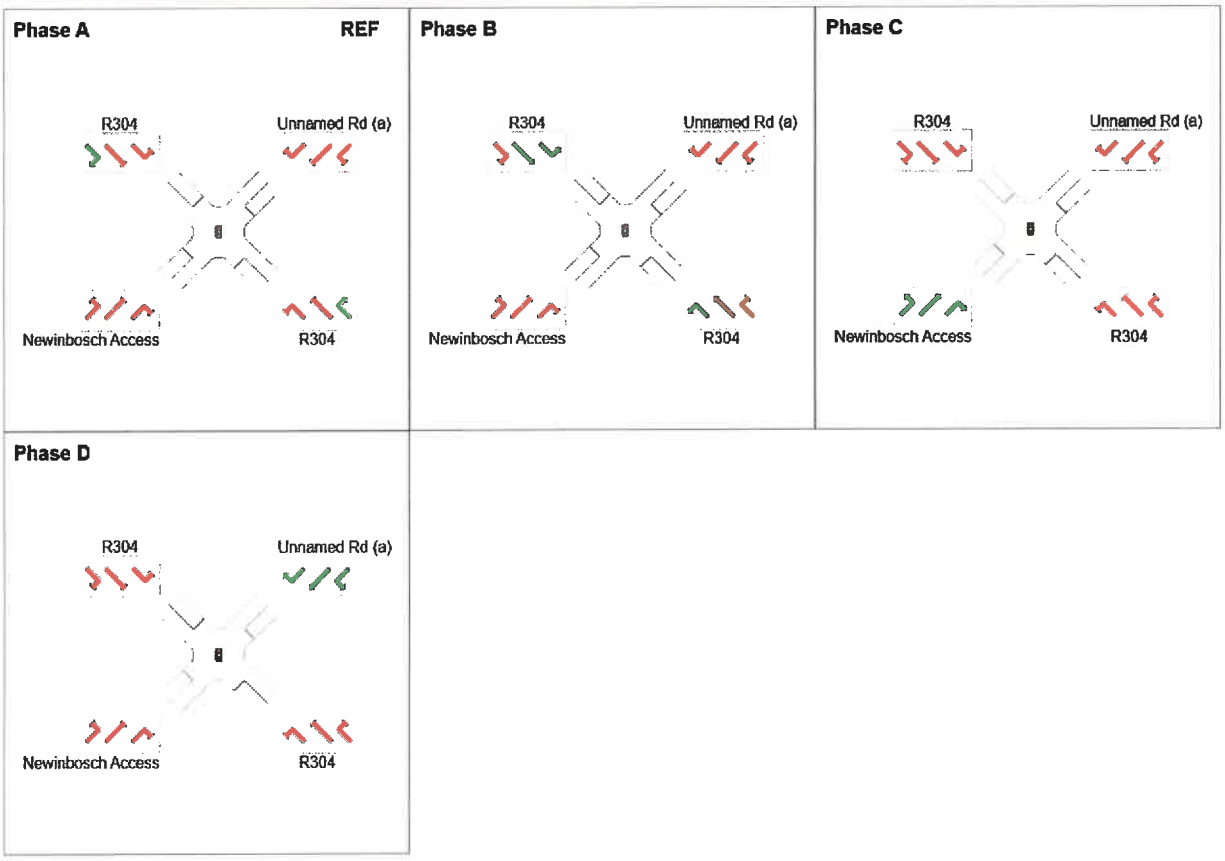
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	7	32	47
Green Time (sec)	3	22	9	4
Phase Time (sec)	6	28	15	8
Phase Split	11%	49%	26%	14%
Phase Frequency (%)	50.0[2]	100.0	100.0	66.7[2]

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

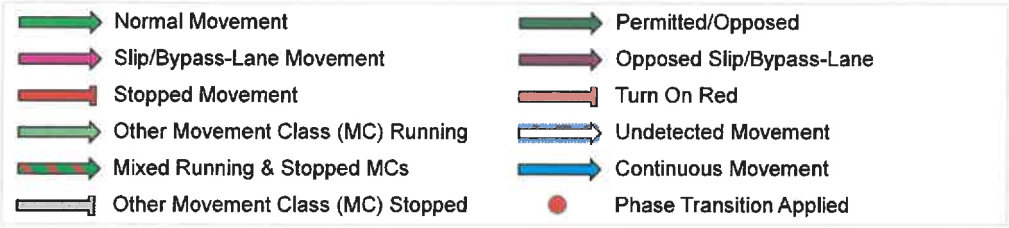
2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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PHASING SUMMARY

Site: 2 [Intersection 2_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 57 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

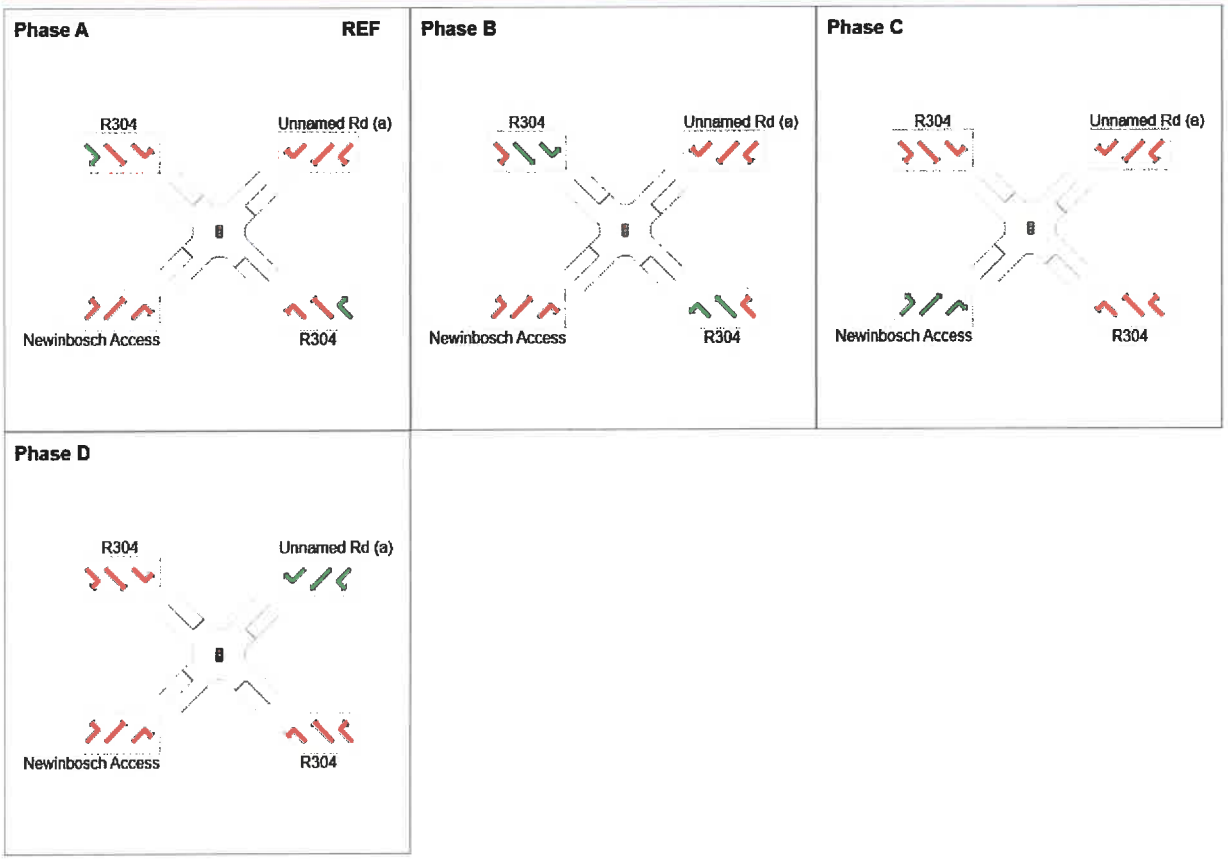
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	7	32	47
Green Time (sec)	3	22	9	4
Phase Time (sec)	6	28	15	8
Phase Split	11%	49%	26%	14%
Phase Frequency (%)	50.0[2]	100.0	100.0	66.7[2]

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

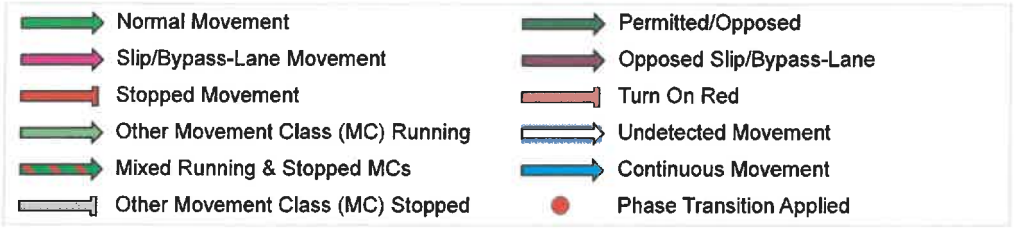
2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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PHASING SUMMARY

Site: 3 [Intersection 3_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 74 seconds (Site User-Given Phase Times)

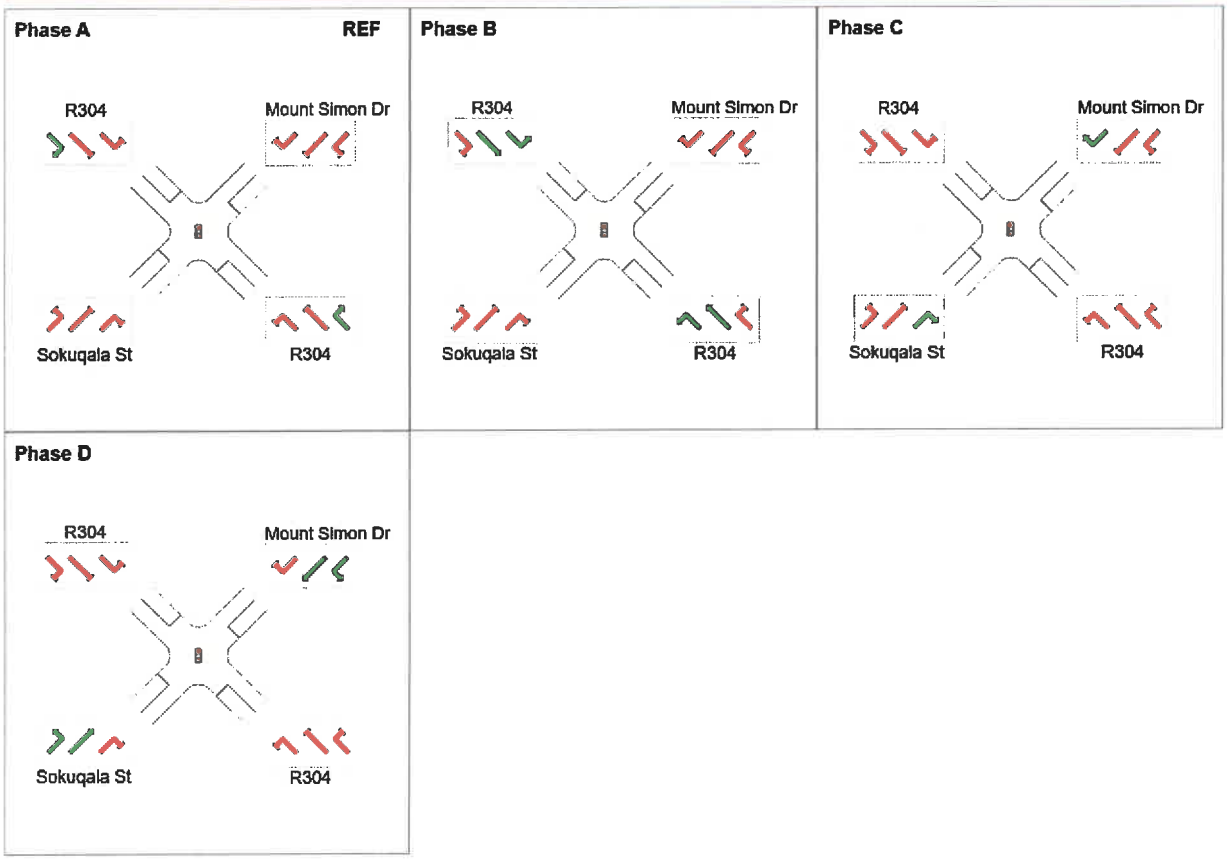
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

Phase Timing Summary

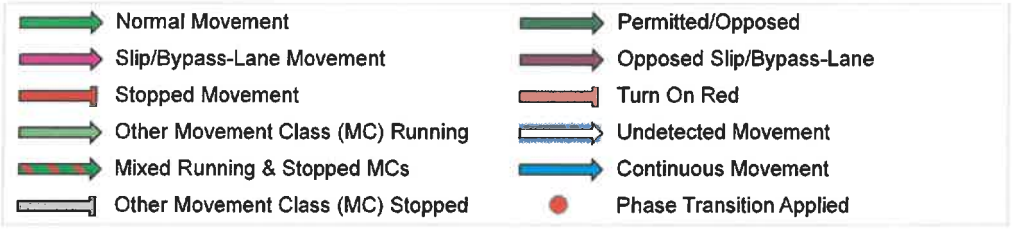
Phase	A	B	C	D
Phase Change Time (sec)	0	11	43	57
Green Time (sec)	6	27	9	12
Phase Time (sec)	11	32	14	17
Phase Split	15%	43%	19%	23%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 3 [Intersection 3_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 74 seconds (Site User-Given Phase Times)

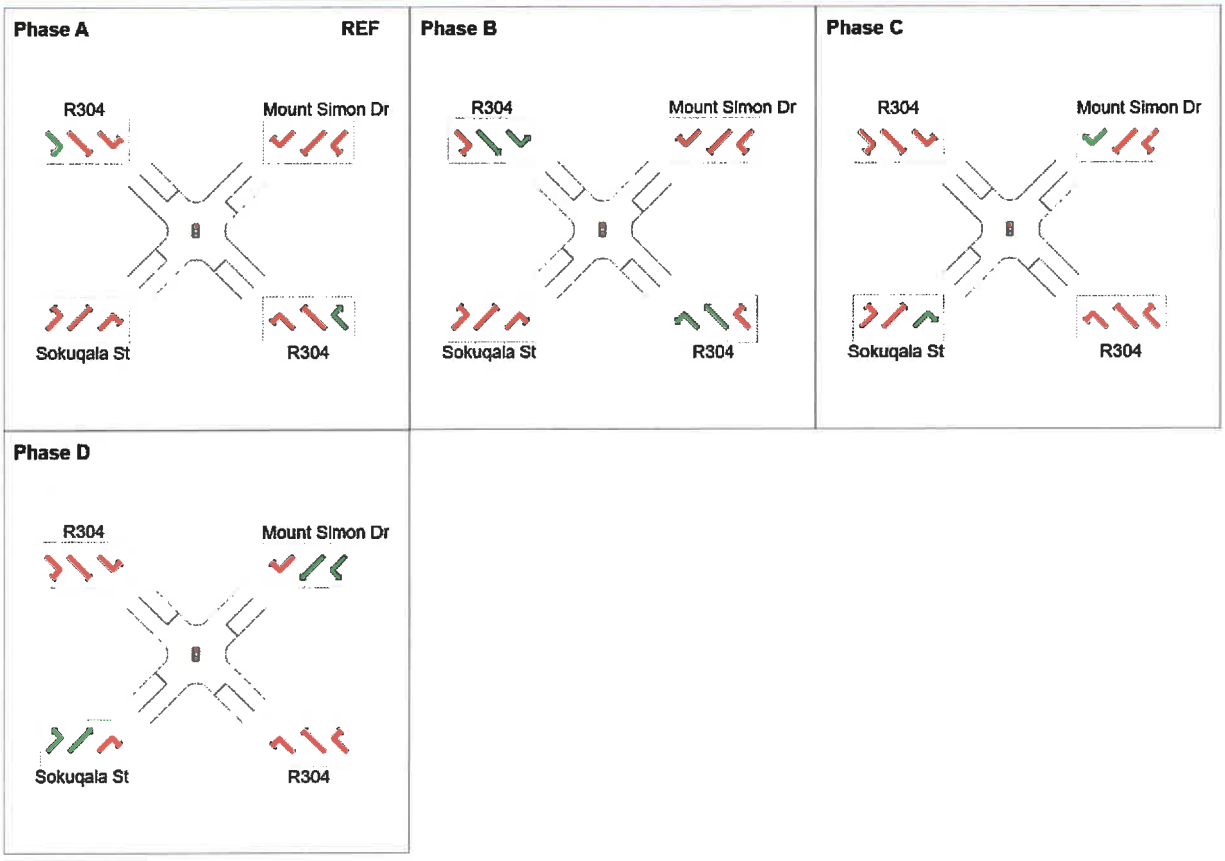
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

Phase Timing Summary

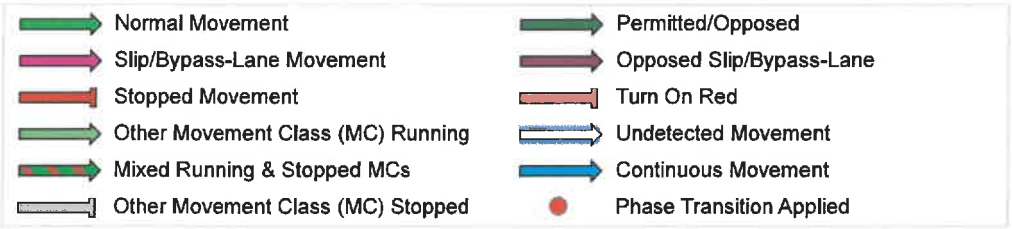
Phase	A	B	C	D
Phase Change Time (sec)	0	11	43	57
Green Time (sec)	6	27	9	12
Phase Time (sec)	11	32	14	17
Phase Split	15%	43%	19%	23%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 4 [Intersection 4_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 67 seconds (Site User-Given Phase Times)

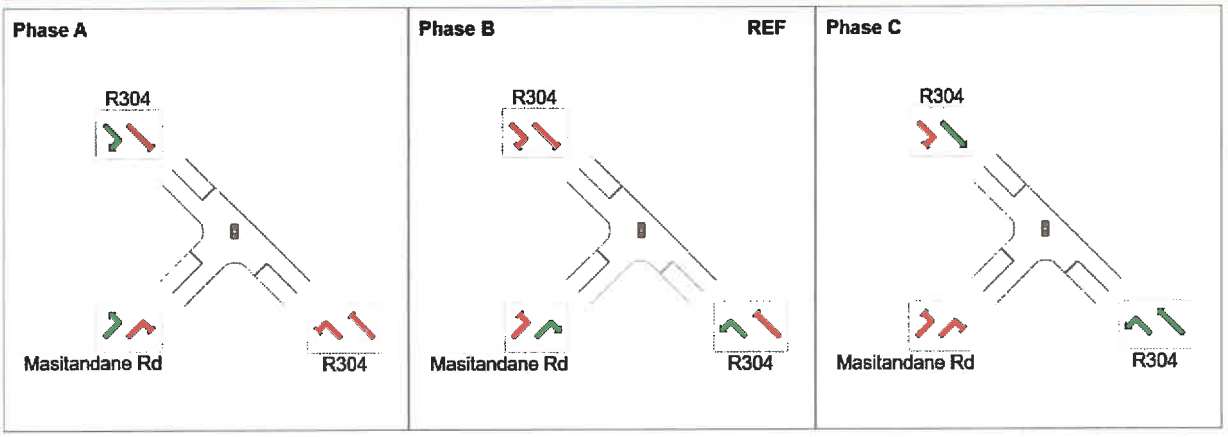
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase B

Phase Timing Summary

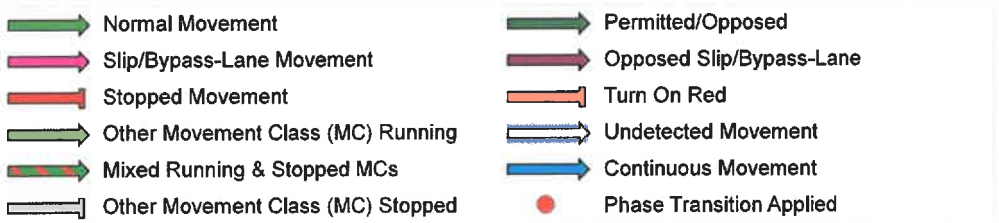
Phase	A	B	C
Phase Change Time (sec)	53	0	20
Green Time (sec)	8	14	27
Phase Time (sec)	14	20	33
Phase Split	21%	30%	49%
Phase Frequency (%)	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:31:09
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 4\Intersection 4_Stellenbosch.sip9

PHASING SUMMARY

Site: 4 [Intersection 4_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 62 seconds (Site User-Given Phase Times)

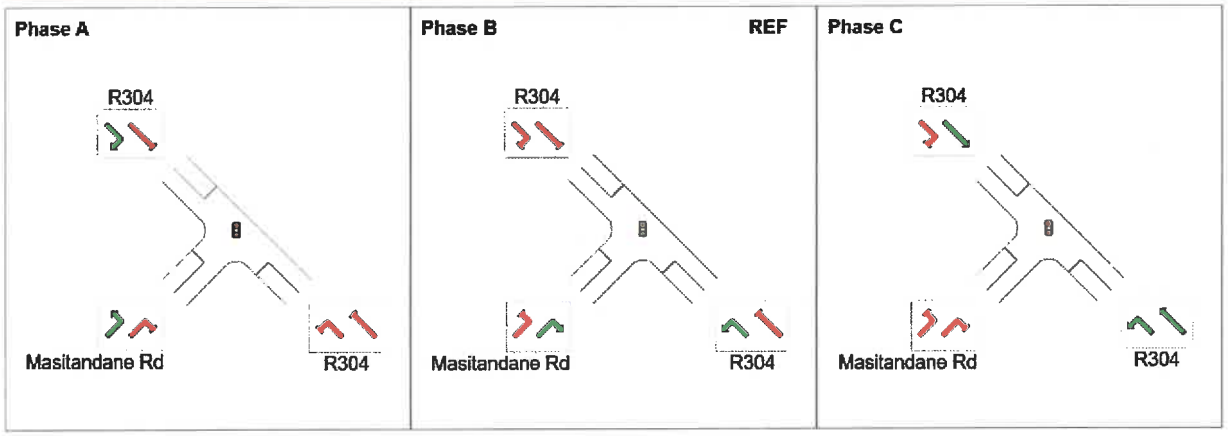
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase B

Phase Timing Summary

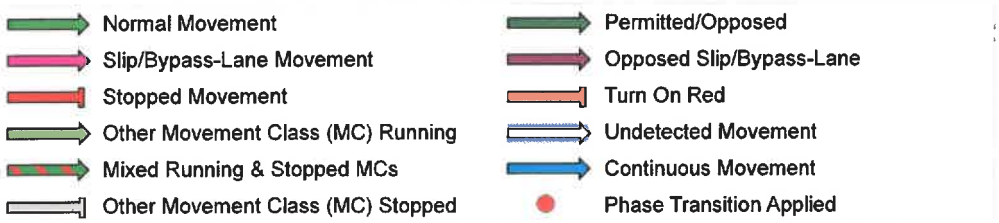
Phase	A	B	C
Phase Change Time (sec)	51	0	14
Green Time (sec)	6	9	32
Phase Time (sec)	11	14	37
Phase Split	18%	23%	60%
Phase Frequency (%)	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:31:10
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 4\Intersection 4_Stellenbosch.sip9

PHASING SUMMARY

Site: 7 [Intersection 7_2025 Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 95 seconds (Site User-Given Phase Times)

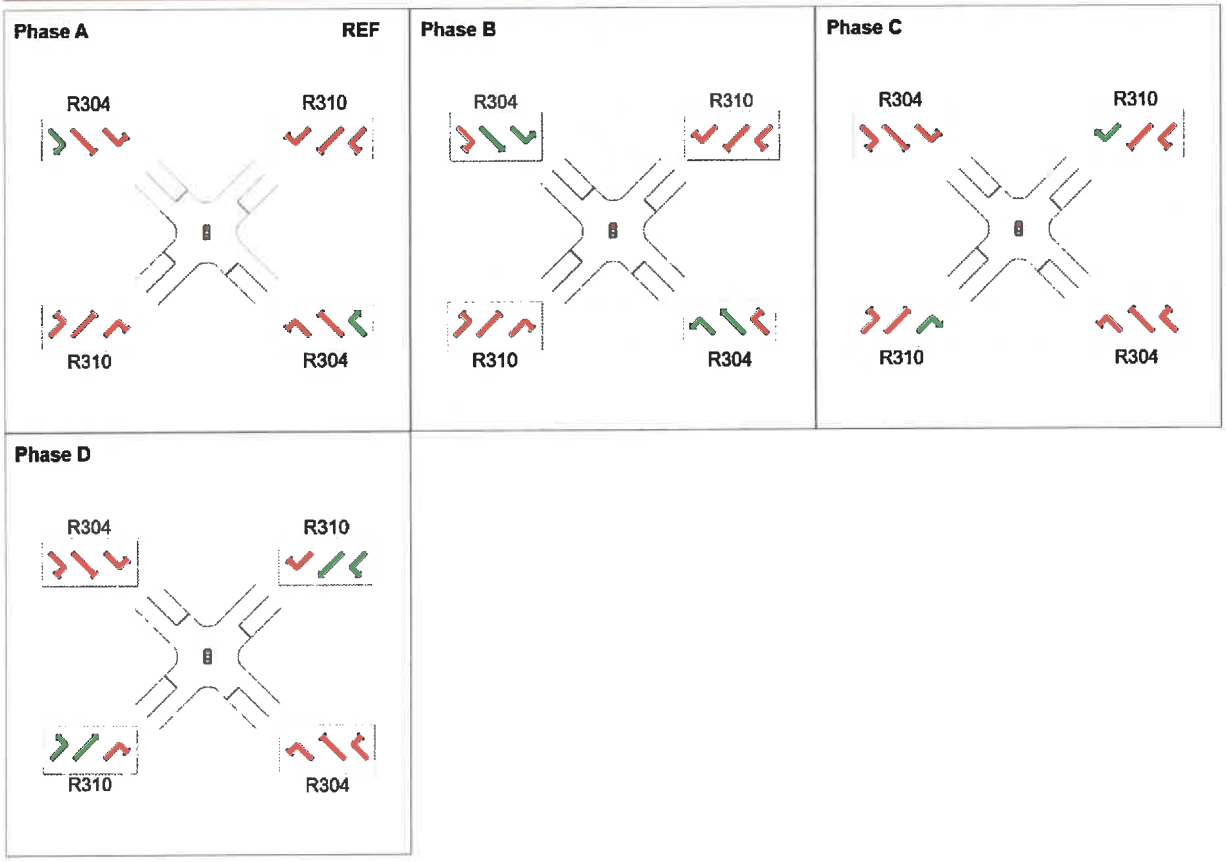
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

Phase Timing Summary

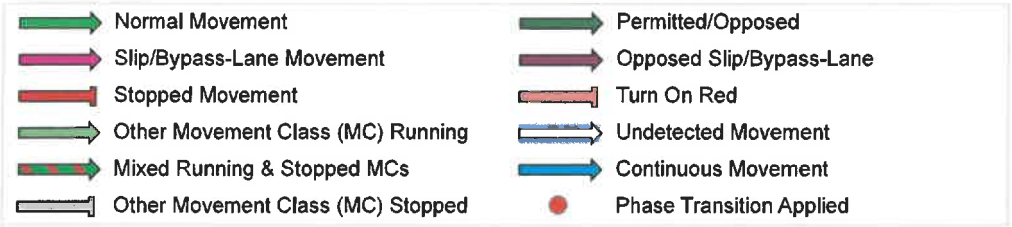
Phase	A	B	C	D
Phase Change Time (sec)	0	17	40	62
Green Time (sec)	13	19	18	29
Phase Time (sec)	17	23	22	33
Phase Split	18%	24%	23%	35%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 7 [Intersection 7_2025 Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 102 seconds (Site User-Given Phase Times)

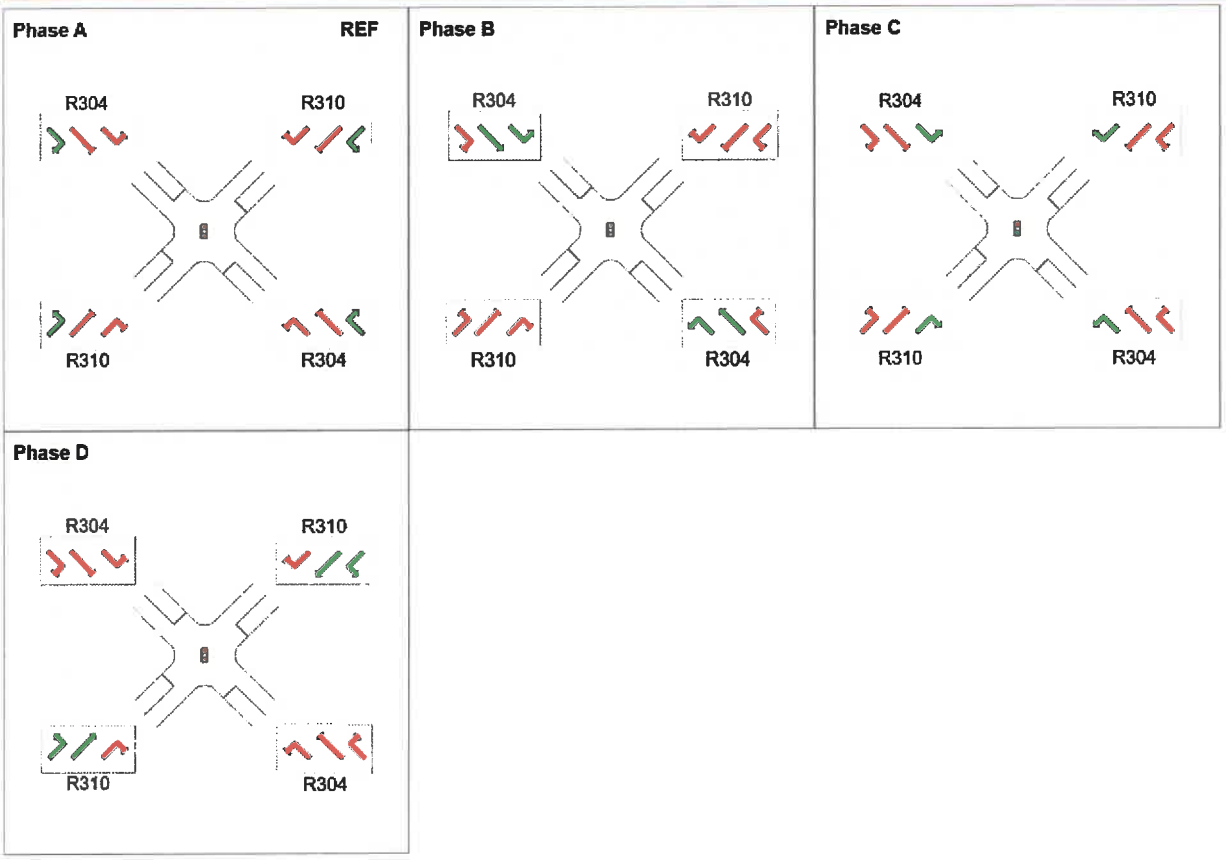
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

Phase Timing Summary

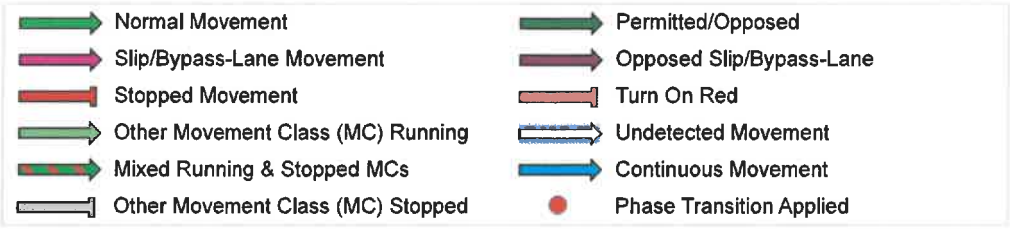
Phase	A	B	C	D
Phase Change Time (sec)	0	15	46	72
Green Time (sec)	11	27	22	26
Phase Time (sec)	15	31	26	30
Phase Split	15%	30%	25%	29%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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APPENDIX H: 2030 BACKGROUND PHASING SUMMARIES

PHASING SUMMARY

Site: 1 [Intersection 1_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 62 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

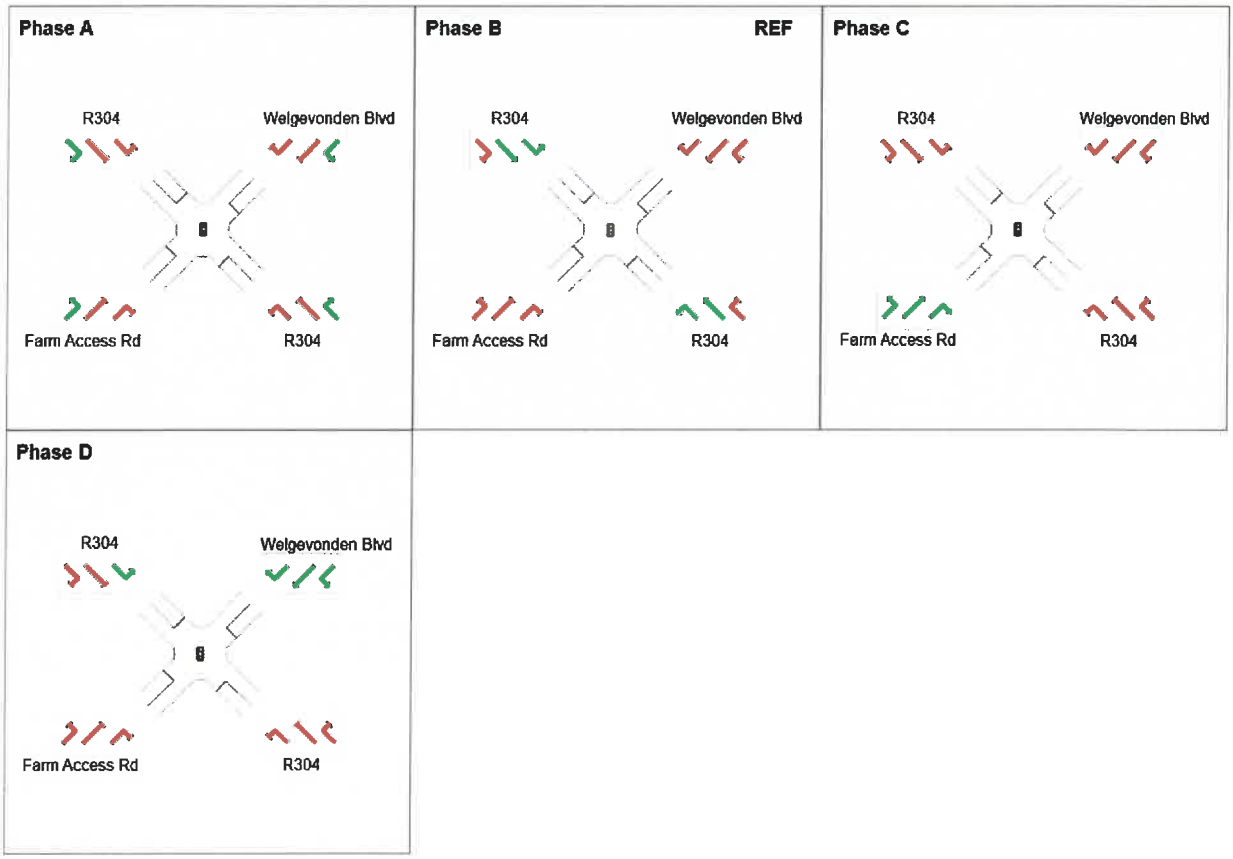
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	51	0	32	40
Green Time (sec)	6	27	3	8
Phase Time (sec)	11	32	6	13
Phase Split	18%	52%	10%	21%
Phase Frequency (%)	100.0	100.0	54.5 [2]	100.0

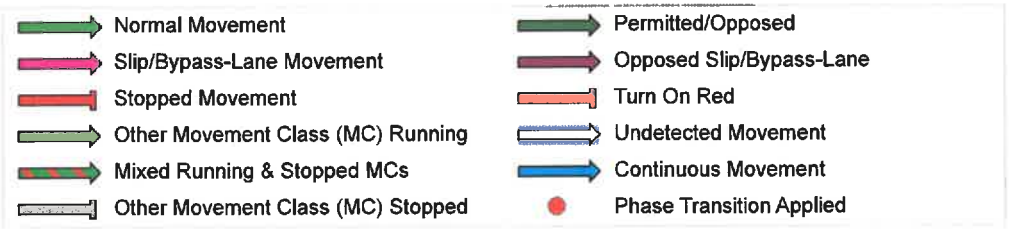
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 1 [Intersection 1_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 58 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import (2)
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

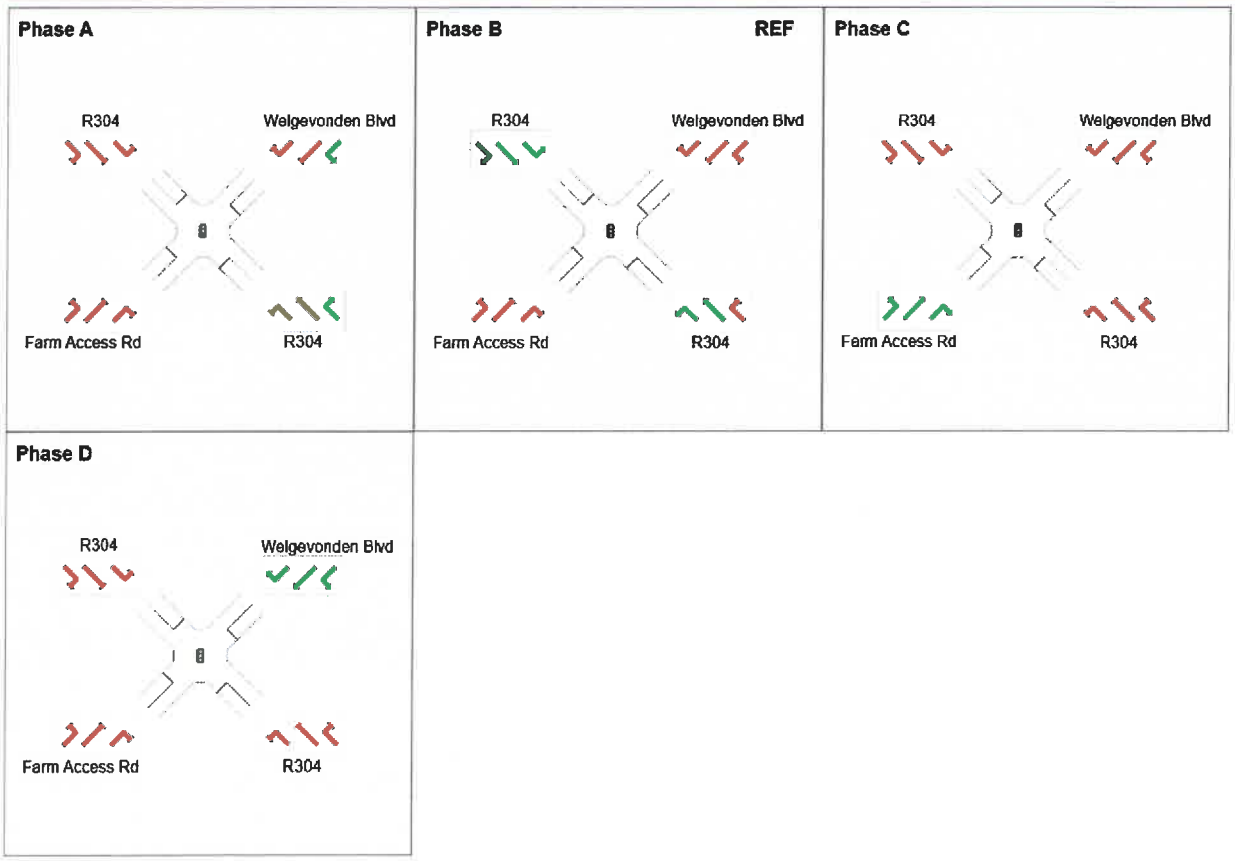
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	45	0	25	33
Green Time (sec)	8	20	3	10
Phase Time (sec)	13	25	5	15
Phase Split	22%	43%	9%	26%
Phase Frequency (%)	100.0	100.0	45.5 [2]	100.0

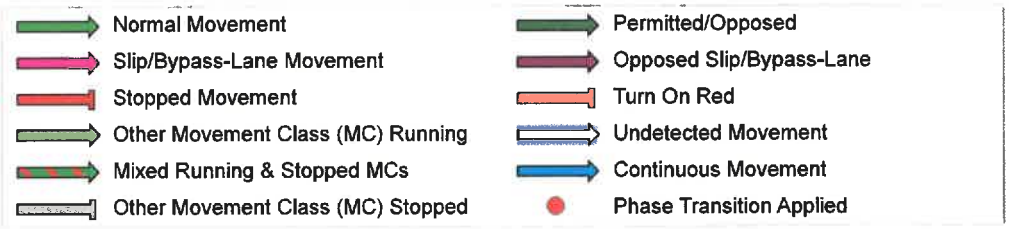
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 2 [Intersection 2_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 54 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

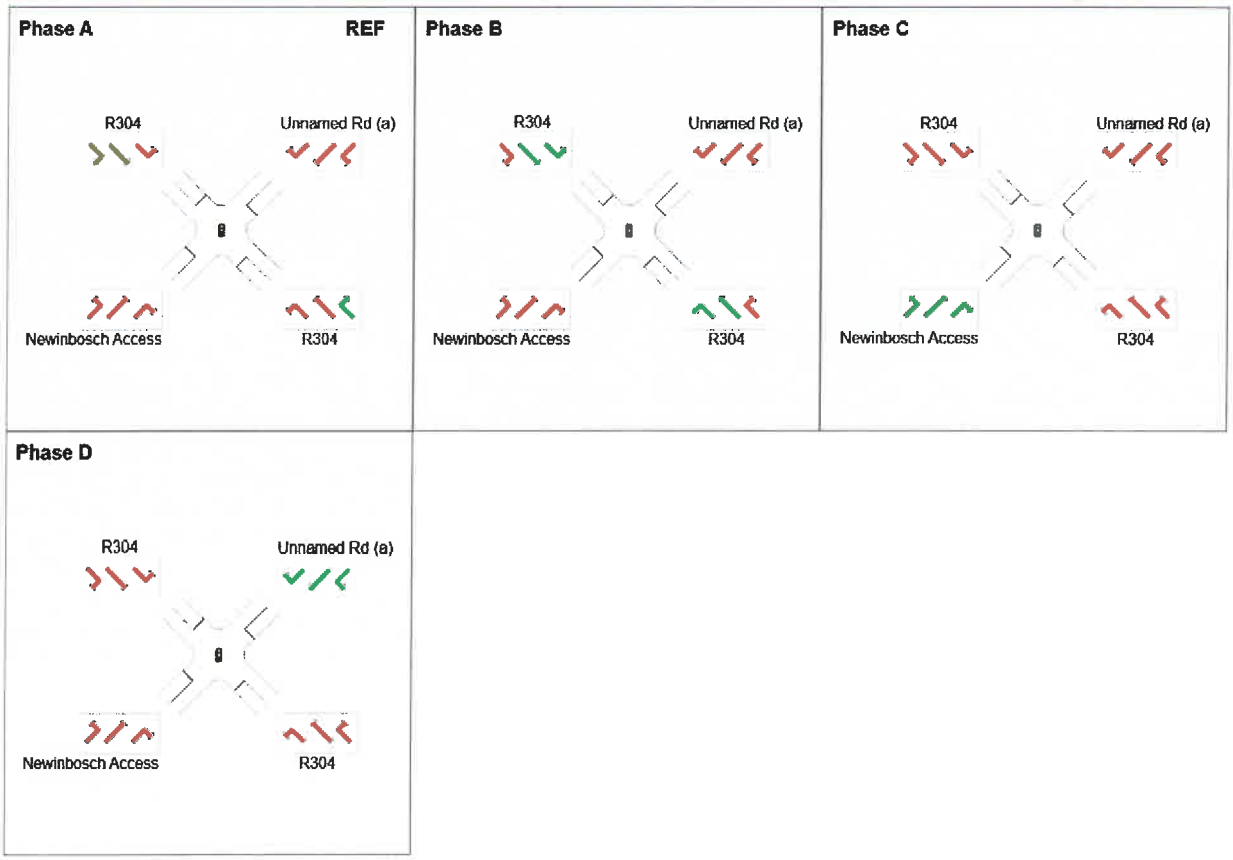
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	7	30	45
Green Time (sec)	3	20	10	4
Phase Time (sec)	6	25	15	8
Phase Split	11%	46%	28%	15%
Phase Frequency (%)	54.5[2]	100.0	100.0	72.7[2]

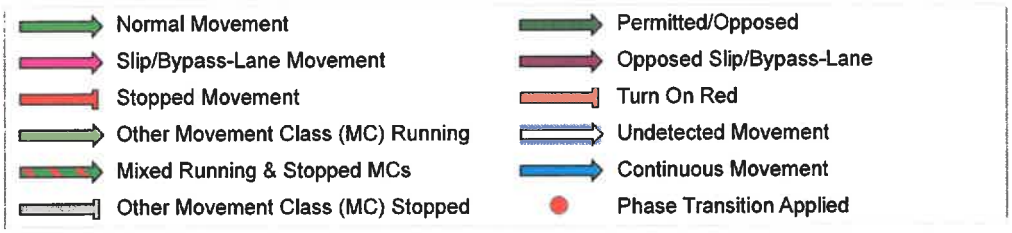
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 2 [Intersection 2_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 55 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

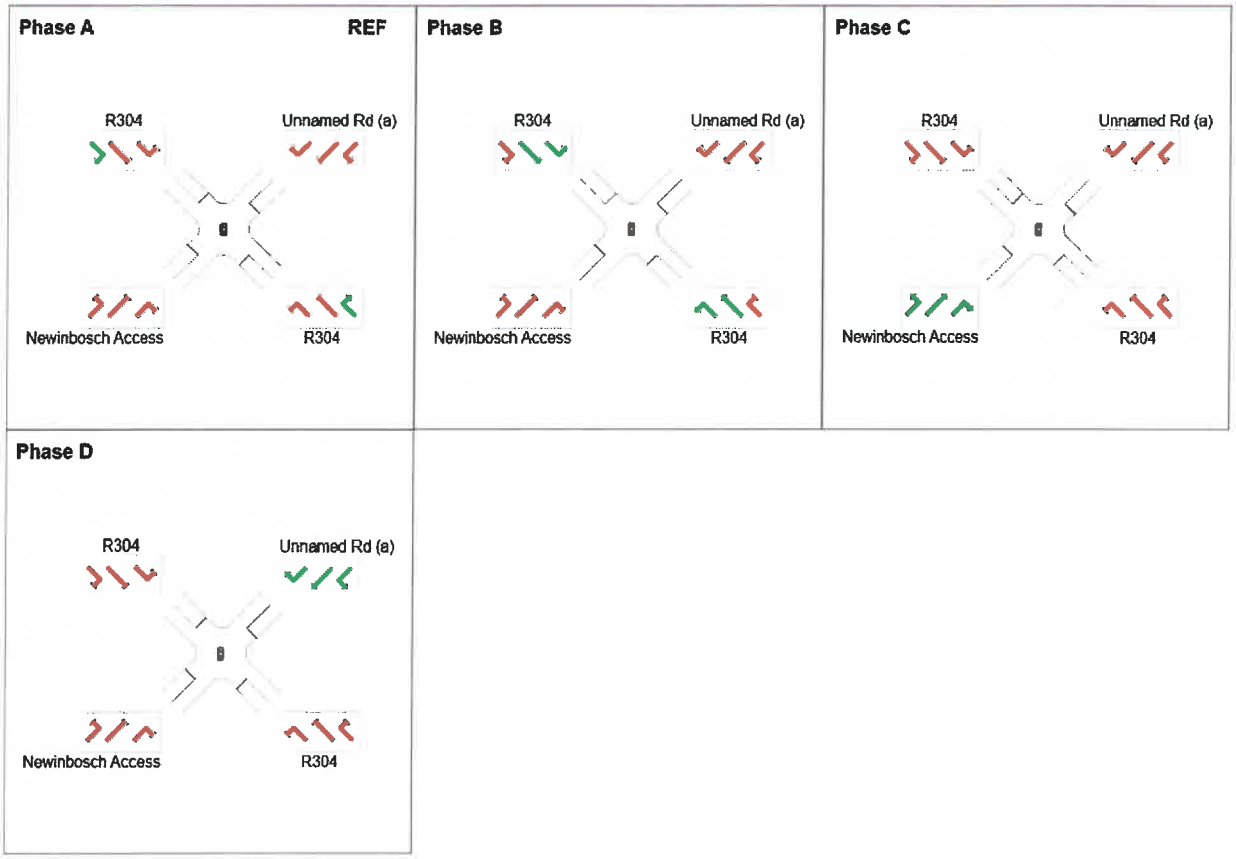
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	7	31	46
Green Time (sec)	3	21	10	4
Phase Time (sec)	6	26	15	8
Phase Split	11%	47%	27%	15%
Phase Frequency (%)	54.5[2]	100.0	100.0	72.7[2]

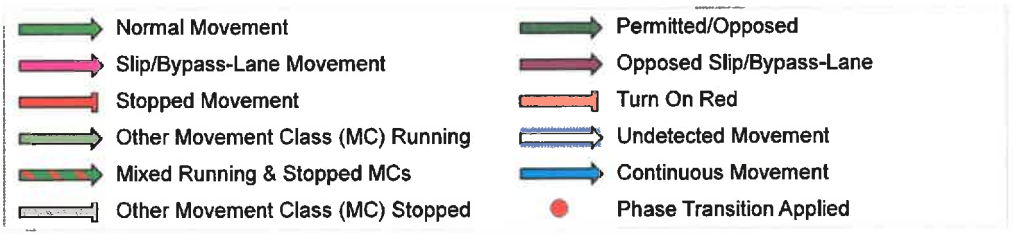
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 3 [Intersection 3_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 71 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

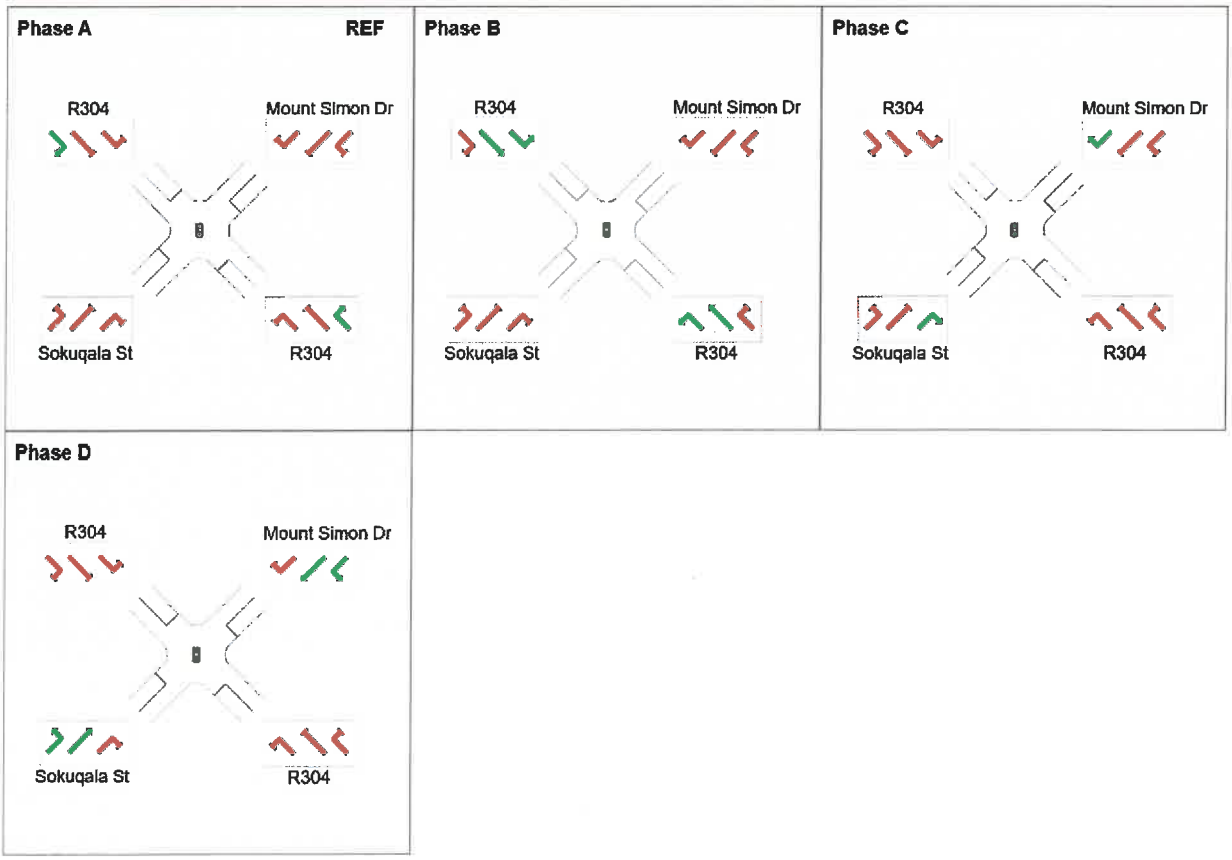
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	10	44	56
Green Time (sec)	5	29	7	10
Phase Time (sec)	10	34	12	15
Phase Split	14%	48%	17%	21%
Phase Frequency (%)	90.9[2]	100.0	100.0	100.0

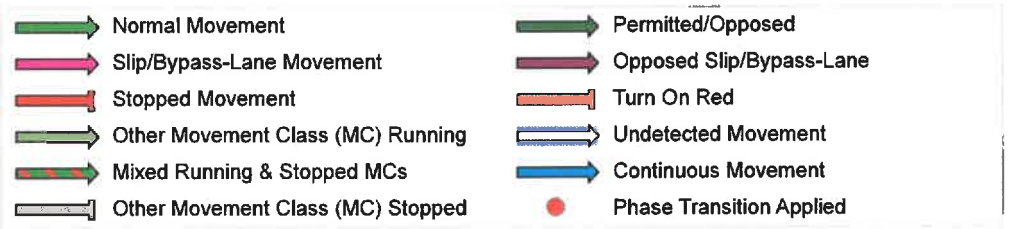
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 3 [Intersection 3_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 73 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import (2)
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

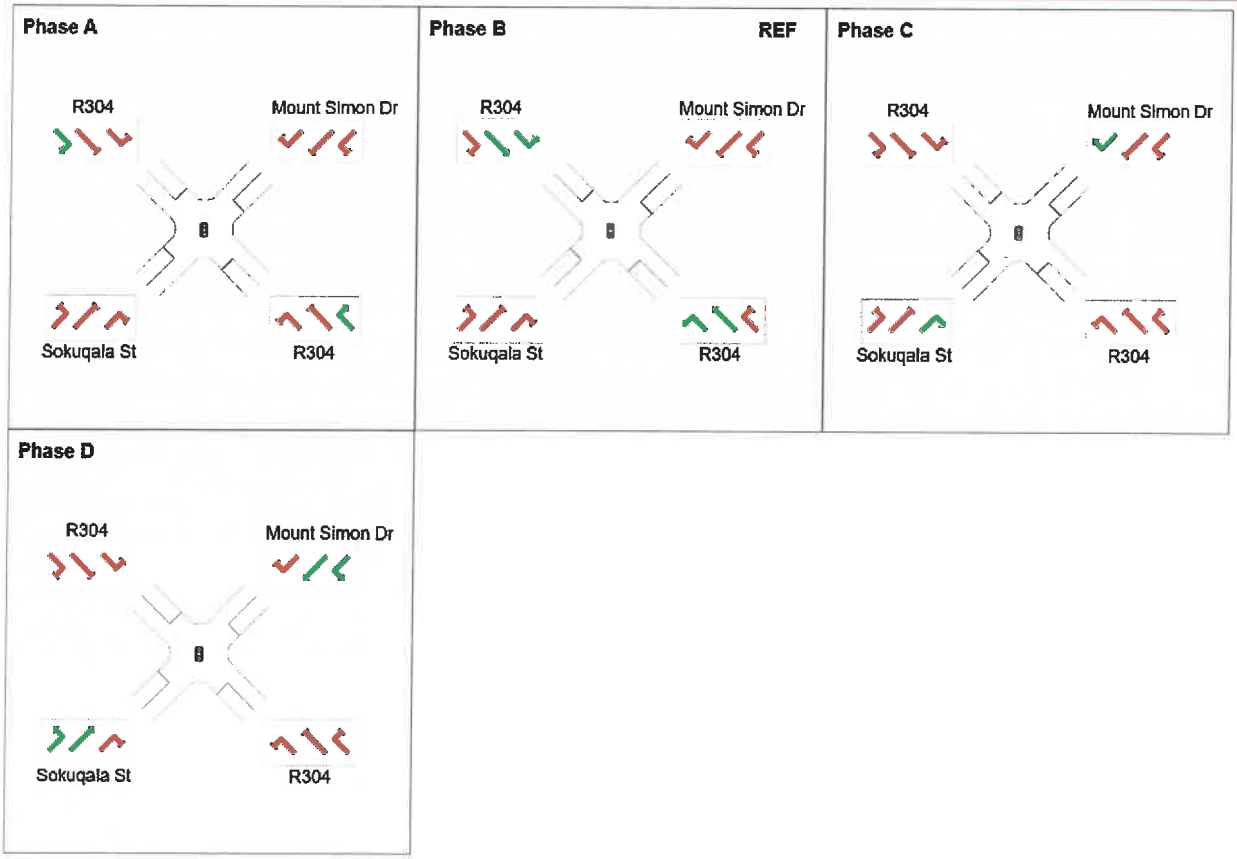
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	63	0	36	48
Green Time (sec)	5	31	7	10
Phase Time (sec)	10	36	12	15
Phase Split	14%	49%	16%	21%
Phase Frequency (%)	90.9[2]	100.0	100.0	100.0

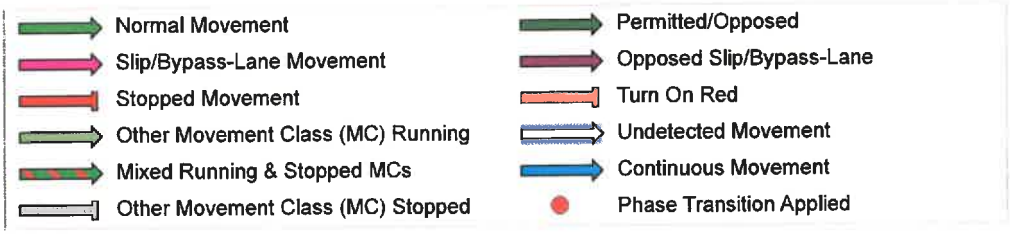
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 3 [Intersection 3_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 71 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

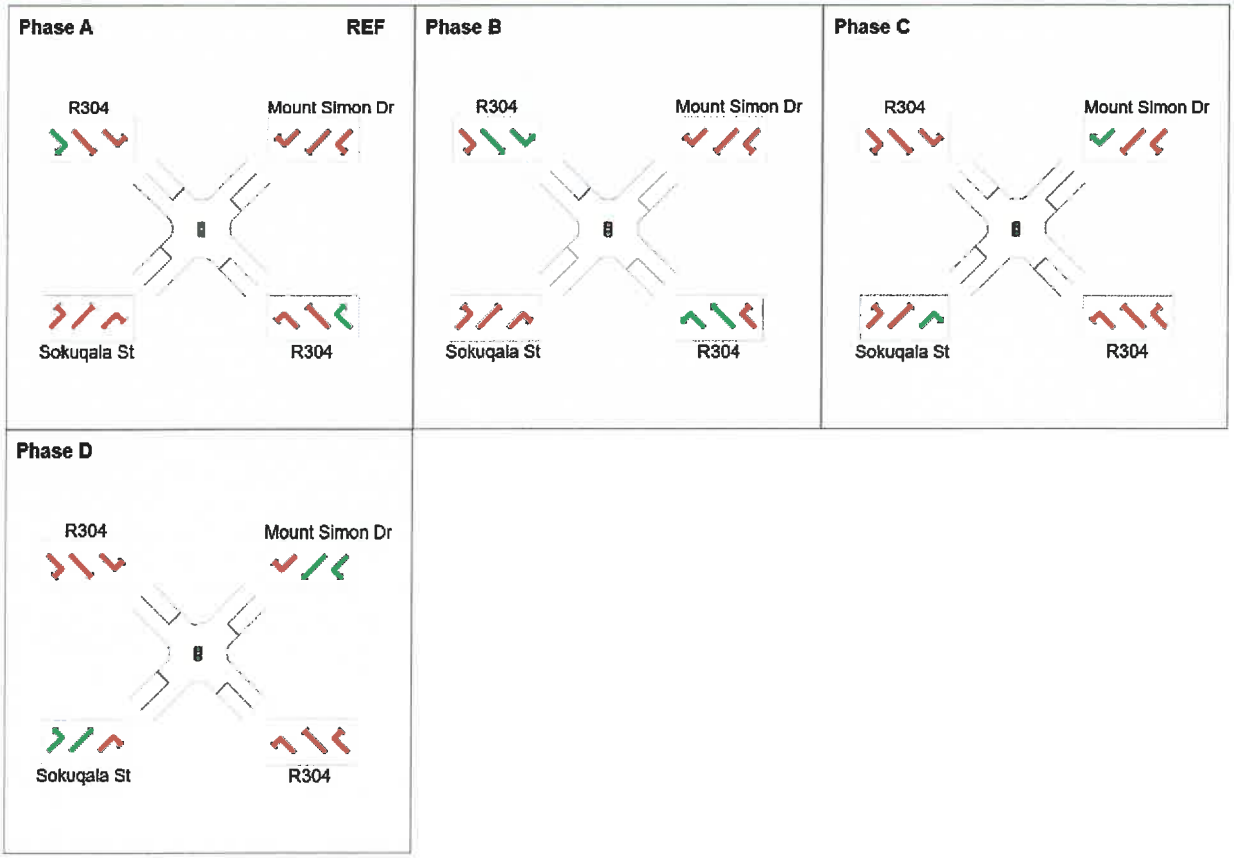
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	10	44	56
Green Time (sec)	5	29	7	10
Phase Time (sec)	10	34	12	15
Phase Split	14%	48%	17%	21%
Phase Frequency (%)	90.9[2]	100.0	100.0	100.0

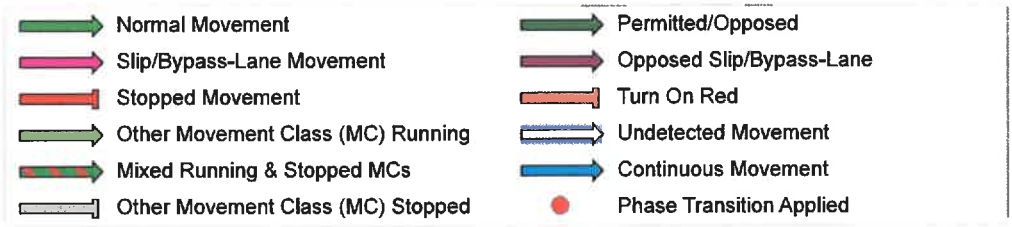
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 3 [Intersection 3_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 73 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import (2)
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

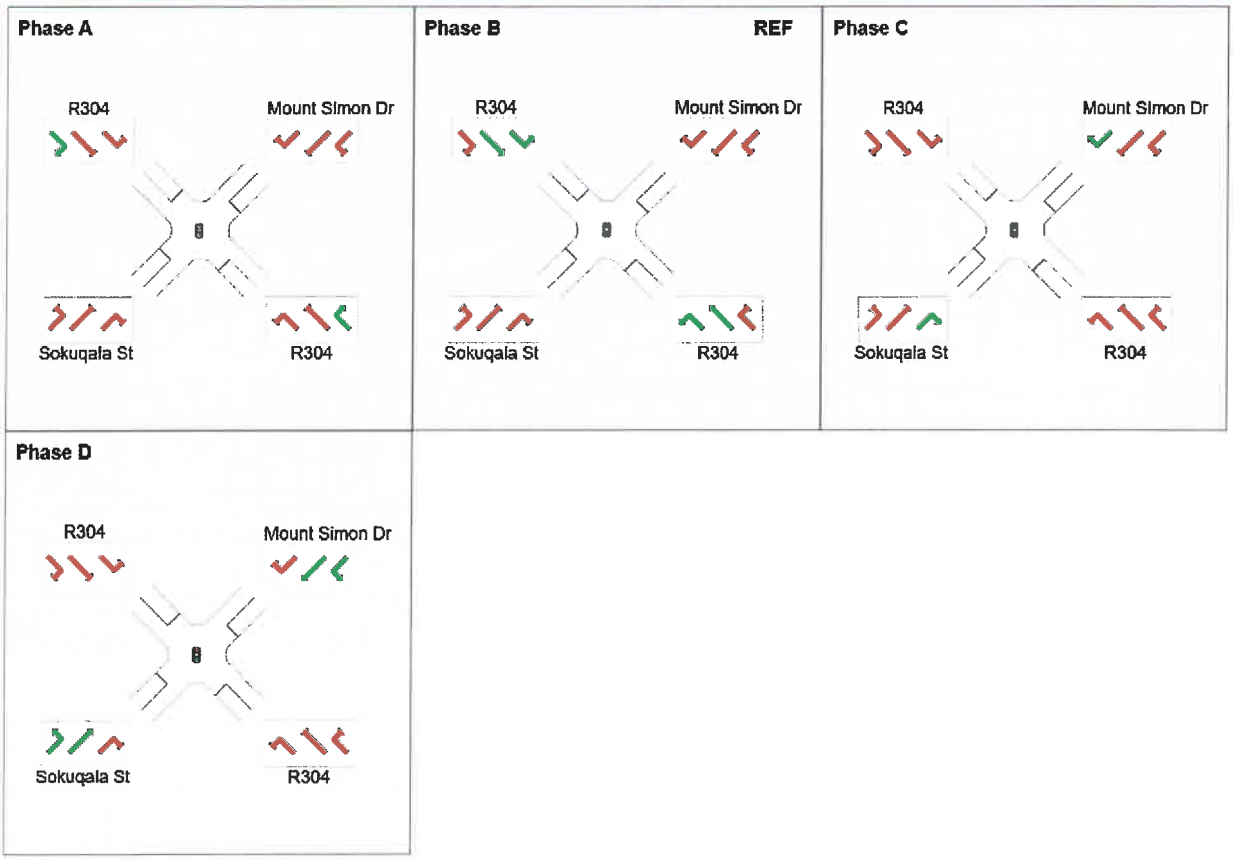
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	63	0	36	48
Green Time (sec)	5	31	7	10
Phase Time (sec)	10	36	12	15
Phase Split	14%	49%	16%	21%
Phase Frequency (%)	90.9[2]	100.0	100.0	100.0

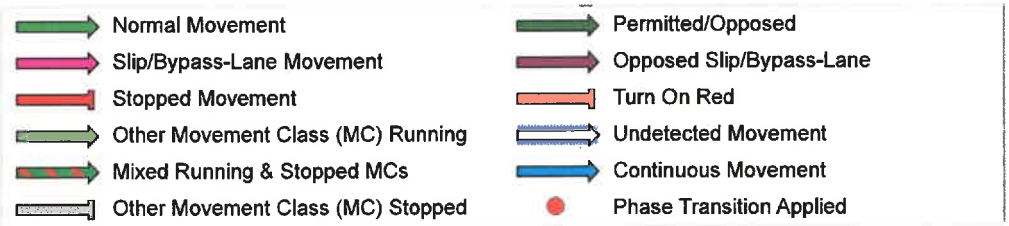
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 4 [Intersection 4_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 71 seconds (Site User-Given Phase Times)

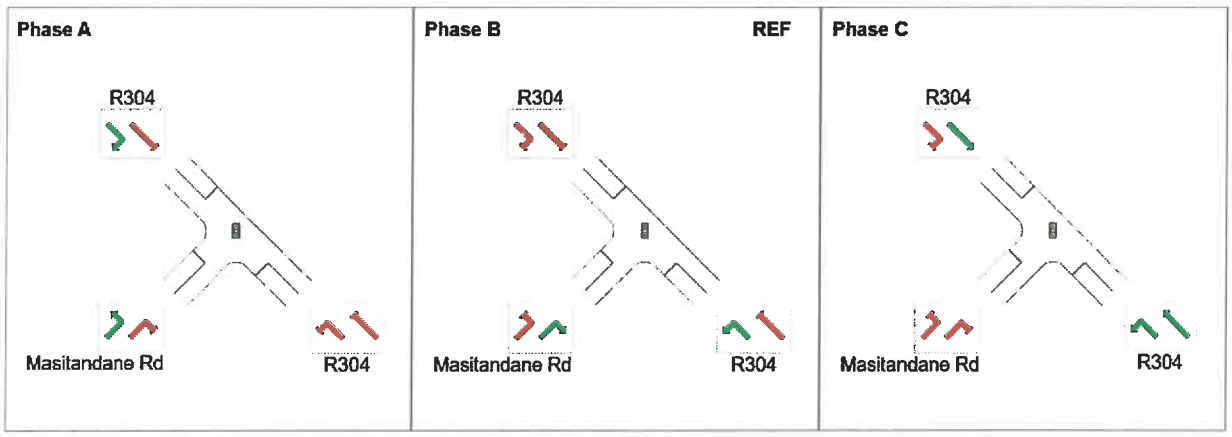
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase B

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	57	0	20
Green Time (sec)	9	15	32
Phase Time (sec)	14	20	37
Phase Split	20%	28%	52%
Phase Frequency (%)	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:31:11
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 4\Intersection 4_Stellenbosch.sip9

PHASING SUMMARY

Site: 4 [Intersection 4_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 65 seconds (Site User-Given Phase Times)

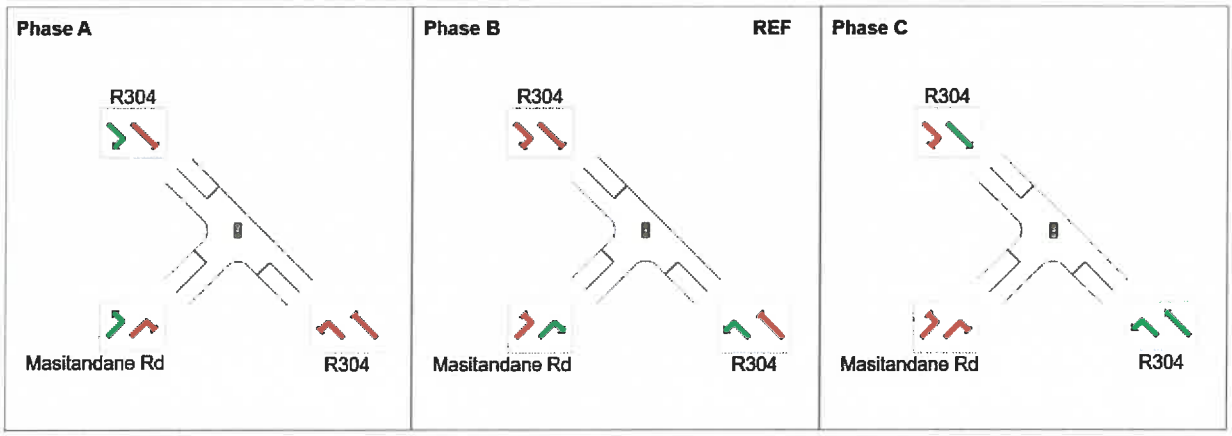
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import (3)
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase B

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	55	0	12
Green Time (sec)	6	8	39
Phase Time (sec)	10	12	43
Phase Split	15%	18%	66%
Phase Frequency (%)	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:31:11
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 4\Intersection 4_Stellenbosch.sip9

PHASING SUMMARY

Site: 7 [Intersection 7_2030 Background AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

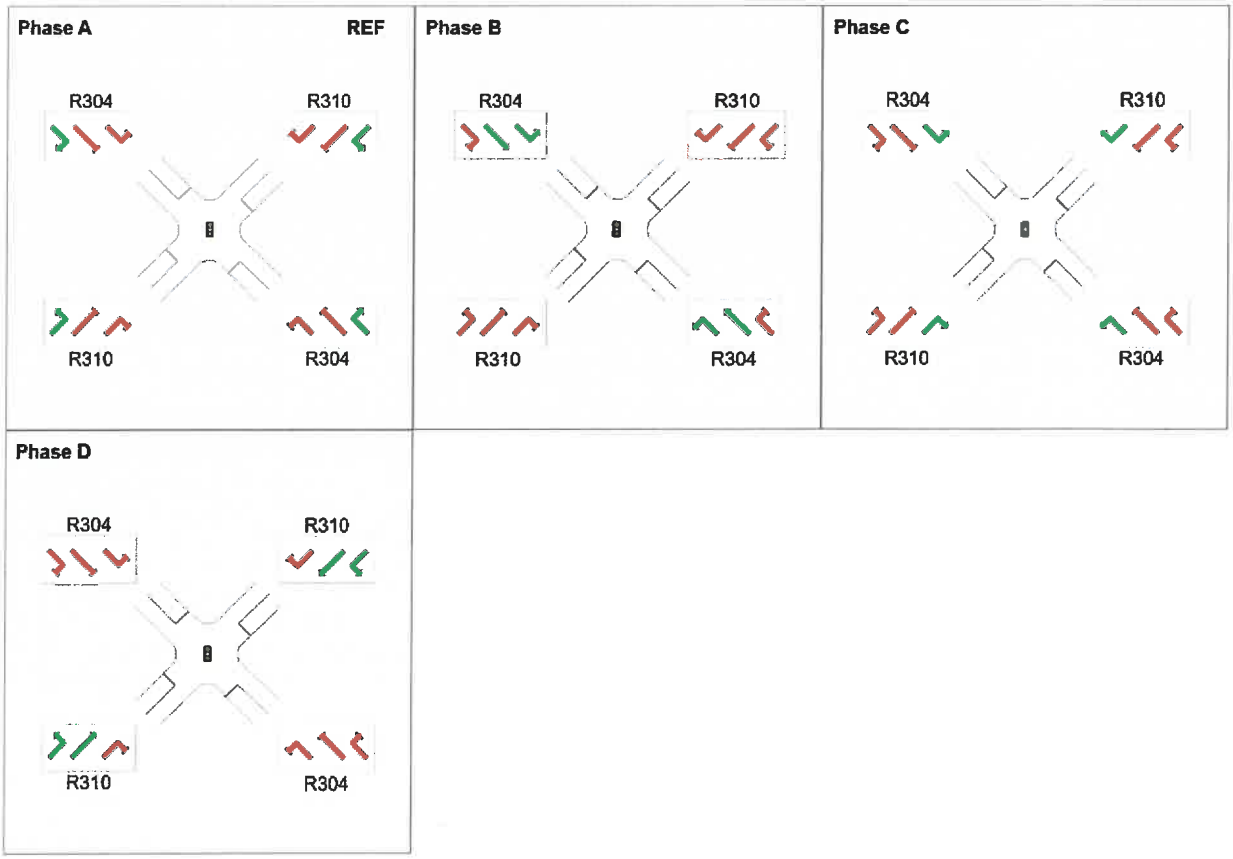
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	19	44	67
Green Time (sec)	16	22	20	20
Phase Time (sec)	19	25	23	23
Phase Split	21%	28%	26%	26%
Phase Frequency (%)	100.0	100.0	100.0	100.0

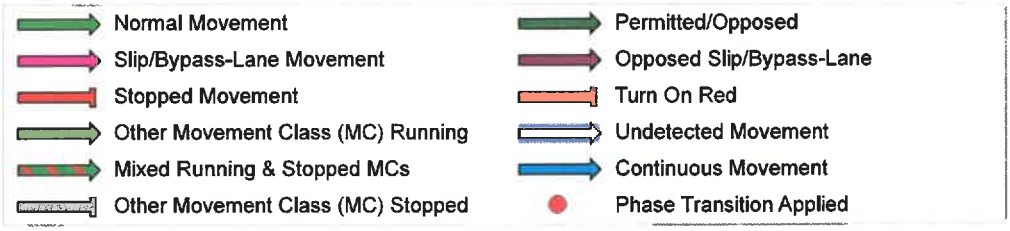
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



PHASING SUMMARY

Site: 7 [Intersection 7_2030 Background PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 117 seconds (Site Practical Cycle Time)

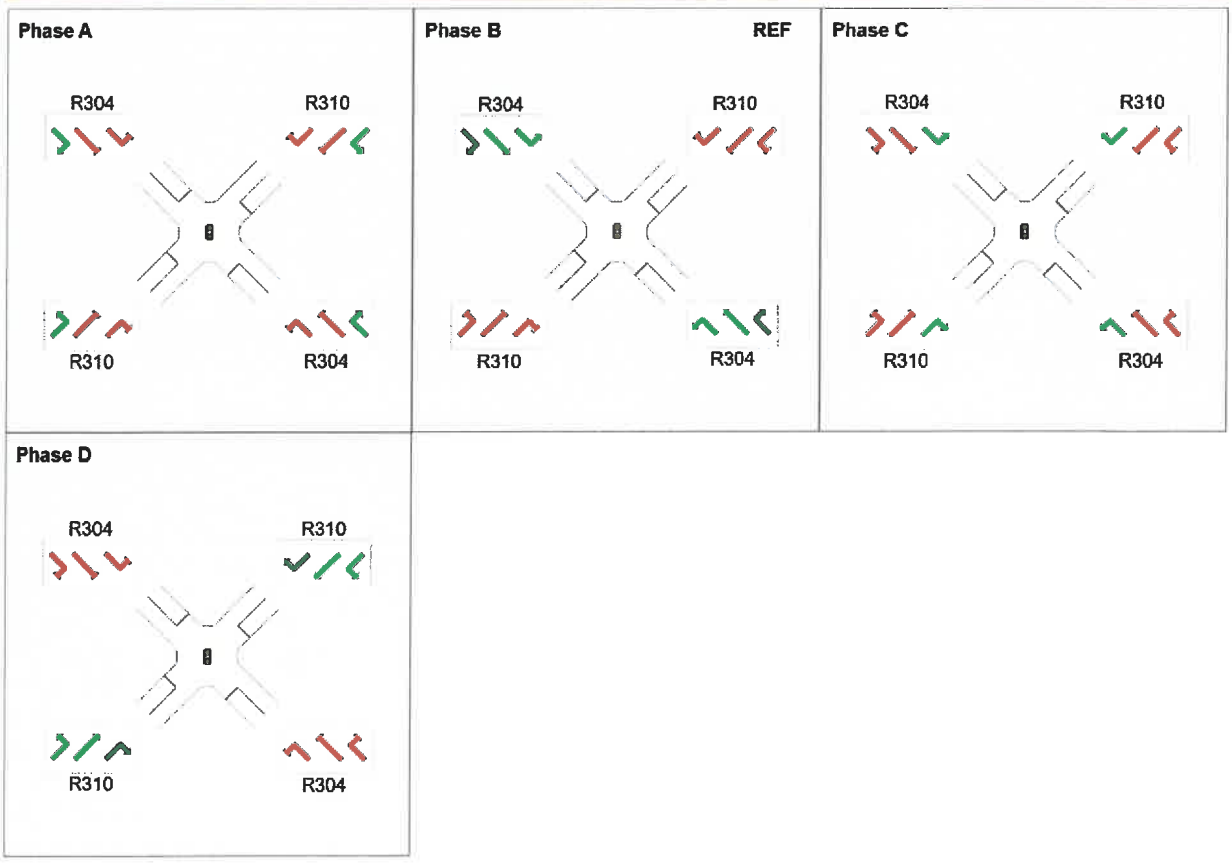
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	94	0	41	64
Green Time (sec)	20	38	20	27
Phase Time (sec)	23	41	23	30
Phase Split	20%	35%	20%	26%
Phase Frequency (%)	100.0	100.0	100.0	100.0

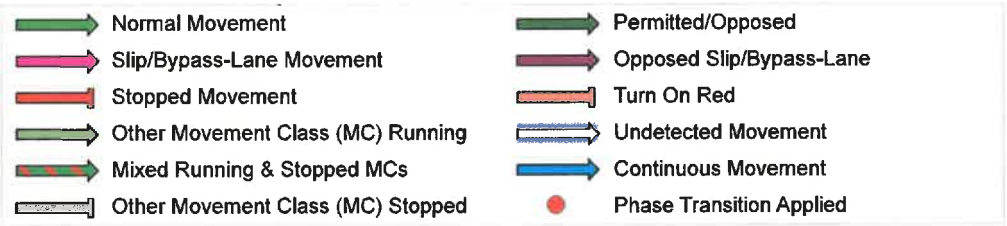
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



APPENDIX I: 2030 BACKGROUND AND DEVELOPMENT PHASING SUMMARIES

PHASING SUMMARY

Site: 1 [Intersection 1_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 65 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

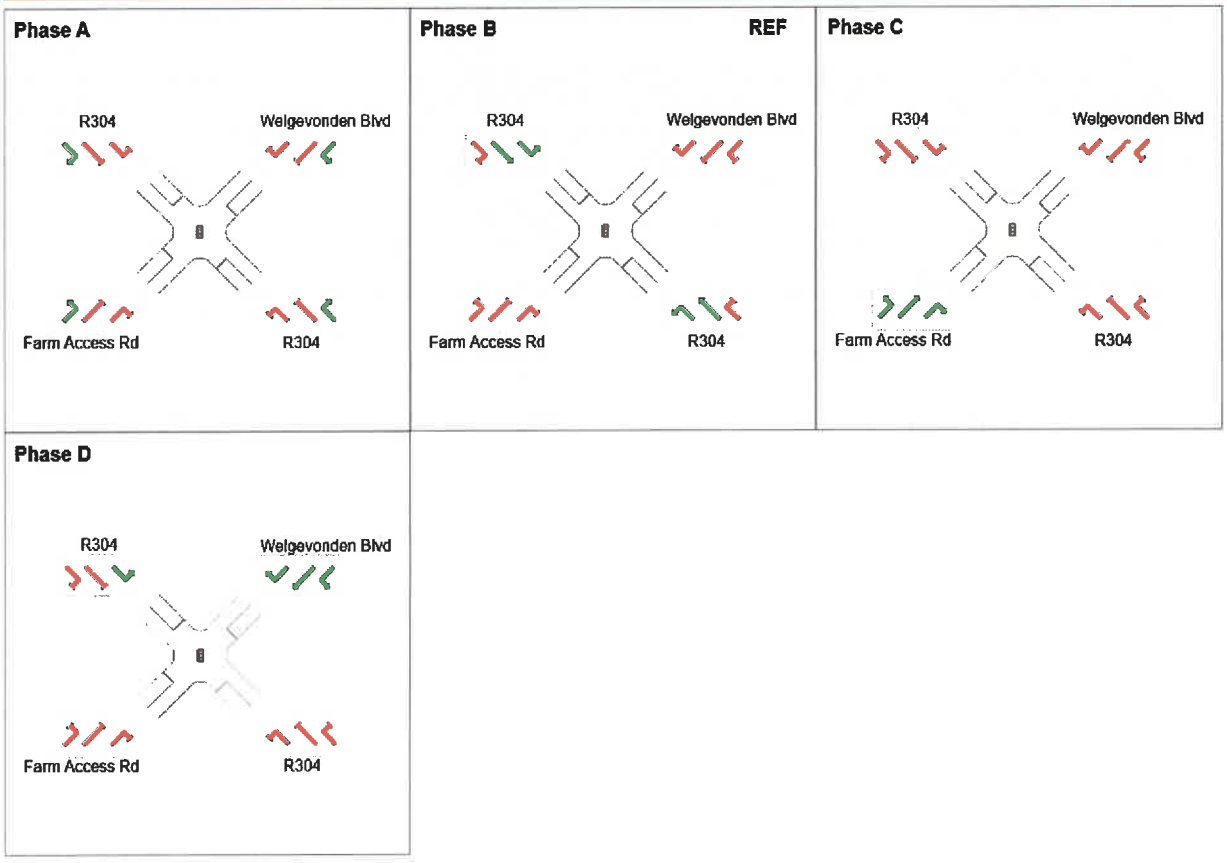
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	54	0	35	43
Green Time (sec)	6	30	3	8
Phase Time (sec)	11	35	6	13
Phase Split	17%	54%	9%	20%
Phase Frequency (%)	100.0	100.0	54.5[2]	100.0

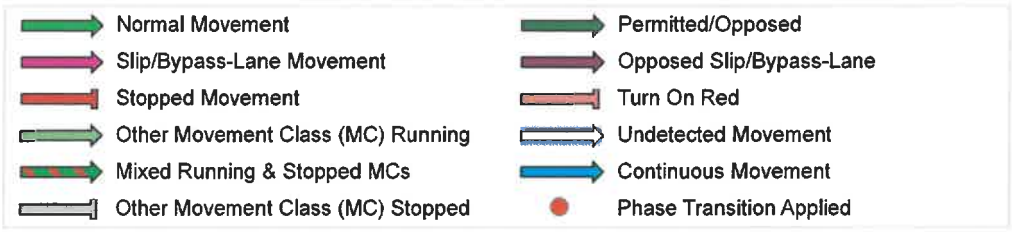
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 1 [Intersection 1_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Intersection of R304, Welgevonden Blvd and Farm Access Rd
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 58 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import (2)
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

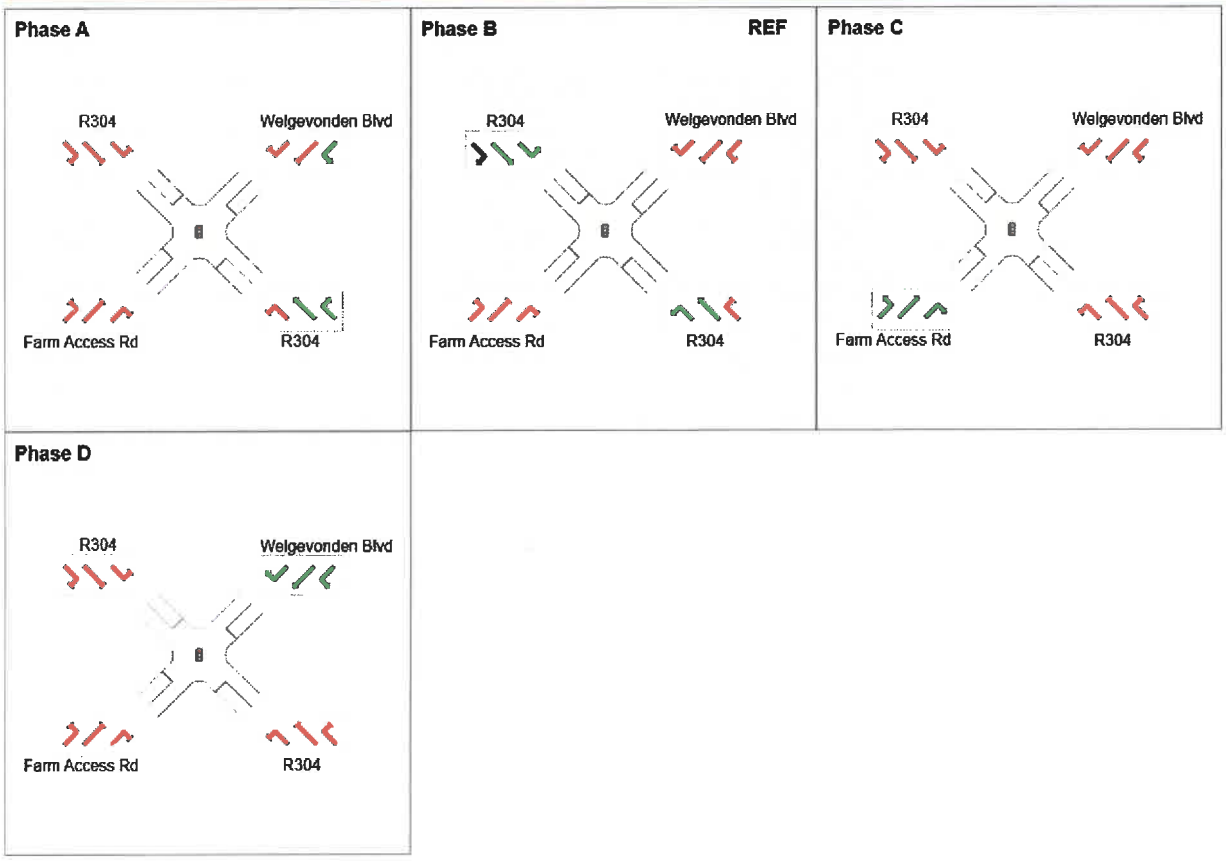
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	45	0	25	33
Green Time (sec)	8	20	3	10
Phase Time (sec)	13	25	5	15
Phase Split	22%	43%	9%	26%
Phase Frequency (%)	100.0	100.0	45.5[2]	100.0

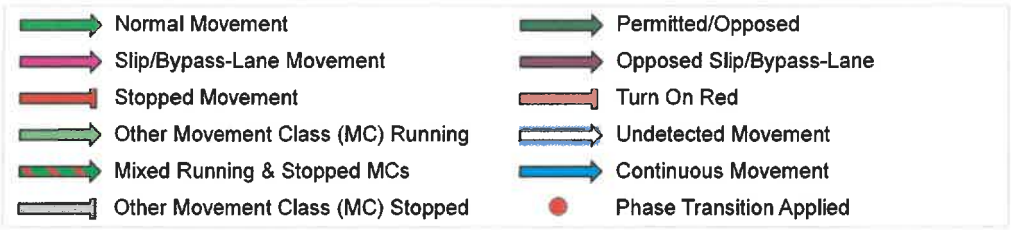
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 2 [Intersection 2_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 54 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

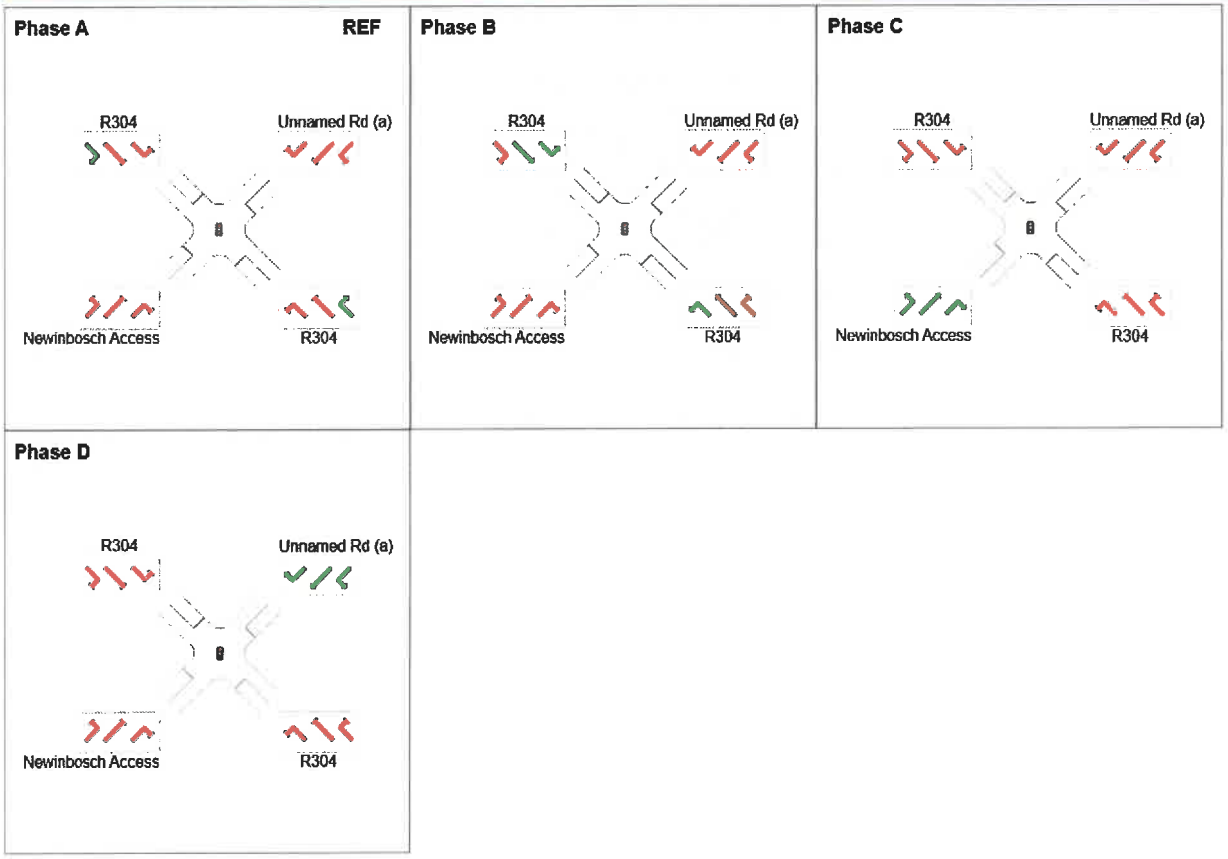
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	7	30	45
Green Time (sec)	3	20	10	4
Phase Time (sec)	6	25	15	8
Phase Split	11%	46%	28%	15%
Phase Frequency (%)	54.5[2]	100.0	100.0	72.7[2]

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 2 [Intersection 2_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 55 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

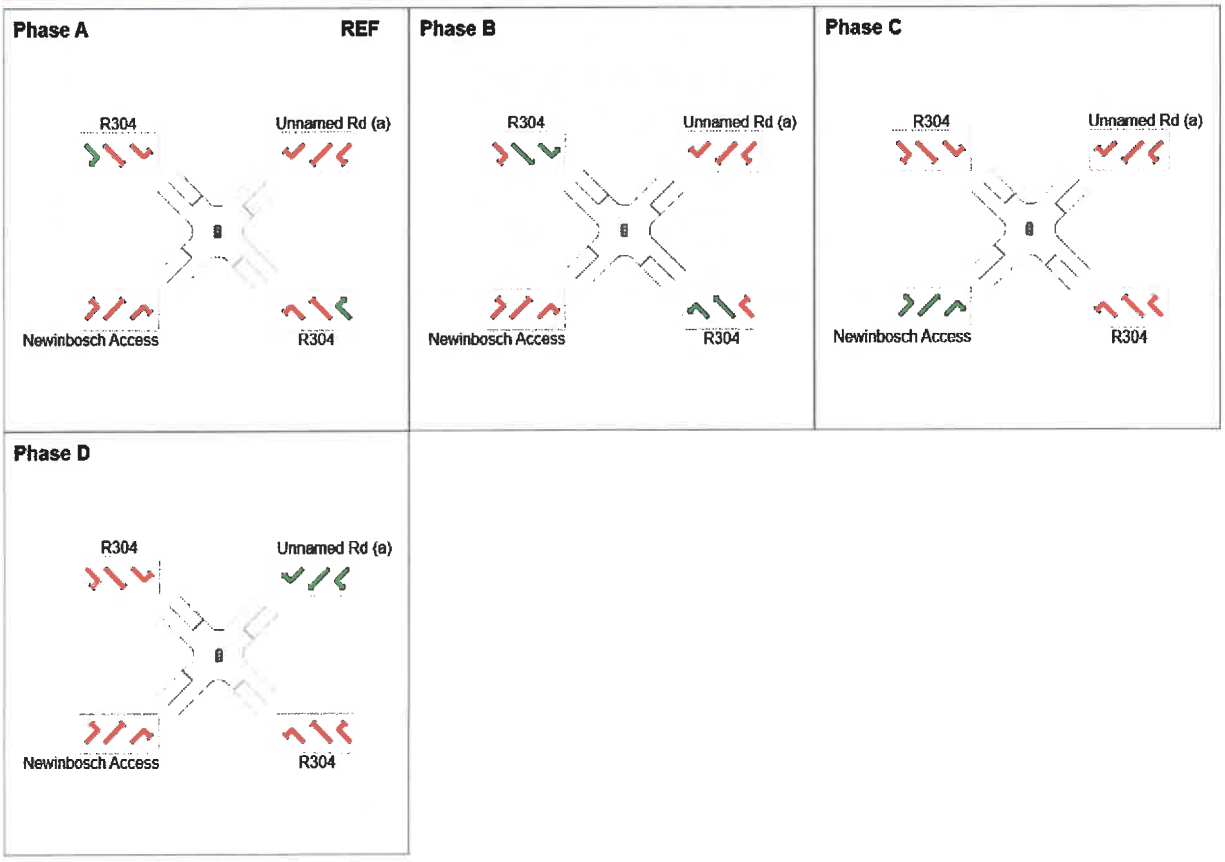
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	7	31	46
Green Time (sec)	3	21	10	4
Phase Time (sec)	6	26	15	8
Phase Split	11%	47%	27%	15%
Phase Frequency (%)	54.5[2]	100.0	100.0	72.7[2]

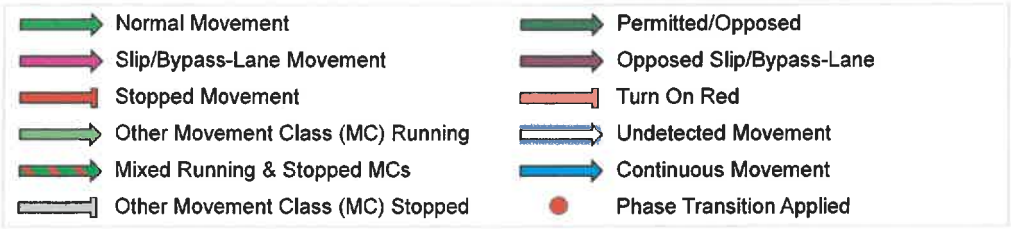
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 3 [Intersection 3_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 71 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

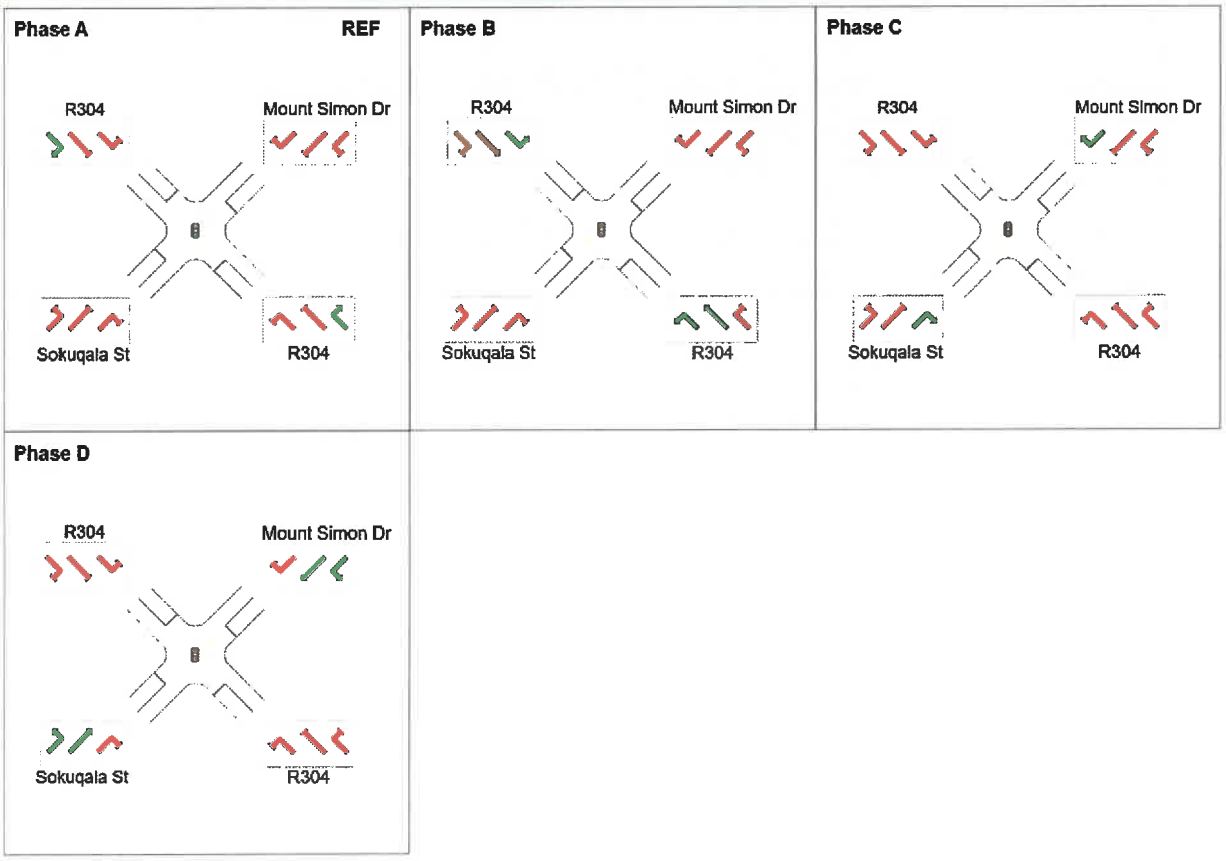
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	10	44	56
Green Time (sec)	5	29	7	10
Phase Time (sec)	10	34	12	15
Phase Split	14%	48%	17%	21%
Phase Frequency (%)	90.9 [2]	100.0	100.0	100.0

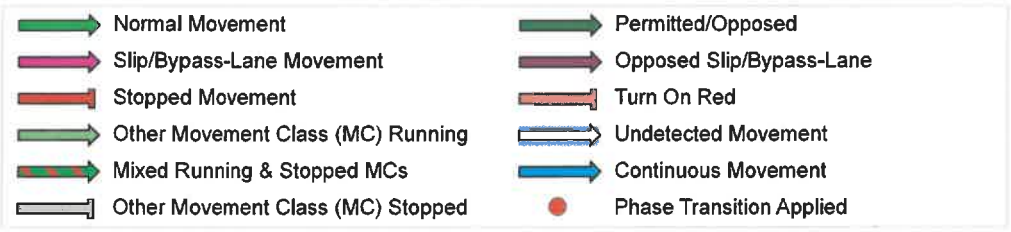
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 3 [Intersection 3_2030 Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 81 seconds (Site User-Given Phase Times)

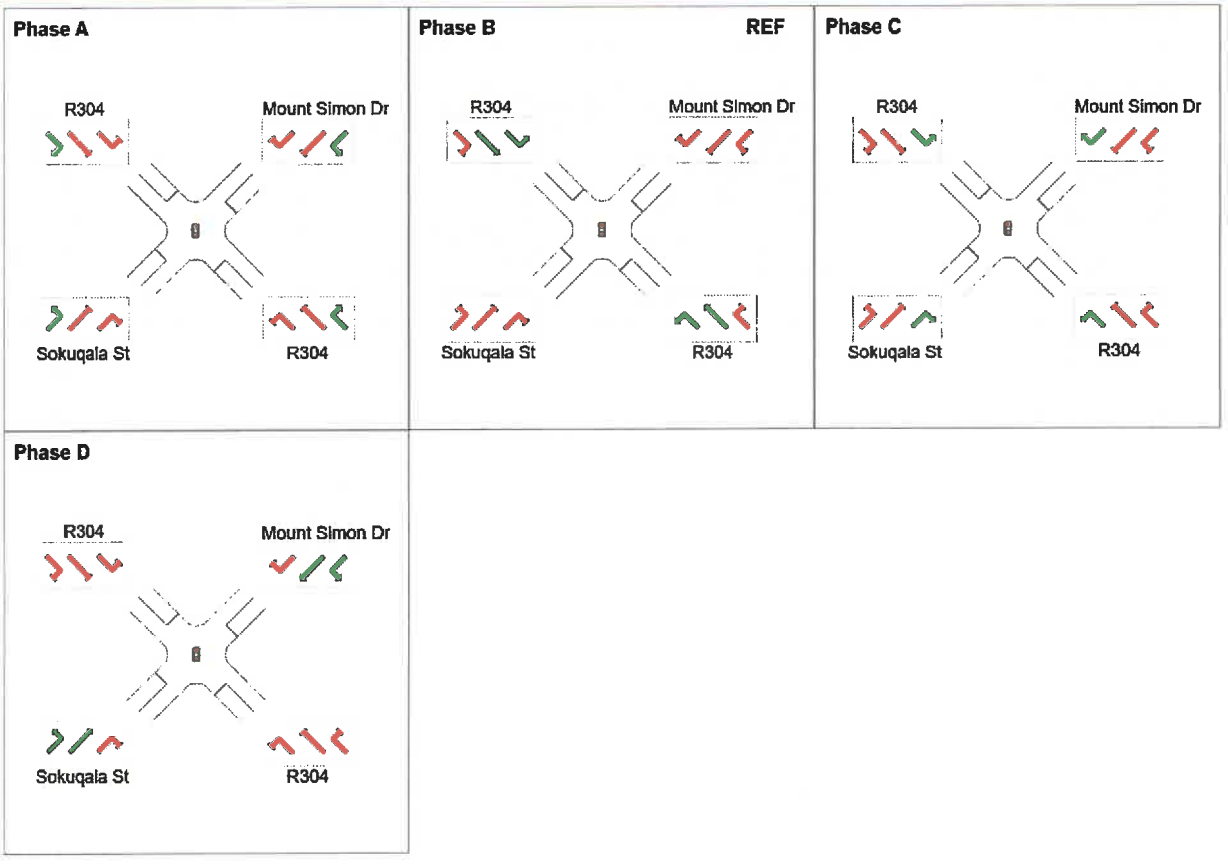
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import (2)
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	66	0	42	53
Green Time (sec)	11	38	7	9
Phase Time (sec)	15	42	11	13
Phase Split	19%	52%	14%	16%
Phase Frequency (%)	100.0	100.0	100.0	100.0

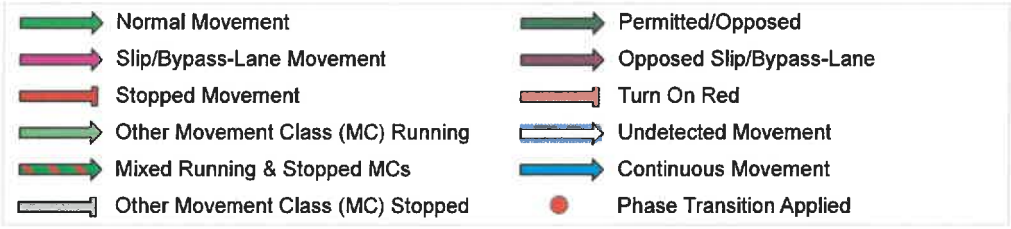
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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PHASING SUMMARY

Site: 4 [Intersection 4_2030 Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 74 seconds (Site User-Given Phase Times)

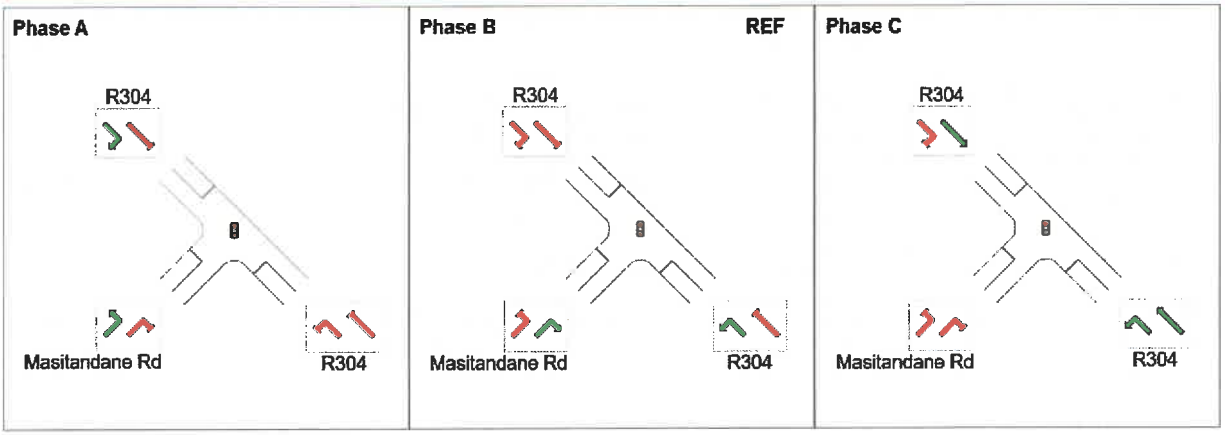
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase B

Phase Timing Summary

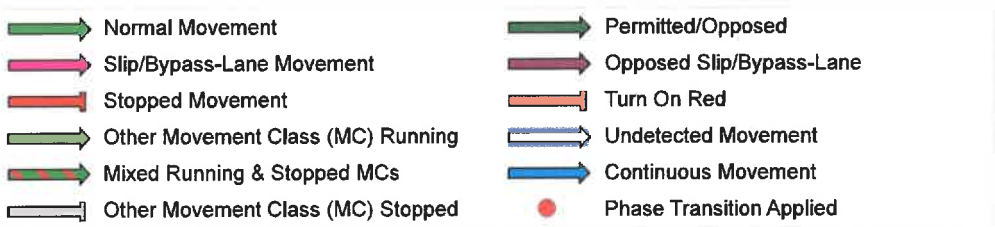
Phase	A	B	C
Phase Change Time (sec)	60	0	17
Green Time (sec)	9	12	38
Phase Time (sec)	14	17	43
Phase Split	19%	23%	58%
Phase Frequency (%)	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:31:12
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 4\Intersection 4_Stellenbosch.sip9

PHASING SUMMARY

Site: 4 [Intersection 4_2030 Background nad Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 70 seconds (Site User-Given Phase Times)

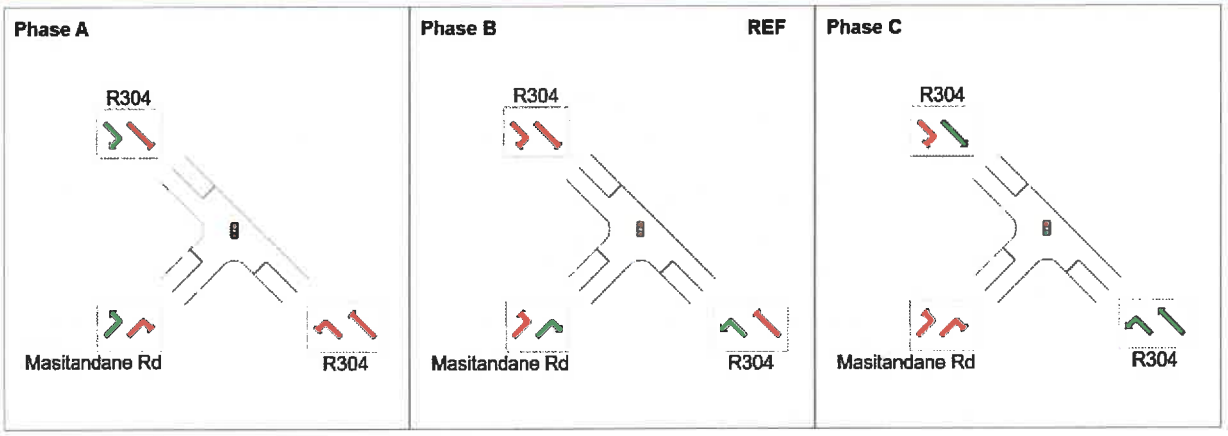
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns - Import (3)
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase B

Phase Timing Summary

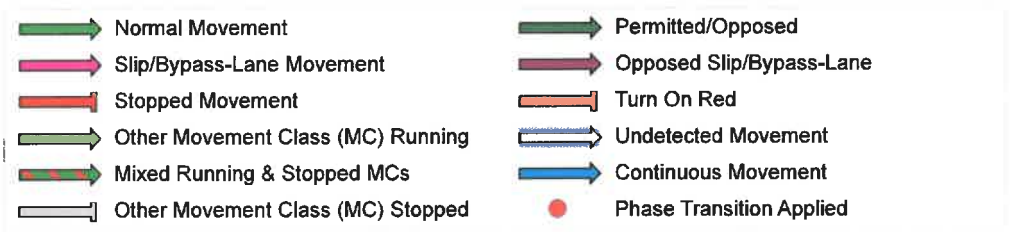
Phase	A	B	C
Phase Change Time (sec)	61	0	11
Green Time (sec)	6	8	47
Phase Time (sec)	9	11	50
Phase Split	13%	16%	71%
Phase Frequency (%)	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 4\Intersection 4_Stellenbosch.sip9

PHASING SUMMARY

Site: 7 [Intersection 7_2030 Proposed Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

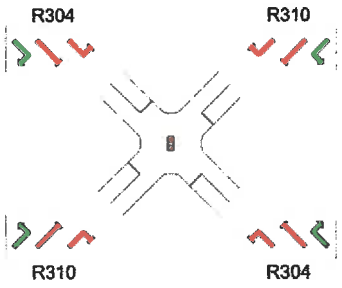
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	18	46	69
Green Time (sec)	15	25	20	18
Phase Time (sec)	18	28	23	21
Phase Split	20%	31%	26%	23%
Phase Frequency (%)	100.0	100.0	100.0	100.0

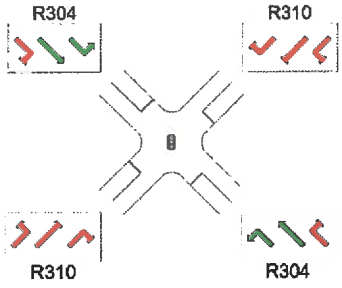
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

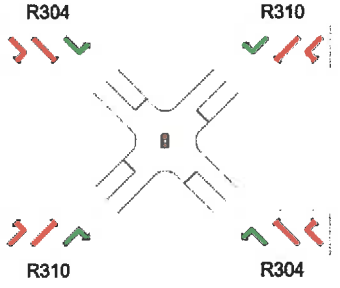
Phase A REF



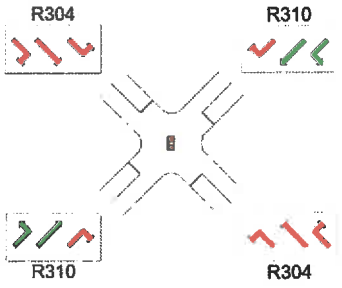
Phase B



Phase C

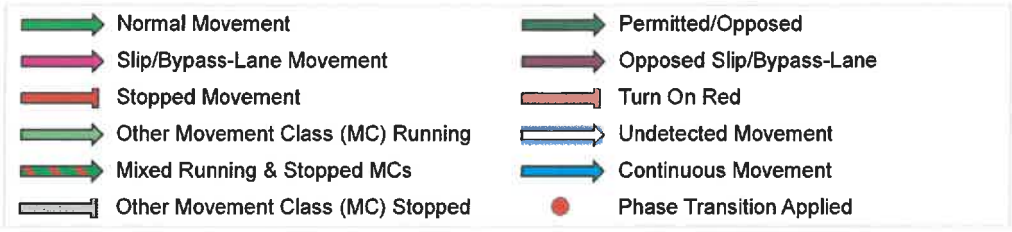


Phase D



REF: Reference Phase

VAR: Variable Phase



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PHASING SUMMARY

Site: 7 [Intersection 7_2030 Proposed Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 117 seconds (Site User-Given Phase Times)

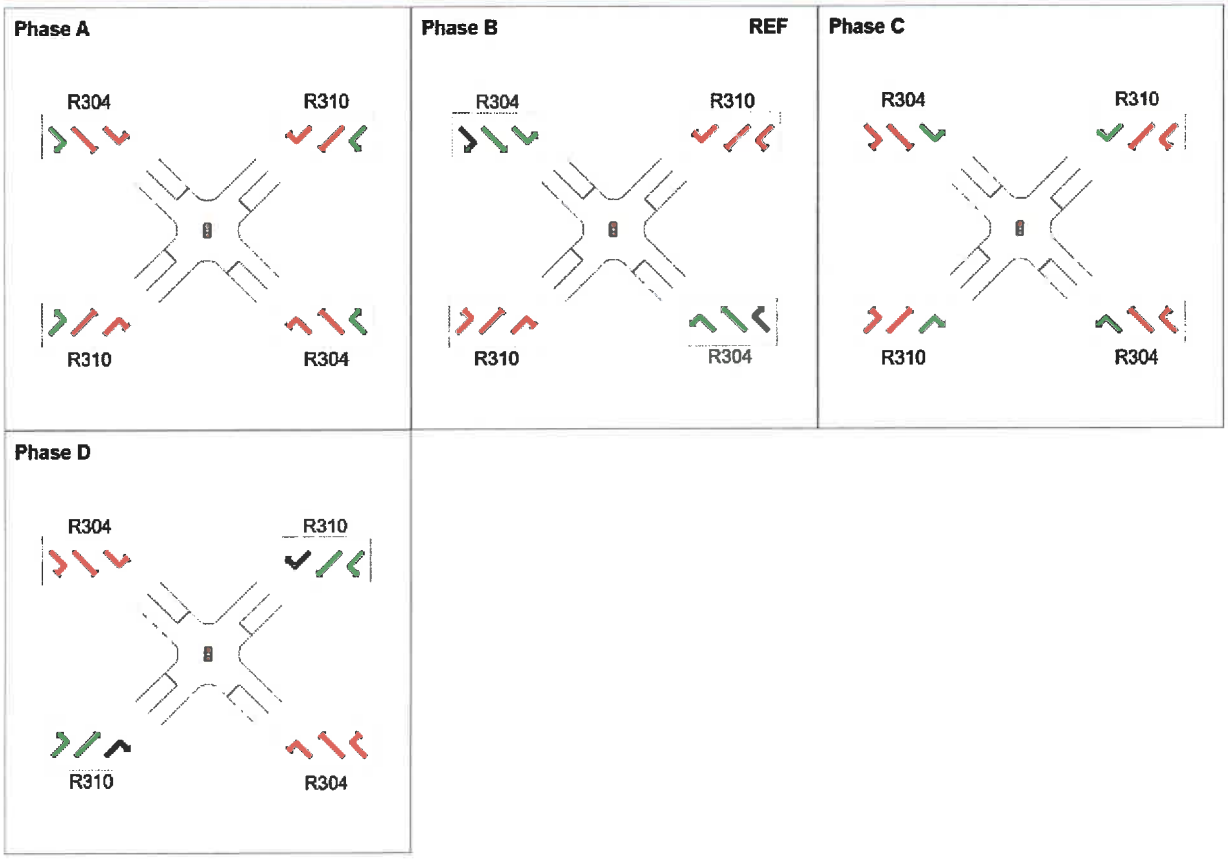
Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	103	0	49	75
Green Time (sec)	11	46	23	25
Phase Time (sec)	14	49	26	28
Phase Split	12%	42%	22%	24%
Phase Frequency (%)	100.0	100.0	100.0	100.0

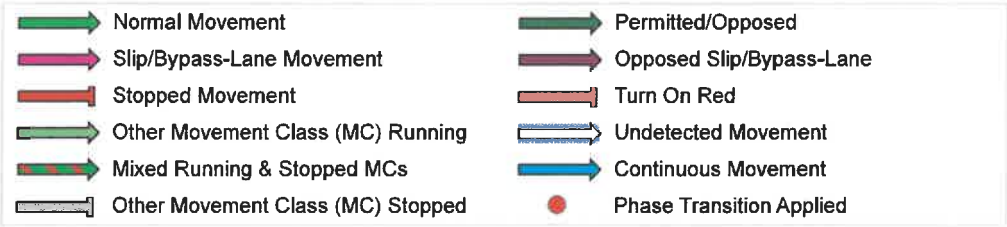
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



APPENDIX J: 2030 BACKGROUND AND DEVELOPMENT PROPOSED PHASING SUMMARIES

PHASING SUMMARY

Site: 5v [Intersection 5_2030 Proposed Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 56 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Convert Function Default
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase A

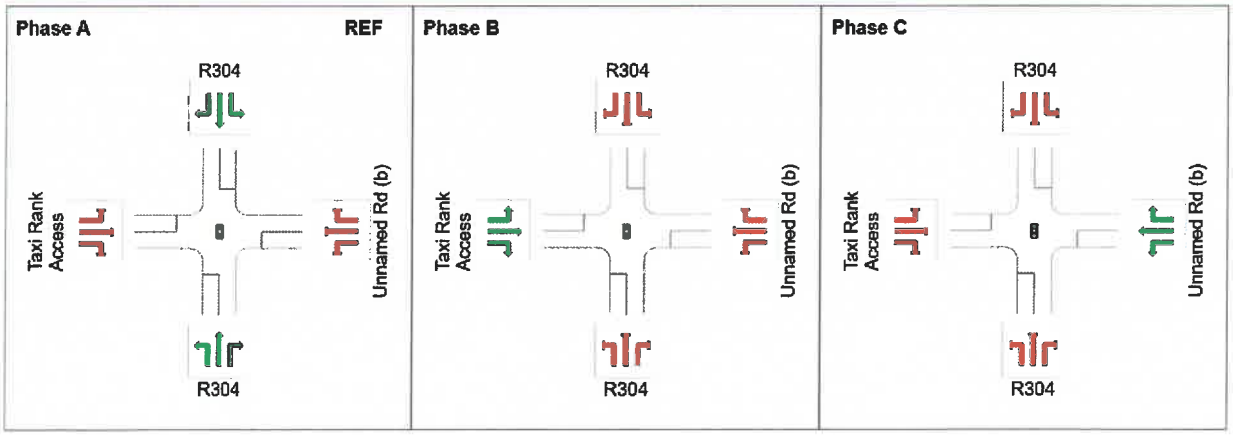
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	39	48
Green Time (sec)	35	4	4
Phase Time (sec)	40	8	8
Phase Split	71%	14%	14%
Phase Frequency (%)	100.0	72.7[2]	72.7[2]

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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PHASING SUMMARY

Site: 5v [Intersection 5_2030 Proposed Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 64 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Convert Function Default - Import
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase A

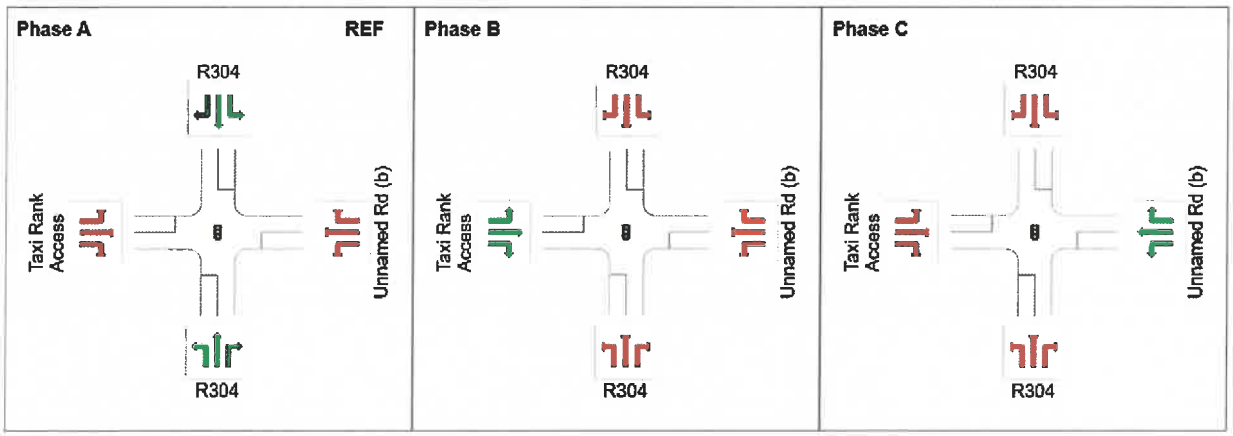
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	49	57
Green Time (sec)	47	5	5
Phase Time (sec)	50	7	7
Phase Split	78%	11%	11%
Phase Frequency (%)	100.0	77.8[2]	77.8[2]

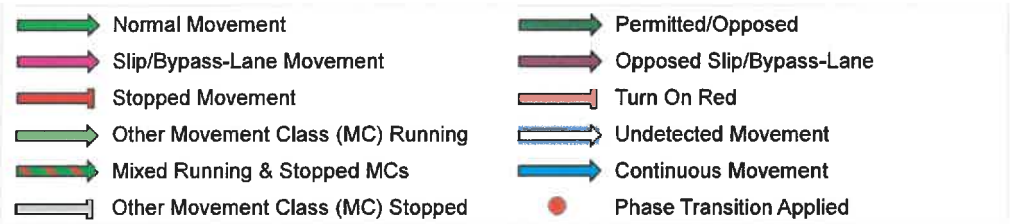
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Organisation: DELTA BEC | Licence: PLUS / 1PC | Processed: Thursday, 03 April 2025 15:31:32
Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 5\Intersection 5_Stellenbosch.sip9

PHASING SUMMARY

Site: 6v [Intersection 6_2030 Proposed Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 68 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Convert Function Default - Import
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase A

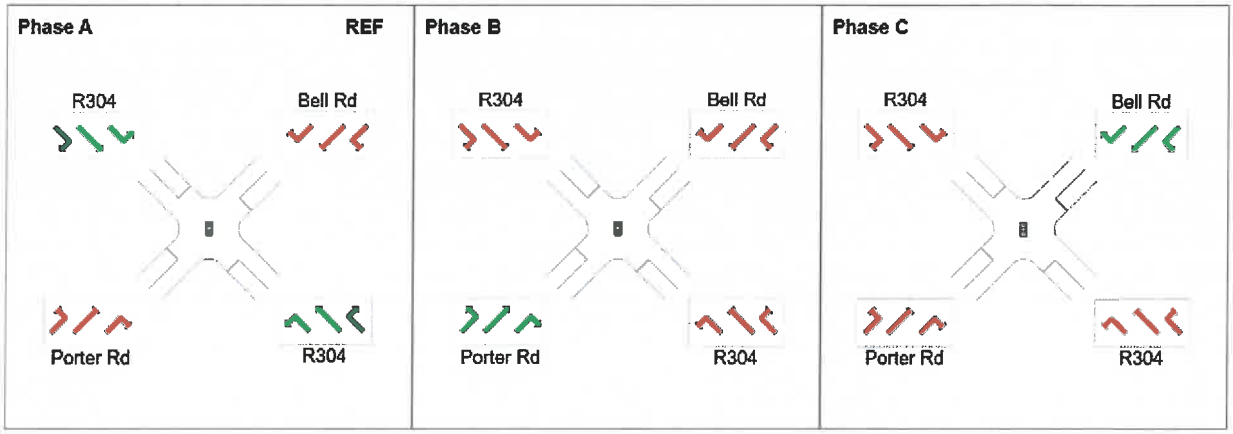
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	48	56
Green Time (sec)	45	5	9
Phase Time (sec)	48	8	12
Phase Split	71%	12%	18%
Phase Frequency (%)	100.0	88.9[2]	100.0

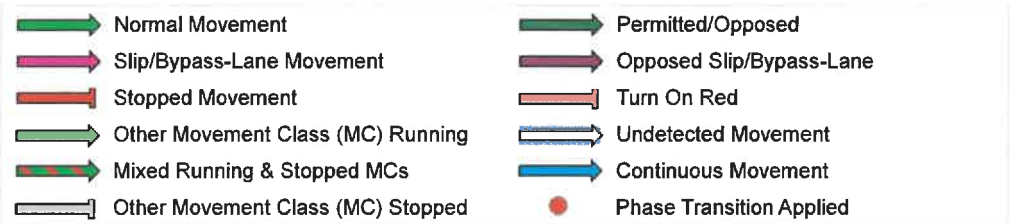
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



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Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 6\Intersection 6_Stellenbosch.sip9

PHASING SUMMARY

Site: 6v [Intersection 6_2030 Proposed Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 73 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Convert Function Default
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C
Reference Phase: Phase A

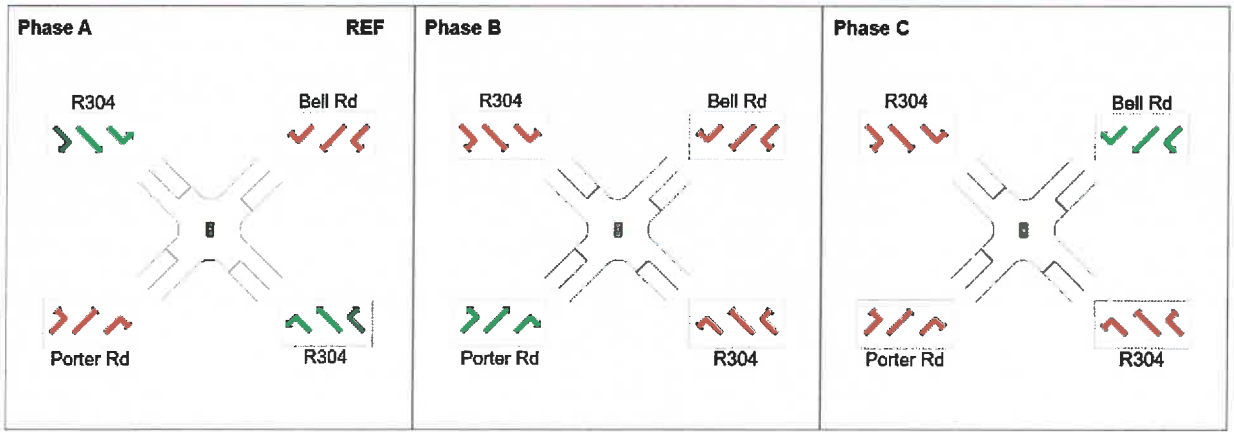
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	50	60
Green Time (sec)	44	4	9
Phase Time (sec)	50	8	15
Phase Split	68%	11%	21%
Phase Frequency (%)	100.0	66.7[2]	100.0

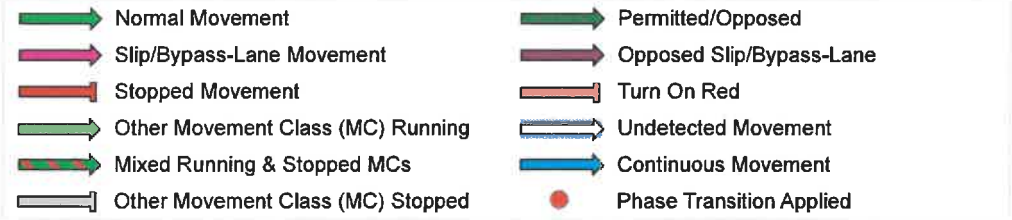
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

2 Phase Frequency is implied by a Phase Time specified by the user that is less than the Required Movement Time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



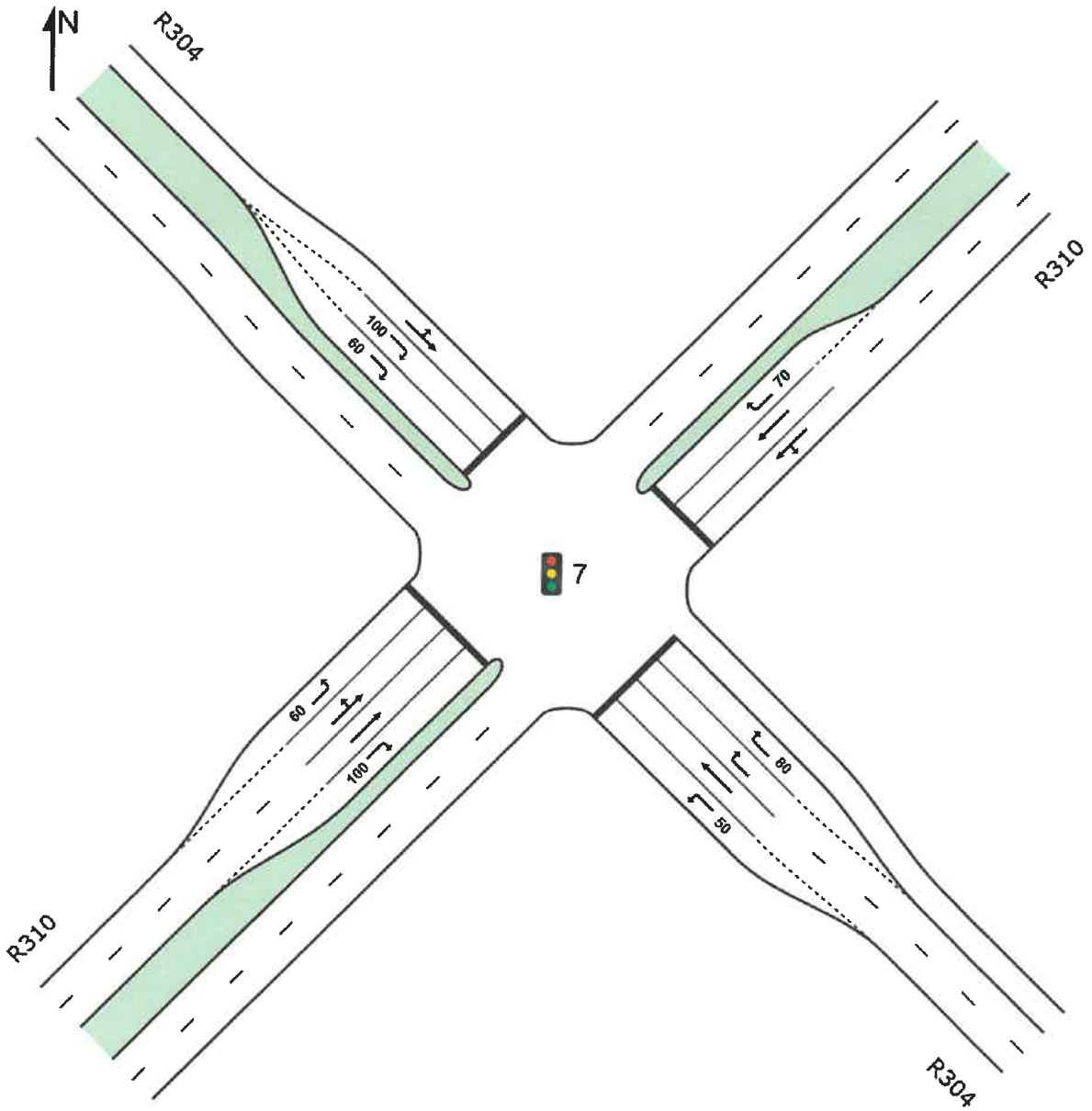
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Project: S:\P25004 STELLENBOSCH TIA\DESIGN\CIVIL\TRAFFIC\SIDRA\INTERSECTION 6\Intersection 6_Stellenbosch.sip9

SITE LAYOUT

Site: 7 [Intersection 7_2030 Proposed Background and Development AM (Site Folder: General)]

New Site
Site Category: Existing Design
Signals - Actuated Isolated

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



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PHASING SUMMARY

Site: 7 [Intersection 7_2030 Proposed Background and Development AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

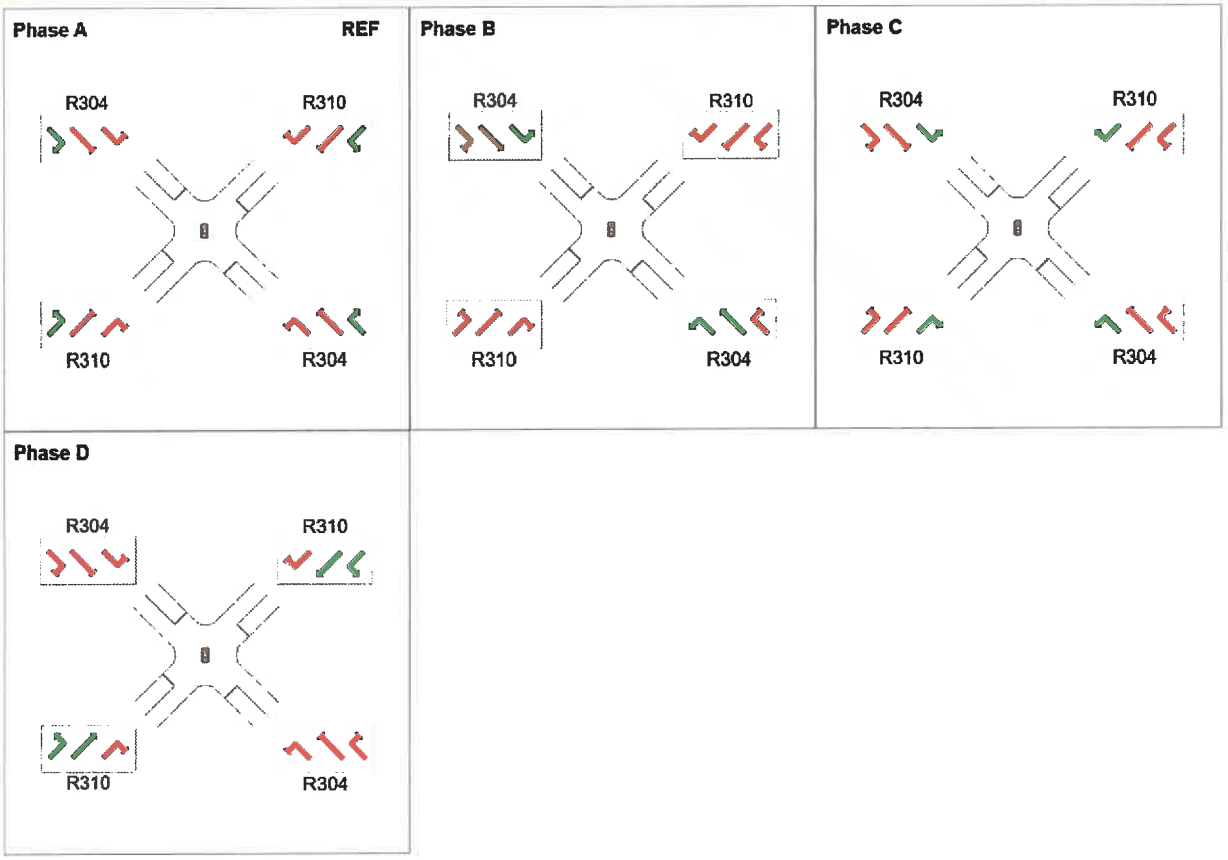
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Four-Phase Leading Right Turns - Import
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	18	46	69
Green Time (sec)	15	25	20	18
Phase Time (sec)	18	28	23	21
Phase Split	20%	31%	26%	23%
Phase Frequency (%)	100.0	100.0	100.0	100.0

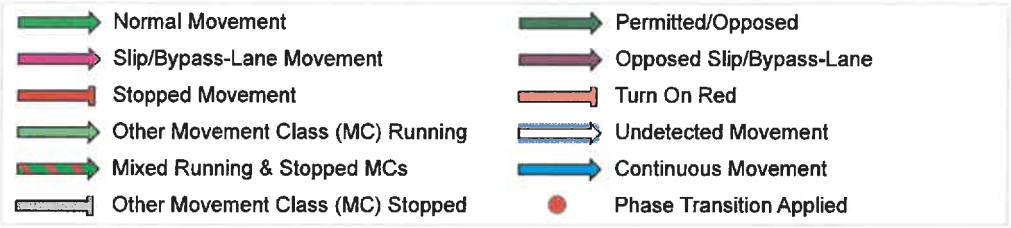
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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PHASING SUMMARY

Site: 7 [Intersection 7_2030 Proposed Background and Development PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: Existing Design
Signals - Actuated Isolated Cycle Time = 117 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase B

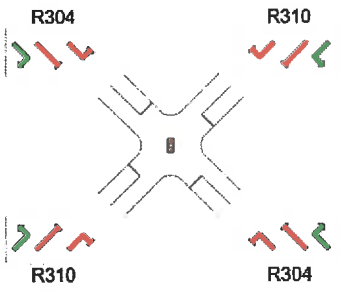
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	103	0	49	75
Green Time (sec)	11	46	23	25
Phase Time (sec)	14	49	26	28
Phase Split	12%	42%	22%	24%
Phase Frequency (%)	100.0	100.0	100.0	100.0

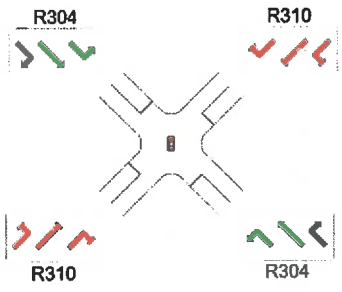
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

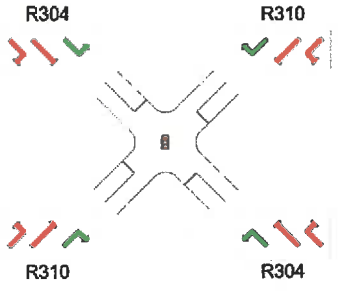
Phase A



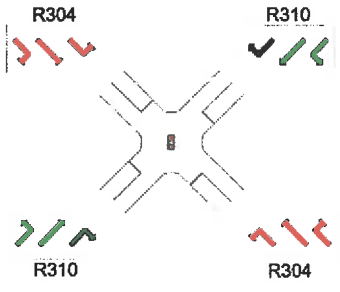
Phase B **REF**



Phase C

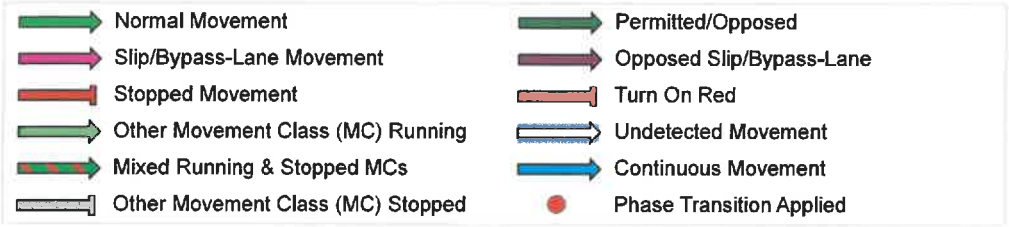


Phase D



REF: Reference Phase

VAR: Variable Phase



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