APPENDIX I

CIVIL ENGINEERING SERVICES REPORT

MOSSEL BAY MUNICIPALITY

1755 MOSSDUSTRIA DEVELOPMENT

CIVIL ENGINEERING SERVICES REPORT

REPORT NO. 1755/001 : REVISION NO. 2

JULY 2026

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MOSSEL BAY MUNICIPALITY

1755 MOSSDUSTRIA DEVELOPMENT

CIVIL ENGINEERING SERVICES REPORT

REPORT NO. 1755/C1 : REVISION NO. 2

JULY 2026

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1755-STW-002: Stormwater Reticulation Layout Plan
1755-SEW-002: Sewer Reticulation Layout Plan
1755-WAT-002: Water Reticulation Layout Plan

1755 MOSSDUSTRIA DEVELOPMENT

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JULY 2026

1 INTRODUCTION AND BACKGROUND

The Mossdustria area, located within Mossel Bay's Urban Edge, is earmarked for significant industrial expansion and urban development as part of strategic spatial planning frameworks. Originally established to support the oil and gas industry in the 1980s, Mossdustria has evolved into a key industrial node. Challenges such as the decline of gas production at PetroSA and the necessity for job creation have spurred efforts to diversify the area's economic activities through catalytic projects like the Motorsport Arena and renewable energy initiatives.

The proposed development includes industrial expansion, motorsport-related facilities, conservation efforts, and alternative energy production. These projects are designed to optimise existing municipal infrastructure, stimulate job creation, and enhance tourism, thereby ensuring long-term municipal sustainability. A conservation area will safeguard sensitive flora, while strategic urban planning will balance economic growth and environmental considerations

Lukhozi Consulting Engineers has been appointed to provide a civil engineering services report in support of the Environmental Authorisation Application (EAA). The report will include an assessment of the feasibility of the proposed development taking into account the bulk services required and whether the existing services would be sufficient to service the proposed development

2 SCOPE OF SERVICE

The purpose of this report is to provide conceptual design input relating to the civil engineering bulk infrastructure. The findings will inform the municipality's planning and decision-making processes.

2.1 TRANSPORTATION

- Assessment of site access and internal road layout.
- Evaluation of the surrounding road network integration.

2.2 STORMWATER MANAGEMENT

- Determination of peak runoff from the site.
- Identification of suitable stormwater management infrastructure.
- Recommendations for attenuation or retention measures.
- Determine the location, routes and size required for stormwater conveyance structures (channels and pipes) and attenuation (detention/retention pond(s)) for various return intervals;
- Stormwater harvesting.

2.3 SANITATION

- Evaluation of wastewater generation.
- Preliminary sizing of sewer reticulation and discharge strategy.

2.4 WATER

- Determination of water demand.
- Sizing of distribution network.

3 LOCALITY

The proposed development will take place on portion 8 of Farm 225 within the Mossdustria industrial zone of the Mossell Bay Municipality jurisdiction (MBM), Western Cape. The site is approximately 13 km west of Mossell Bay Central and is accessible via the N2 and R327. A Locality Plan is indicated on drawing 1755-GEN-001 attached hereto as Annexure A.

Coordinates to the centre of the site are:

Latitude 34°09'59.23"S; Longitude 22°00'24.68"E

4 SPECIALIST STUDIES

4.1 GEOTECHNICAL INVESTIGATION

A geotechnical investigation is recommended before detailed design to determine the founding conditions for roads and infrastructure.

4.2 TRAFFIC IMPACT ASSESSMENT

GPL Consulting was appointed to conduct a Traffic Impact Assessment (TIA) and produced a report dated March 2023. The assessment analysed the effects of the trips generated by the new development and proposed accesses. The proposed intersection of the Motorsport Arena Access and the R327 is shown in Figure 1 below:

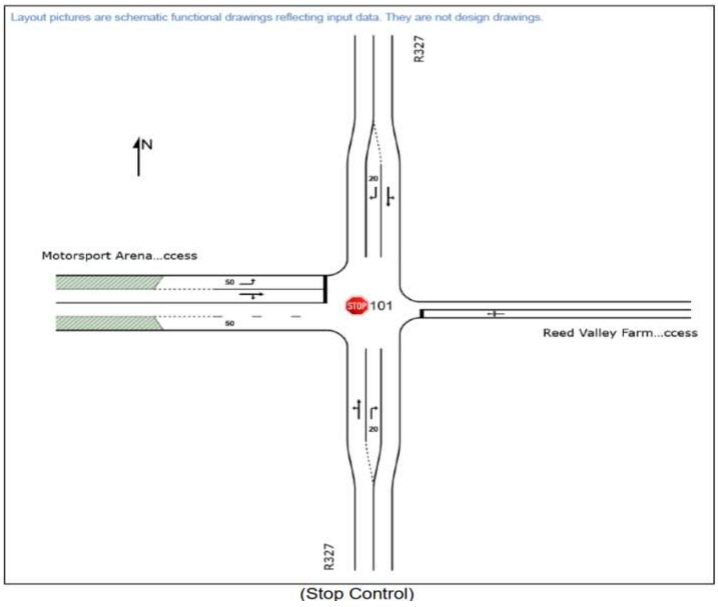


Figure 1: Proposed Intersection Layout for Motorsport Arena Access and R327

The Traffic Impact report is included in this report as Annexure B

4.3 SURVEY DATA

The drawings were done with the use of information from online spatial databases and shapefiles from the Mossel Bay Municipality. A detailed topographical survey will be required for the detailed design and layout of bulk services, roads, and drainage systems

5 ROADS

5.1 STANDARDS

The following standards are applicable to the road infrastructure

- The Neighbourhood Planning and Design Guide: Section I Transportation and Road Pavements (Red Book 2019)
- TRH 26 South Africa Road Classification and Access Management Manual
- TRH 17 Geometric Design of Rural Roads, 1988.

5.2 DRAWINGS

The following drawings apply to this section of the report:

- 1755-STW-001 P0 Roads Layout Plan

5.3 EXISTING ROAD INFRASTRUCTURE

Current access to the development site is primarily via Unicorn Street, which connects Barrier Street to the R327. Unicorn Street is an Urban Class 4a Collector Street, approximately 130 meters long, surfaced with two 3.3m wide lanes and painted shoulders. It has street lighting but no formal pedestrian sidewalks, and a speed limit of 60 km/hr.

The R327, a Provincial Main Road (MR00342), serves as the only access road to Mossdustria and links directly to the N2. It is classified as a Rural Class 3 Minor Arterial road, surfaced with two 3.8m wide lanes and 2m painted shoulders on either side. No formal pedestrian sidewalks or street lighting are present, and the speed limit is 100 km/h.

The N2 is a National Road carrying high volumes of daily traffic between Mossel Bay and Albertinia. It is a Rural Class 1 Principal Arterial road, surfaced as a 21m wide four-lane road with two 3.3m lanes in each direction, 0.5m painted shoulders, and separate turning lanes at the R327 intersection. An acceleration lane of 75m is provided for left-turning vehicles from the R327 onto the N2. Street lighting is present on the southern side near PetroSA, but no formal pedestrian sidewalks exist. The speed limit on this section is 100 km/h.

5.4 SITE ACCESS ROAD

Access to the Motorsport Arena and associated businesses will be provided via two new access points:

- **Primary Access**: Located on the R327 opposite the existing Reed Valley Farm access. This intersection will operate under Stop control with priority given to the R327. The primary access road will feature one inbound lane and two outbound lanes (right and left turns), each 3.3m wide. Right turn lanes (3.1m wide) will be added on the R327 to enhance safety for vehicles waiting to turn right. Bell-mouth radii of at least 15m will accommodate large vehicles, and any security checkpoint should be set back at least 20m from the R327 edge to prevent vehicle queues on the highway.

- **Alternative/Emergency Access**: Via a new link road extending southward from Barrie Street, which itself is an 8m wide Urban Class 5a Local Street. This link road will be at least 6.6m wide, providing two 3.3m lanes for two-way traffic.

The vertical alignment will follow the natural ground levels in order to minimise earthworks volumes during construction. The road cross-fall will be shaped with the contours to avoid excessive earthworks and trapped low points.

6 STORMWATER MANAGEMENT

6.1 STANDARDS

The following standards are applicable to the water infrastructure:

- The Neighbourhood Planning and Design Guide: Section L Stormwater (Red Book 2019)
- The South African National Roads Agency: Drainage Manual 6th Edition, 2013.

6.2 DRAWINGS

The following drawings apply to this section of the report:

- 1755-STW-002 P0 Stormwater Reticulation Layout Plan

6.3 CONCEPTUAL DESIGN RATIONALE

An increase in runoff quantity is expected due to surface hardening. The Sustainable Drainage System (SuDS) control measure adopted for this development is “Source & Local Control” as per Table L.2 in the Red Book. As a result, both runoff quality and quantity will be managed within the development.

The catchment area is less than 15km^2, therefore the Rational Method is used to determine the runoff as per the SANRAL Drainage Manual.

The table below indicates the design return periods applied to this development.

Table 1: Design Return Periods

Return Period	Design Objective
1 in 5 Year	Minor storms for stormwater conveyance design (pipes and channels)
up to 1 in 20 Year	Major storms for stormwater runoff control to protect downstream properties from fairly frequent nuisance storm events (reduced to pre-development level)

6.4 RAINFALL DATA

The mean annual precipitation (MAP) from the nearest rainfall station in Mossel Bay (Latitude –34° 11’ , Longitude 22° 08) is 550 mm. The 24-hour rainfall is summarised in Table 2 below

Table 2: 24-Hour Rainfall Data

Rainfall Classification	Return Period					
	1 in 2 year	1 in 5 year	1 in 10 year	1 in 20 year	1 in 50 year	1 in 100 year
From The Nearest Station in Mossell Bay (mm/h)	12.5	17.5	20.0	27.5	35	42.5

6.5 RUNOFF CALCULATIONS

The Rational Method was used to estimate peak runoff from the various land use zones within the Mossdustria development.

A 20-year return period was selected for the stormwater infrastructure design, in accordance with municipal guidelines for regional and critical infrastructure. Runoff coefficients were determined by surface cover type.Table 3 indicates the increase in stormwater runoff in the development area during a major storm.

Table 3: Major Storm Runoff (1:20-years)

Catchment Area	Size (Ha)	Pre-Development Runoff (m^3/s)	Post-Development Runoff (m^3/s)	Difference (m^3/s)
*Mossdustria Development	70	0.830	6.982	6.152
Motorsport Business Development	0.8	0.014	0.154	0.14

*Area does not include the conservation area and the Motorsport business development.

6.6 STORAGE PONDS

Storage and attenuation ponds are proposed for all portions of the development excluding the upper part of the industrial extension, which is assumed to connect directly to existing municipal stormwater infrastructure due to its proximity to the established Mossdustria network.

The design objective of the storage ponds is to attenuate peak stormwater flows from developed areas during a 1:20-year storm event, reducing the risk of downstream flooding and erosion. Pond sizing was based on capturing 50% of the peak discharge over a 1-hour storm duration, with allowance for gradual outflow.

The pond required for the development, excluding the Motorsport Business Development area, must have a total storage capacity of 24,000 m³. To optimise stormwater management, areas within the track layout, particularly in the loop sections, will be repurposed as storage ponds. This integration allows stormwater management to be seamlessly incorporated into the motorsport design. The ponds are not expected to exceed depths of 1 meter, though final dimensions will be determined during the detailed design phase. Additionally, a small outflow pond is proposed for the southwestern corner of the site to facilitate the controlled release of stormwater and to support overall stormwater management efforts. This pond will also provide an opportunity to store and reuse stormwater for non-potable purposes, such as cleaning and waterborne sanitation.

An existing pond is located immediately south of the project boundary. It is recommended that a thorough assessment be conducted to evaluate whether this pond can be integrated into the proposed stormwater management system, potentially enhancing its capacity and efficiency.

For the Motorsport Business Development area, a smaller pond with a capacity of 200 m³ is required and will require a surface area of approximately 135 m². This pond is proposed near the southeastern boundary, adjacent to the main entrance.

Stormwater runoff from the motorsport arena is expected to contain contaminants such as grease, oil, and fuels, which pose a risk to the surrounding environment if it enters natural watercourses. To mitigate this risk, it is proposed that stormwater from this area be collected and directed into an oil separation tank designed to separate and remove oil, grease, and fuel residues from the water. Following this treatment, the clarified water will be discharged into the main stormwater retention pond for further management.

To efficiently transfer stormwater from developed areas to the storage ponds, a network of 7km of 450mm diameter concrete pipes is proposed to be utilised throughout the site.

6.7 FLOODLINES

The need for a formal floodline analysis and hydraulic modelling of the development area was assessed during the inception phase in consultation with the Mossel Bay Municipality. Factors considered include the location of the development relative to watercourses and water sources, the municipality's requirements, and the nature of the proposed industrial development. The 1:100-year flood line is typically applied for development control purposes, while smaller recurrence interval events (1:5-year to 1:20-year) inform the stormwater network design addressed elsewhere in this report.

The development site is situated on elevated ground within the Mossdustria industrial zone and is not traversed by, nor located adjacent to, any significant watercourse or drainage feature that would place the developable area within a 1:100-year flood line. This is supported by the Green Book Municipal Risk Profile flood hazard mapping (CSIR, powered by Esri), which returns a Flood Hazard Index of 0.00 (very low) for the site (Figure 2), and classifies the Mossel Bay RSC settlement area within which the site falls as having a low settlement flooding risk (Figure 3).

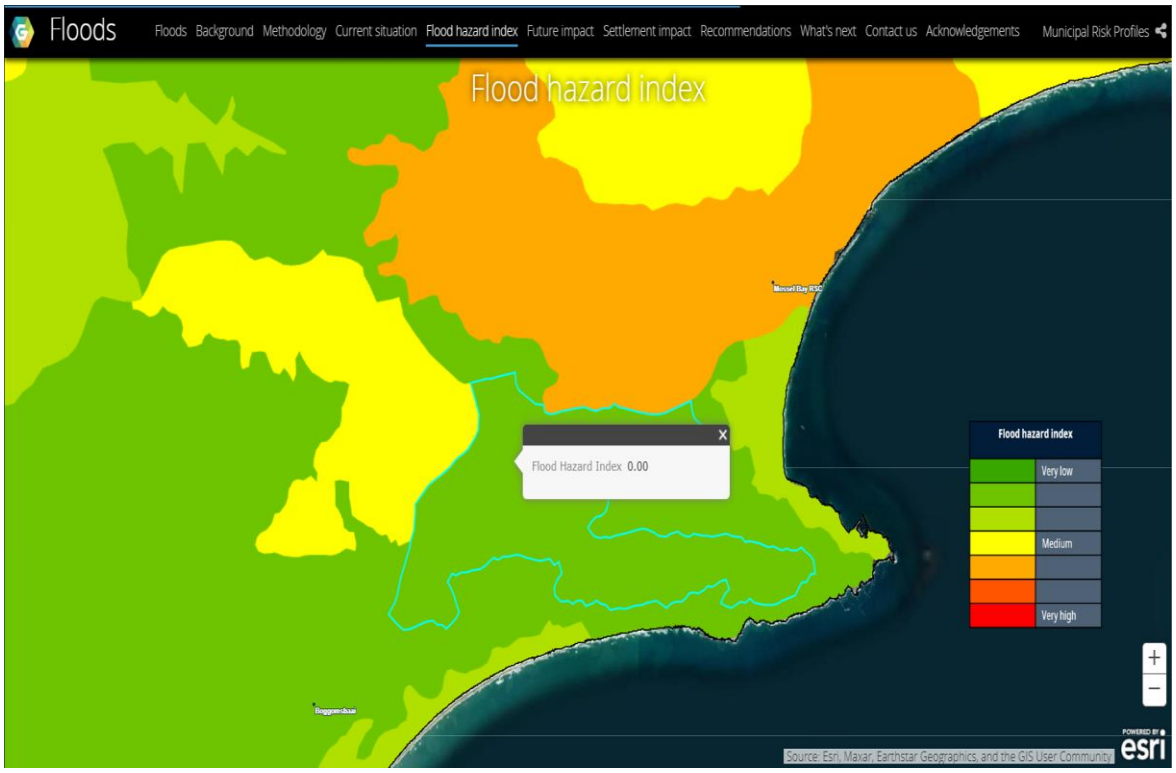


Figure 2 Green Book Municipal Risk Profile, flood hazard index for the Mossdustria site area, showing an index value of 0.00 (very low)

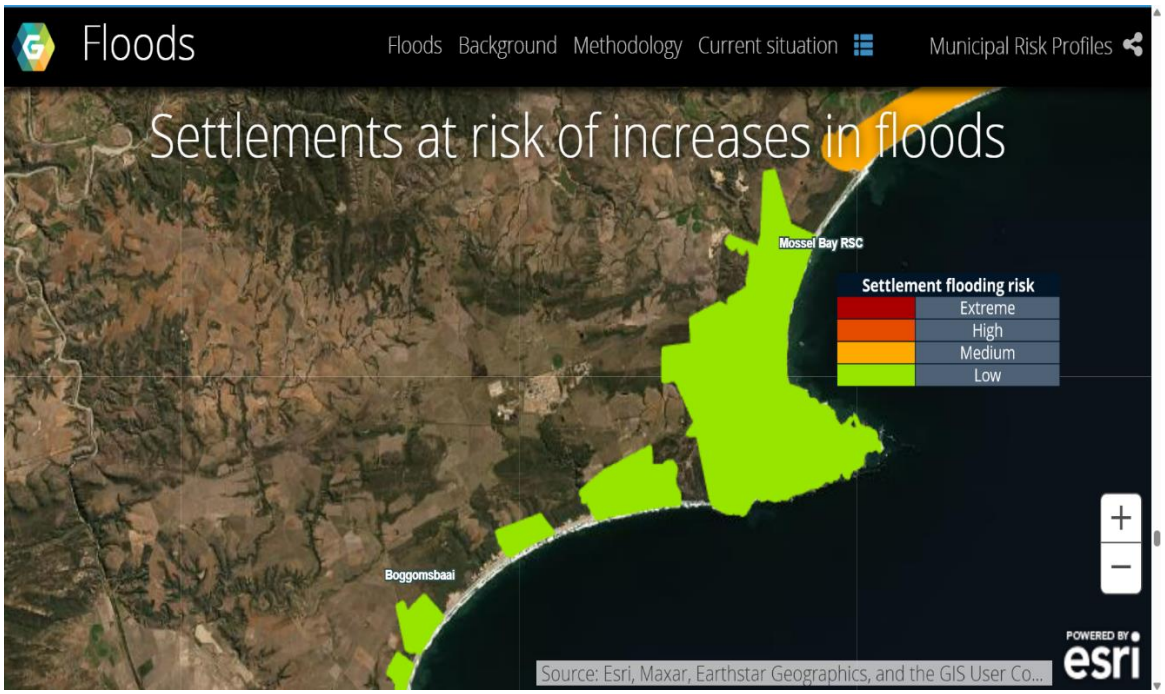


Figure 3 Green Book Municipal Risk Profile, settlements at risk of increases in floods, showing the Mossel Bay RSC settlement area classified as low risk

On this basis, and as confirmed with the Mossel Bay Municipality, a detailed floodline analysis and modelling exercise is not warranted for this development, and this statement is provided in lieu thereof. Stormwater generated within the development will be managed through the source and local control measures, conveyance infrastructure, and attenuation ponds described in Sections 6.3 to 6.6, which limit post-development discharge to pre-development levels for events up to the 1:20-year recurrence interval, thereby protecting downstream properties. Should the development layout change materially, or should future phases extend towards any identified drainage line, the requirement for a floodline determination should be re-evaluated at that stage.

7 WASTEWATER

7.1 STANDARDS

The following standards are applicable to the sanitation infrastructure:

- The Neighbourhood Planning and Design Guide: Section K Sanitation (Red Book 2019)
- SANS 10400-P: Drainage
- SANS 10252: Water Supply and Drainage for Buildings (2012)
- DPW Drainage Water Supply and Stormwater Drainage (2000)

7.2 DRAWINGS

The following drawing applies to this section of the report:

- 1755-SEW-002 P0 Sewer Reticulation Layout Plan and Schematic

7.3 WASTEWATER SERVICES

7.3.1 Existing Infrastructure

The Mossdustria development area is currently serviced by an established wastewater reticulation network managed by Mossel Bay Municipality. Within the proposed project boundaries, a primary gravity sewer line conveys sewage flows to the Mossdustria Sewer Pump Station, where wastewater is subsequently pumped towards the Pinnacle Point Wastewater Treatment Works for processing.

The infrastructure data available for the project area is incomplete; notably, the shapefiles provided do not include critical details such as pipe diameters and invert levels at manholes, which are essential for accurate hydraulic modelling and effective system design. There is also a need to verify the exact routing of the gravity sewer line connecting to the pump station, as this linkage is not depicted in the shapefiles provided for the project but is illustrated in the Mossel Bay Sewer Master Plan. The current hydraulic capacity and operational status of this pump station are unknown and require verification.

7.3.2 Future development

The Sewer Masterplan for Mossel Bay outlines plans to verify the existing pumpstation and the rising main in 2025. This assessment will confirm the ability of the infrastructure to accommodate increased effluent volumes that will be generated by the Mossdustria development. The Sewer Masterplan has marked the verification of the pump and the rising main as high priority and states that this should occur in 2025.

7.4 HYDRAULIC LOAD

The projected Average Dry Weather Flow (ADWF) for the development area, based on an annual event with an attendance of 10,000 individuals, is estimated at 619 kilolitres per day. This equates to an additional hydraulic load of 7.2 litres per second on the Mossdustria Pump Station. Conveyance of this wastewater to the pump station will be facilitated via 1.9km of 160mm diameter sewer pipeline.

8 WATER

8.1 STANDARDS

The following standards are applicable to the water infrastructure:

- The Neighbourhood Planning and Design Guide: Section J Water Supply (Red Book 2019)
- SANS 10252: Water Supply and Drainage for Buildings (2012)

8.2 DRAWINGS

The following drawing applies to this section of the report:

- 1755-WAT-002 P0 Water Reticulation Layout Plan

8.3 WATER SUPPLY AND RESOURCES

The Mossdustria area forms part of the broader Bartelsfontein Supply Zone. The area receives its potable water supply from the Bartelsfontein Reservoir, which currently has a storage capacity of 5ML and is situated approximately 1km north of the project site.

8.3.1 Existing infrastructure

The industrial area immediately north of the project is serviced by an existing water reticulation network, which the project area can connect to. However, the available pipeline data does not have sufficient pipe diameter details for certain segments within this network. There is a need to verify all existing pipe diameters before finalising tie-in designs to ensure they meet projected flow and pressure requirements. Where data is incomplete or outdated, on-site investigations should be conducted to confirm pipe capacities.

8.3.2 Future development

As outlined in the 2025 Water Master Plan for Mossel Bay, there are approved plans to increase the capacity of the Bartelsfontein Reservoir from 5ML to 25ML over the next five years. This expansion will substantially enhance the water supply security for the Mossdustria area, supporting anticipated industrial growth and increased demand. The increased storage volume will improve operational flexibility and resilience against supply disruptions, thereby ensuring a more reliable water supply for the project's future needs.

8.4 WATER DEMAND

8.4.1 Potable Use

The water demand for the Mossdustria project area was calculated based on recommended demand rates per hectare according to intended land uses and event attendance characteristics. Table 1 presents the expected daily water demands per area.

Table 4: **Daily Water Demands**

AREA	SIZE (Ha)	DEMAND (KL/day) per Ha	TOTAL DAILY DEMAND (KL/day)
Industrial Development	13	13	169
Alternative Energy Area	22	0.3	0.660
Motorsport Workshop	0.8	13	16.8
Motorsport Business Development	0.1	13	2.1
*Motorsport Arena			500
TOTAL			688.56

**The motorsport arena water demand is estimated at 500 kL/day, based on a large annual event attendance of 10,000 people with an assumed water use of 50 L/person/event.*

A 3.5km, 160mm main will connect to the existing water services just north of the industrial expansion and distribute potable water throughout the entire site.

8.4.2 Fire Water

The Mossdustria development comprises a mix of industrial activities and motorsport facilities, both of which introduce elevated fire risks due to the storage and handling of flammable materials (e.g., fuels) as well as the potential for large public gatherings during events. In line with the Red Book (2019) guidelines, the development is classified as a high-risk area for fire protection design purposes.

Design Parameters:

- Required fire flow: 100 L/s
- Fire water supply duration: 6 hours continuous (recommended for high-risk developments)
- Fire water storage requirement: 2.16 ML (to be provided from the reservoir)

To ensure reliability and redundancy in supply, the installation of an onsite reservoir with dedicated emergency fire water storage should be explored as part of the overall fire protection strategy. This would enhance system resilience and safeguard against potential interruptions in bulk supply.

9 CONCLUSION

The preliminary bulk services feasibility for the Mossdustria development has been undertaken in accordance with applicable industry standards and best practice guidelines, as detailed within this report.

Although the locations of the existing municipal infrastructure have been identified, further detailed information and verification are required. This should include confirmation of pipe diameters, invert levels, and pump station capacities to enable a comprehensive assessment of the entire system.

Given the anticipated increase in runoff volumes associated with the development's proposed land uses, the implementation of appropriately sized attenuation ponds will be critical to effectively mitigate potential hydrological impacts. These retention facilities will serve to minimise downstream flooding risks, preserve environmental quality, and reduce pressure on existing stormwater infrastructure.

Overall, with continued data acquisition and detailed hydraulic design, Mossdustria has the potential to be developed sustainably with minimal adverse effects on the municipal services and limited impact on the environment and neighbouring community's properties.

10 RECOMMENDATIONS

It is recommended that the following studies be carried out:

1. Topographical and As-Built Survey

- Accurately define earthwork quantities, drainage patterns, flow paths, and inform detailed stormwater design and attenuation pond placement.

- Map all existing civil services including pipes, manholes, culverts, drains, and roads.

- Capture natural features such as earth dams, streams, wetlands, and depressions.

- Provide precise spot heights and contours with preferably ≤0.5 m intervals.

2. As-built Services verification

- Confirm pipe diameters, invert levels, capacity, and condition of existing municipal and on-site infrastructure

- Verify the exact route that shows the connection to Mossdustria Sewer Pumpstation.

3. Geotechnical investigation

- Confirm soil and subsoil conditions for attenuation pond foundations, embankment stability, and building footprints.

- Assess soil permeability, groundwater levels, and clay layer continuity, especially considering existing natural ponding and earth dams on site.

- Guide design requirements such as pond lining, infiltration capacity, and structural stability to mitigate construction risks

4. Stormwater management plan updates

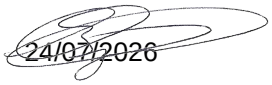
- Incorporate refined survey data and investigation results to update catchment delineations, runoff calculations, and pond sizing.

- Finalise detailed siting, design, and sizing of attenuation/retention ponds aligned with latest sustainable urban drainage system (SuDS) technologies.

- Integrate stormwater quality measures such as permeable pavements, infiltration systems, and pollution control devices



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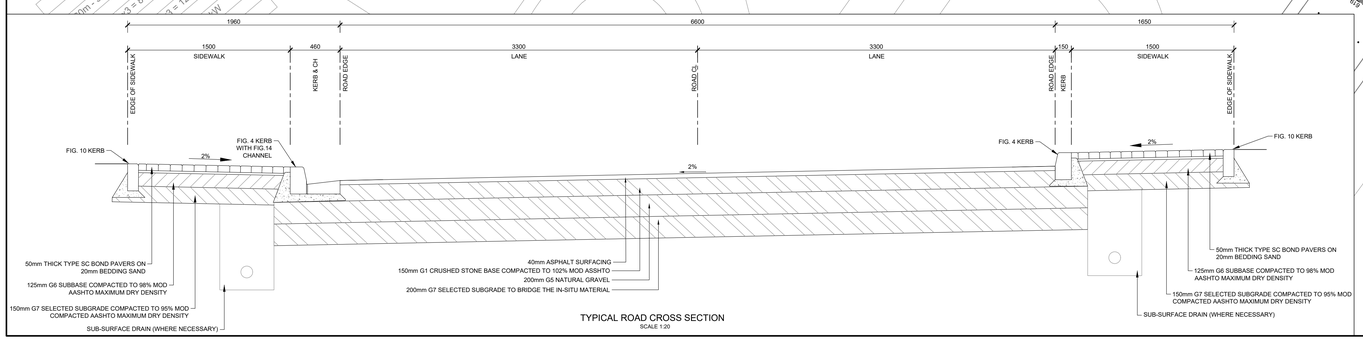
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Date: 24 JULY 2026

ANNEXURE A

CONCEPTUAL CIVIL ENGINEERING DRAWINGS





TYPICAL ROAD CROSS SECTION
SCALE 1:20

LEGEND:

EXISTING INFRASTRUCTURE

FENCE

PROPOSED INFRASTRUCTURE

ASPHALT SURFACE ROADWAY

PAVED SIDEWALK

No	APPROVED	AMENDMENTS	DATE
			-
P0		ISSUED FOR INFORMATION	FEB 2026

SURVEYED		
DRAWN	S.KULU	FEB 2026
DESIGNED	N GODOKA	FEB 2026
CHECKED	C BEZUIDENHOUT	FEB 2026
APPROVED	PR REGISTRATION NO.	DATE:---

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CLIENT

ILAC
Integrated Licencing & Assurance Consulting

INTERGRATED LICENSING & ASSURANCE CONSULTING

PROJECT TITLE

MOSSDUSTRIA DEVELOPMENT

DRAWING TITLE

ROADS LAYOUT PLAN

SCALE		SHEET SIZE
1:1000	SHEET 1 OF 1 SHEETS	A0
DRAWING No. 1755-RDS-001		REVISION P0

P:\PE\1755 Mossdustria Sport Arena\04 Design & Drawings\09 All services\1755 All Services.dwg



LEGEND:

EXISTING INFRASTRUCTURE

- STORMWATER PIPELINE (Ø450mm CLASS 1000)
- STORMWATER GRID INLET

PROPOSED INFRASTRUCTURE

- STORMWATER PIPELINE (Ø450mm CLASS 1000)
- STORMWATER GRID INLET
- STORMWATER KERB INLET
- STORMWATER POND
- OIL INTERCEPTOR TANK

GENERAL NOTES

No	APPROVED	AMENDMENTS	DATE
			-
T0		ISSUED FOR TENDER	-

SURVEYED		
DRAWN	H PINDA	JUNE 2025
DESIGNED	N GODOKA	JUNE 2025
CHECKED	C BEZUIDENHOUT	JUNE 2025
APPROVED		

PR REGISTRATION NO. DATE:—

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CLIENT

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INTERGRATED LICENSING & ASSURANCE CONSULTING

PROJECT TITLE

MOSSDUSTRIA DEVELOPMENT

DRAWING TITLE

STORMWATER LAYOUT PLAN

SCALE		SHEET SIZE
AS SHOWN	SHEET 1 OF 1 SHEETS	A0
DRAWING No. 1755-STW-002		REVISION T0

P:\PE\1755 Mossdustria Sport Arena\04 Design & Drawings\04 Stormwater\1755 STW.dwg



LEGEND:

EXISTING INFRASTRUCTURE

- SEWER PIPELINE (Ø160mm CLASS 34)
- SEWER MANHOLE
- FENCE

PROPOSED INFRASTRUCTURE

- SEWER PIPELINE (Ø160 mm CLASS 34)
- SEWER MANHOLE

GENERAL NOTES

No	APPROVED	AMENDMENTS	DATE
			-
T0		ISSUED FOR TENDER	-

SURVEYED	SURPLAN	APR 2025
DRAWN	H PINDA	JUNE 2025
DESIGNED	N GODOKA	JUNE 2025
CHECKED	C BEZUIDENHOUT	JUNE 2025
APPROVED		
	PR REGISTRATION NO.	DATE:---

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PROJECT TITLE

MOSSDUSTRIA DEVELOPMENT

DRAWING TITLE

SEWER LAYOUT PLAN

SCALE	SHEET SIZE
AS SHOWN SHEET 1 OF 1 SHEETS	A0
DRAWING No. 1755-SEW-002	REVISION P0

P:\PE\1755 Mossdustria Sport Arena\Civil Design & Drawings\09 All services\1755 All Services.dwg



LEGEND:

EXISTING INFRASTRUCTURE

- WATER PIPELINE ((Ø160mm CLASS 9)
- WATER JUNCTION
- FENCE

PROPOSED INFRASTRUCTURE

- DOMESTIC WATER RING MAIN ((Ø75mm CLASS 9)
- WATER JUNCTION

GENERAL NOTES

No	APPROVED	AMENDMENTS	DATE
			-
T0		ISSUED FOR TENDER	-

SURVEYED		
DRAWN	H PINDA	JUNE 2025
DESIGNED	N GODOKA	JUNE 2025
CHECKED	C BEZUIDENHOUT	JUNE 2025
APPROVED	PR REGISTRATION NO.	DATE:–

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INTERGRATED LICENSING & ASSURANCE CONSULTING

PROJECT TITLE

MOSSDUSTRIA DEVELOPMENT

DRAWING TITLE

WATER LAYOUT PLAN

SCALE	SHEET SIZE
AS SHOWN SHEET 1 OF 1 SHEETS	A0
DRAWING No. 1755-WAT-002	REVISION P0

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ANNEXURE B

TRAFFIC IMPACT STUDY

Proposed Mossdustria Development

Mossel Bay Local Municipality

Traffic Impact Assessment



Prepared for:

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Final Draft Report: May 2023

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List of Abbreviations

AADT	:	Annual Average Daily Traffic
ADT	:	Average Daily Traffic
AM	:	Morning
CBD	:	Central Business District
COTO	:	Committee of Transport Officials
GLA	:	Gross Leasable Area
IDP	:	Integrated Development Plan
LOS	:	Level of Service
NMT	:	Non-Motorised Transport
PM	:	Afternoon
SANRAL	:	South African National Roads Agency Ltd
SDP	:	Site Development Plan
SIDRA	:	Micro-Analytical Traffic Engineering Software Package
TIA	:	Traffic Impact Assessment
vph	:	Vehicles per Hour

1 INTRODUCTION

1.1 Background

The Mossdustria Industrial / Raceway Development is located on the farm Rietvalley, Portion 8 in the Mossel Bay Local Municipality area, approximately 14 km from the centre of the Town of Mossel Bay. The new development is proposed in the area to the south of the existing Mossdustria development on Municipal land, bordered to the east by the Provincial Road R327 which intersects with the National Road N2 approximately 2 km to the south.

The adjacent, existing developed industrial area that will be further developed, is comprised of light industrial and warehousing businesses and is located off the National Road N2 along Provincial Road R327. The development is adjacent to the PetroSA facility to the west and undeveloped land (currently agriculture) to the east and south. According to the *Mossel Bay Municipality Integrated Development Plan (IDP), Fifth Generation, 2022-2027* (approved by Council on 31 May 2022), the area to the south of the existing built up portion is earmarked for future development including industrial / light industrial, racetrack, alternative energy, waste disposal and business premises.

The locality of the Mossdustria development area is indicated in Figure 1-1.

The objective of this Traffic Impact Assessment (TIA) is to assess the traffic impact of the new development on the adjacent road network (Provincial Road R327) and in particular the intersection of the National Road N2 and the R327, and to propose mitigation measures to improve access and traffic flow, where necessary. The TIA will form a part of an application to the South African National Roads Agency Ltd (SANRAL) in respect of the intersection of the National Road N2 with the R327 and to the Western Cape Government Department of Transport and Public Works in respect of the R327.

The Study Area, shown in Figure 1-1, includes the intersection of the National Road N2 / Provincial Road R327, the existing and proposed road intersections on the R327 providing access to the built portion of Mossdustria and the new development area.

1.2 Development Particulars

The Site Development Plan (SDP) is shown in Figure 1-2 and presents the proposed development components. The total area of the proposed development is 88 ha.

The SDP indicates that the proposed development will be accessible via the existing Mossdustria internal road network, which connects to the R327 via Unicorn Street, and one new access point on the R327 opposite the existing access to the Reed Valley Farm.

According to the Mossel Bay Municipality's IDP, the 'Motorsport Mecca' development is an important catalyst project that will house several motorsport disciplines with the objective of attracting possible events to the area to stimulate the tourism industry. The Mossdustria Spatial Proposal, as contained in the 2022-2027 Mossel Bay IDP, is shown in Figure 1-3.

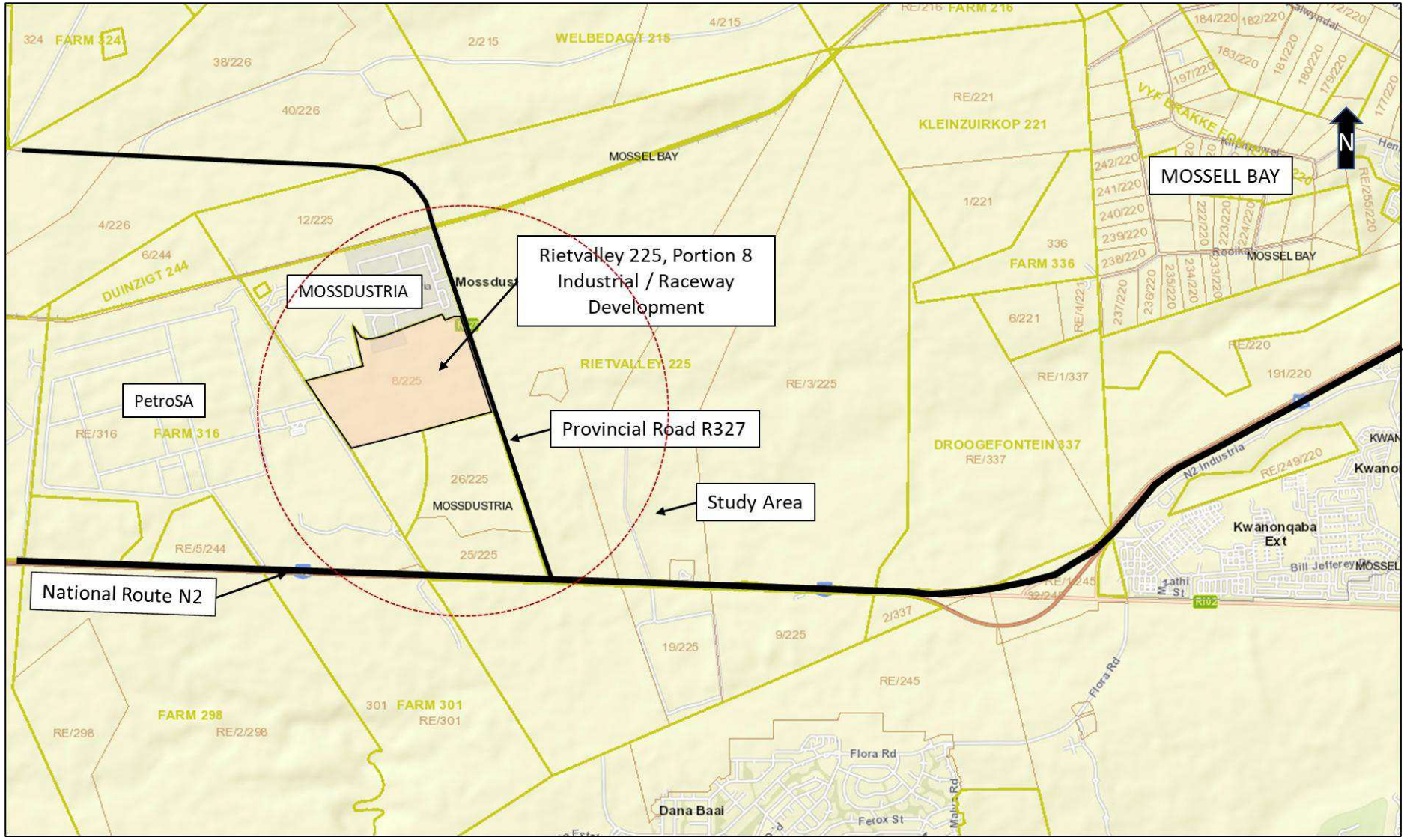


Figure 1-1: Locality Plan: Mossdustria Rietvalley 225, Portion 8 Development

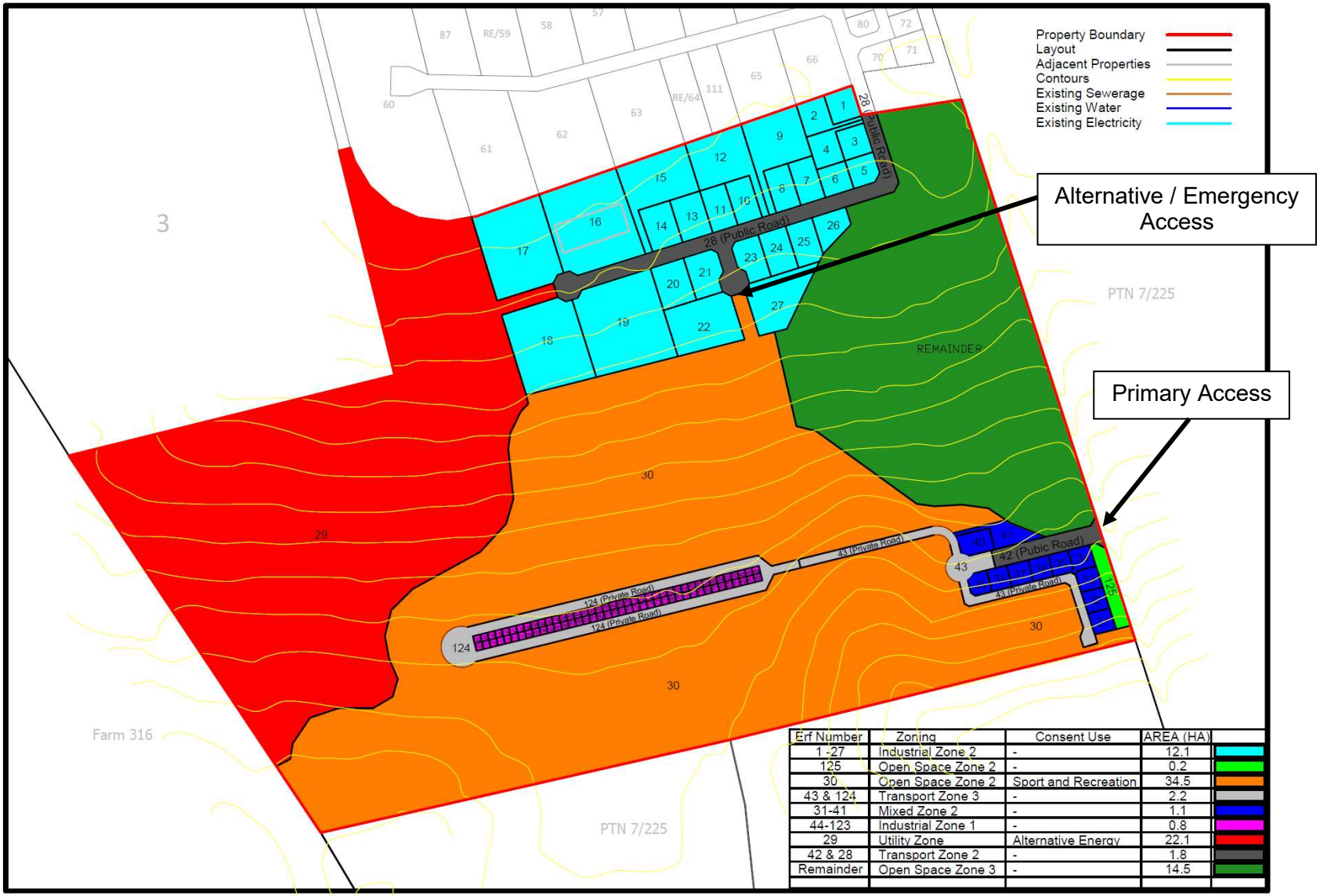


Figure 1-2: Site Development Plan: Mossdustria

Source: Mossel Bay Municipality, Site Development Plan (Dated May 2023)

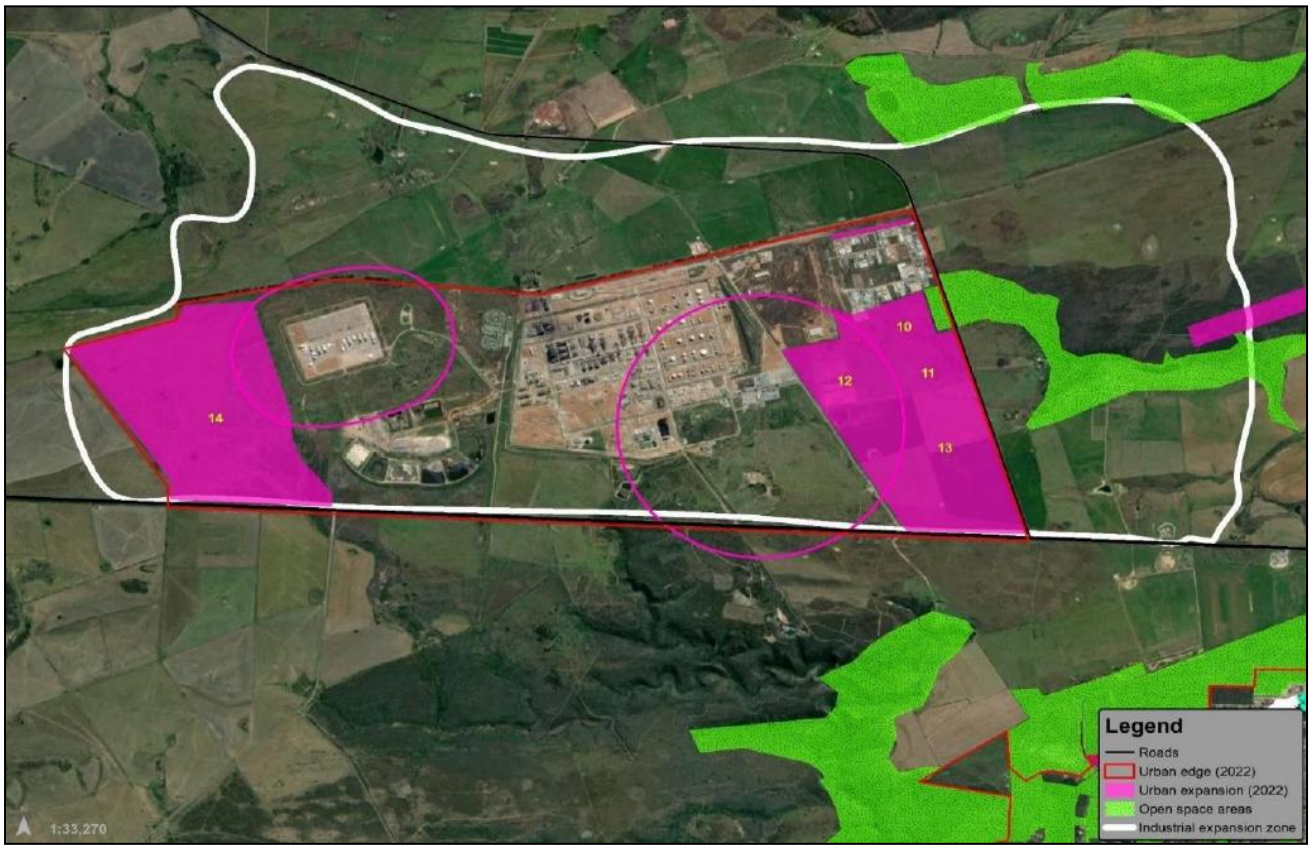


Figure 1-3: Mossdustria Spatial Proposal

Source: Mossel Bay Municipality IDP, Fifth Generation, 2022-2027

2 STUDY METHODOLOGY

This TIA was approached and conducted in a systematic manner, as indicated by the methodology.

The following guideline documents were used in the preparation of this TIA:

- Mossel Bay Municipality's Integrated Development Plan (IDP), Fifth Generation, 2022 - 2027 (Mossel Bay Municipality, 2022);
- South African Traffic Impact and Site Traffic Assessment Manual, TMH 16, Volume 1 (Committee of Transport Officials, 2012);
- South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual, TMH 16, Volume 2 (Committee of Transport Officials, 2014);
- South African Trip Data Manual, TMH 17 (Committee of Transport Officials, 2013);
- South African Road Classification and Access Management Manual, TRH 26 (Committee of Transport Officials, 2018);
- South African Parking Standards, PG3/85 (Department of Transport, 1985).

The following methodology was adopted for the preparation of this TIA:

- Collection of all relevant available information and documentation, including other transport related studies in the vicinity of the site (e.g. other TIAs, Integrated Development Plan, etc.).
- Liaison with Client / Project Team to obtain the proposed site development information and drawings.

- Identification of affected intersections for traffic counts in order to determine the existing traffic flows on the roads surrounding the site. The preparation of traffic counting sheets and briefing of enumerators also form part of this step.
- Site inspection to assess the safety of proposed access points; to observe existing transport operations; and to record existing road widths and intersection geometry. Any other transport features considered relevant is also documented, e.g. presence of public transport, pedestrians, cyclists, etc.
- Conduct traffic counts; process traffic data and generate traffic flow diagrams as a base from which future traffic volumes can be estimated.
- A conventional four step transport planning process is used to determine the future traffic flows, namely:
  - Calculation of the number of trips that will be generated by the proposed development during peak hours;
  - Distribution of the generated trips between the anticipated origins and destinations;
  - Modal split (the split of passenger trips between private vehicles and public transport), if applicable, as well as any heavy vehicle trips (e.g. trucks, waste removal) during peak hours; and
  - Trip assignment by assigning each vehicle to a route on the road network.
- The newly generated traffic is then added to the existing background traffic, along with any additional traffic generated by other planned developments in the vicinity of the site.
- Analysis of traffic impact at access points and affected intersections using the SIDRA software package, to identify the need for physical road improvements and the extent thereof.
- Preparation of a TIA report that summarises the above, along with conclusions and recommendations.
- Submission of the TIA report to the relevant road authority for consideration and approval.

3 EXISTING ROADS AND FUTURE ROAD NETWORK

3.1 Existing Roads

Site inspections were carried out on Friday 3 March 2023 and Saturday 4 March 2023. The *South African Road Classification and Access Management Manual*, TRH 26 (COTO, 2018) was used to classify the existing roads within the study area. The surrounding road network is described as follows:

- The **N2** is a national road (NR00206) carrying high volumes of daily traffic between Mossel Bay in the east and Albertinia in the west. The N2 can be classified as a Rural Class 1 Principal Arterial. In the vicinity of the intersection with the R327, the N2 is a surfaced 21m wide four-lane road, with two 3.3m wide traffic lanes in each direction and 0.5m wide painted shoulders on either side. Separate turning lanes (3.3m wide) are present on the N2 at the R327 intersection, as well as an acceleration lane (75m length) for left turning vehicles onto the N2 from the R327. No formal pedestrian sidewalks are present along the road, and street lighting is present on the southern side of the N2 to the west of the R327 intersection in the vicinity of PetroSA. The speed limit on this section of the N2 is 100km/h.
- The **R327** is a provincial road (Provincial Main Road MR00342) carrying moderate volumes of daily traffic between the National Road N2 and the town Herbertsdale, whilst also being the only access road to Mossdustria. The R327 can be classified as a Rural Class 3 Minor Arterial. In the vicinity of the development site, the R327 is a surfaced 11.6m wide two-lane

road, with a single 3.8m wide traffic lane in each direction and 2m wide painted shoulders on either side. No formal pedestrian sidewalks or street lighting is present along the road. The speed limit on this section of the R327 is 100km/h.

- **Unicorn Street** links to the R327 and is currently the only road providing access to the Mossdustria area. Unicorn Street is approximately 130m in length and can be classified as an Urban Class 4a Collector Street (commercial). Unicorn Street is a surfaced 8.1m wide two-lane road, with a single 3.3m wide traffic lane in each direction and painted shoulders on either side ranging in width from 0.6m to 0.9m. No formal pedestrian sidewalks are present along the road, but street lighting is present. The speed limit on Unicorn Street is 60 km/h, although it is a very short length of road.

The abovementioned roads intersect at the following two intersections located in the study area:

- National Road N2 / Provincial Road R327 (Stop control)
- Provincial Road R327 / Unicorn Street (Stop control)

The spacing between these two intersections is approximately 2.45km and both operate with Stop control on the minor road approaches. The layouts of these intersections are shown in the following images and layout plans.

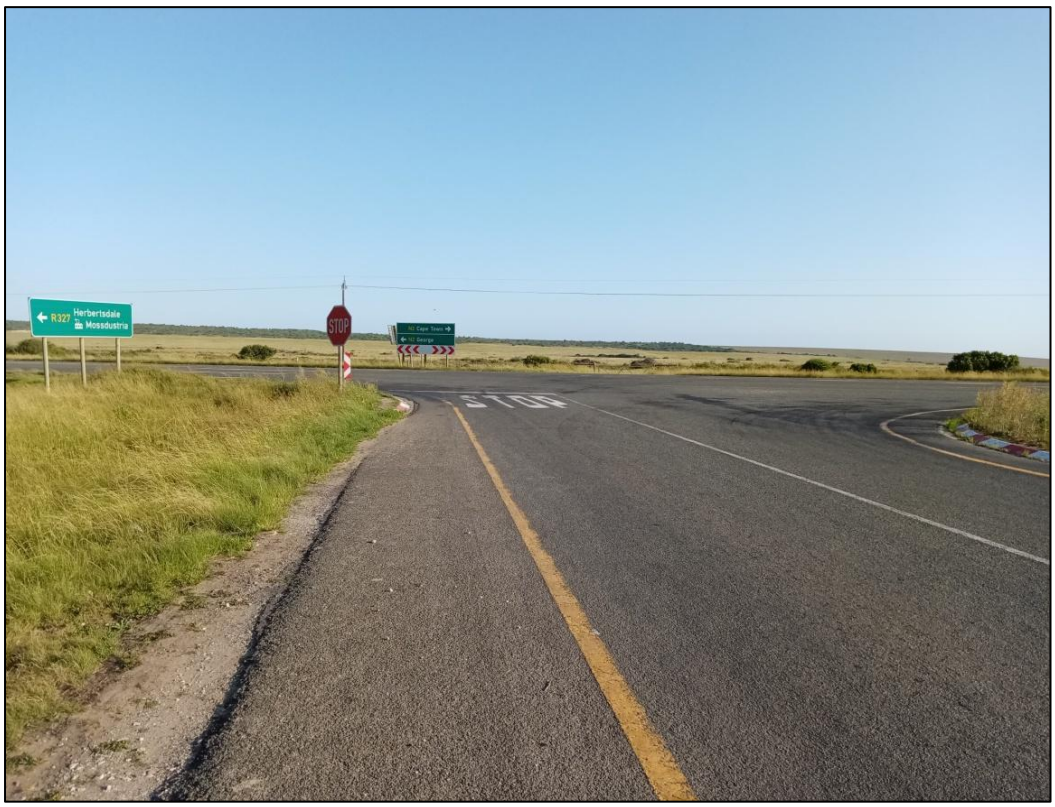


Figure 3-1: N2 / R327 Intersection (looking south along R327 towards N2)



Figure 3-2: N2 / R327 Intersection (looking west along N2 towards R327)



Figure 3-3: N2 / R327 Intersection (looking east along N2 towards R327)



Figure 3-4: R327 / Unicorn Street Intersection (looking east along Unicorn Street towards R327)



Figure 3-5: R327 / Unicorn Street Intersection (looking south along R327 towards N2)



Figure 3-6: N2 / R327 Existing Intersection Layout



Figure 3-7: R327 / Unicorn Street Existing Intersection Layout

3.2 Future Road Network

The *Mossel Bay Municipality Integrated Development Plan (IDP), Fifth Generation, 2022-2027* (Mossel Bay Municipality, 2022) was consulted to determine the Municipality's future transport related plans within the study area. It was concluded that no new transport related infrastructure is currently planned in the study area for the 5-year time horizon assessed by this TIA, in addition to the 'Motorsport Mecca' development discussed in Section 1.2.

The proposed *Mossel Bay Roads Masterplan* contained in the *Mossel Bay Transportation Plan 2023*, provides for a network of future arterial and collector roads to improve access and connectivity to all areas in the long term. A network of north / south and east / west road links is planned in the area to the east of the Provincial Road R327 and north of the N2. The proposed Masterplan provides for a future interchange at the intersection of the N2 and the R327. Details of the future planning are contained in the aforementioned Plans.

4 FUTURE DEVELOPMENT PLANNING

According to the *Mossel Bay Municipality Integrated Development Plan (IDP), Fifth Generation, 2022-2027* (Mossel Bay Municipality, 2022), the land parcel labelled '13' located between the proposed Mossdustria Industrial / Raceway Development (land parcels 10, 11 and 12) and the National Road N2, as shown in Figure 4-1, is planned for industrial, business, alternative energy, light industry, business premises, corporate park, education, gas and oil related land uses.



Figure 4-1: Mossdustria Spatial Proposal: Future Development Planning

Source: Mossel Bay Municipality IDP, Fifth Generation, 2022-2027

The area of land parcel 13 is 118 ha and no timeframe is available for the development of this land parcel. It was therefore assumed that the development of land parcel 13 will occur beyond the 5-year time horizon assessed by this TIA. A separate TIA needs to be undertaken as part of the planning process for the development of land parcel 13 to assess the potential traffic impact on the adjacent road network.

5 ACCESS PROPOSAL

The proposed road access locations for the Mossdustria Industrial / Raceway Development were evaluated in terms of the *South African Road Classification and Access Management Manual*, TRH 26 (COTO, 2018), which sets out the standards for permitted road intersections and property access separations. The proposed access locations are also evaluated in terms of the required sight distances for safe traffic operation based on a site inspection and the relevant guideline requirements.

5.1 Site Access and Internal Vehicle Circulation

The SDP shown in Figure 1-2 indicates that multiple access points will be provided to the various development components:

- To the south of Mossdustria, the proposed Industrial Expansion area will be accessible via a southward extension of Barrie Street, which is a surfaced two-way road, approximately 8m wide. Barrie Street can be classified as an Urban Class 5a Local Street (commercial) and the road extension will provide direct property access to the new industrial properties, the Conservation Area, as well as the Motorsport Arena.
- Access to the Motorsport Arena and related businesses will be provided via two new accesses. The primary access intersection will be located on the R327, opposite the existing access to the Reed Valley Farm. An alternative / emergency access to the Motorsport Arena may be provided from the north via a new link road extension of Barrie Street.
    - The primary access with the R327 should operate under Stop control, with the R327 having priority. The primary access road should have one inbound lane, one outbound right turn lane and one outbound left turn lane, each being 3.4m wide, as shown in Figure 5-1. Right turn lanes (3.1m wide) should be introduced on the R327, as per the recommendation of the TRH26 Manual for Class 3 rural roads, to improve the safety of stationary vehicles waiting to turn right at the intersection. The bell-mouth radii of the new access should be at least 15m to accommodate the turning movements of larger heavy vehicles (e.g. trucks). Should security access control be present at the new access, the checkpoint or gate should be located far enough (20m minimum) from the western road edge of the R327 so that stationary vehicles (especially large trucks) do not back-up onto the R327 roadway.
    - At the primary access, the road section between the R327 and the proposed traffic circle should provide one inbound and one outbound traffic lanes (minimum 3.4m lane width) and an additional 2.5m wide on-street parking lane allowed on both sides of the road to serve the adjacent businesses. The start/end of the parking bays should have a 50m spacing (minimum) from the R327 road edge. This road layout should ensure unobstructed access to / from the Motorsport Arena for emergency vehicles should one traffic lane be blocked.

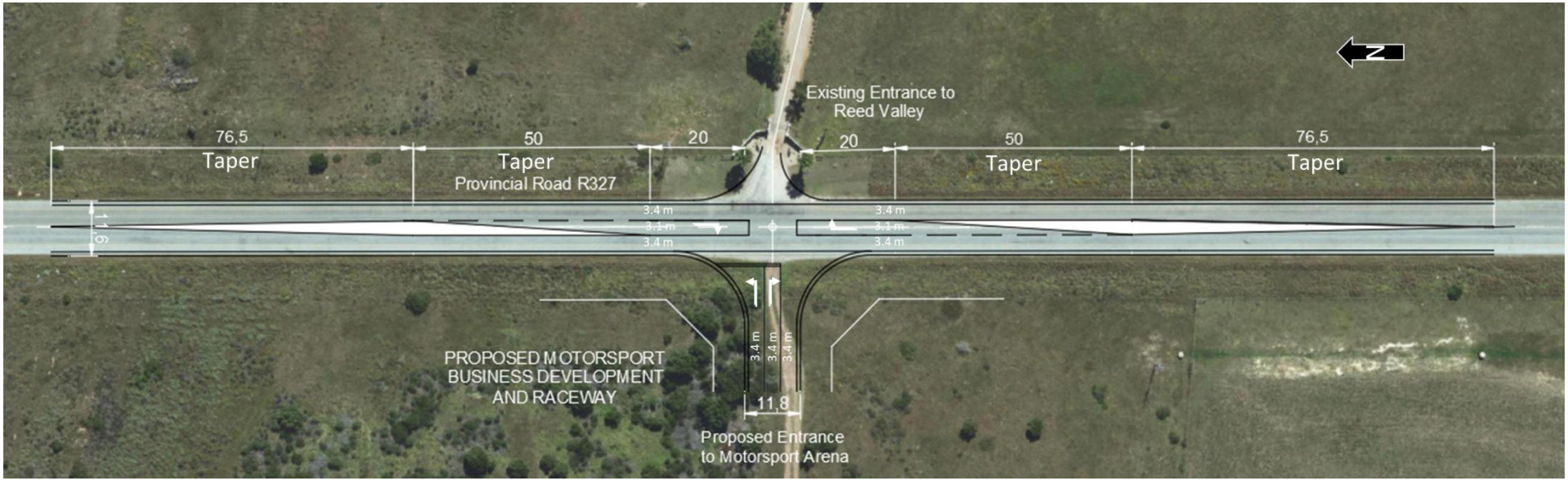


Figure 5-1: Proposed Primary Access Intersection Layout on Provincial Road R327

- The proposed traffic circle should have an inscribed circle diameter of at least 25m to allow for the turning movements of buses and trucks, which will also allow for two-lane operation by passenger cars. Should any planting or features be planned for the traffic circle's central island, these should be such that it does not obstruct the visibility of approaching motorists to ensure safe traffic flow.
- Should an alternative / emergency access to the Motorsport Arena be provided from the north via a new link road extension of Barrie Street, the road should be at least 6.8m wide to provide two 3.4m wide traffic lanes for two-way traffic.
- New internal roads will provide access to parking areas and the various business and spectator components of the Motorsport Arena. The new internal roads, which may be surfaced or gravel, should be at least 6.8m wide in order to provide two 3.4m wide traffic lanes for two-way traffic.
- The bell-mouth radii of intersections along the internal roads should be at least 15m to accommodate the turning movements of trucks and buses. Turning circles of minimum 30m diameter should be provided on the internal road network where the turning around of large vehicles is anticipated, e.g. trucks transporting race cars.
- Based on the SDP, the proposed accesses and internal road network appears to be adequate for emergency vehicles (e.g. ambulance, fire brigade) and service vehicles (e.g. refuse truck) to access the various facilities located in the Motorsport Arena.

- The SDP does not indicate how access will be provided to the Alternative Energy area which will accommodate a Solar PV facility. The vehicle trip generation of such a development is low and is typically limited to maintenance vehicles that will access the site on a day-to-day basis. Access could therefore be provided via a 4m wide gravel access road from Mossdustria's internal road network, via the Motorsport Arena or from the PetroSA access road located to the west of the site.

5.2 Access Separation

Consideration was given to the spacing of the new primary access intersection on the R327 serving the Motorsport Arena and related businesses. The primary access will have a 995m (approximate) spacing to the north to the R327/Unicorn Street intersection, and a 1445m (approximate) spacing to the south to the N2/R327 intersection.

According to the *South African Road Classification and Access Management Manual*, TRH 26 (COTO, 2018), access to property should not be allowed on a Rural Class 3 Minor Arterial road such as the R327. The manual does however state that access to property may be considered by the road authority if the property is sufficiently large to warrant its own access intersection, and there is no present or future need to provide a public road intersection. The proposed Motorsport Arena and related businesses land-use component of the development is considered to meet this requirement and therefore, based on the planned spacing of the new primary access intersection on the R327, the position is supported.

5.3 Sight Distance Requirements

According to the Department of Transport's guideline for the *Geometric Design of Rural Roads*, TRH17 (DOT, 1988), for a road with a speed limit of 100km/h, e.g. the R327, the minimum shoulder sight distance required along the main road at a Stop controlled intersection for a passenger car and a heavy vehicle (e.g. single unit truck and trailer) is 225m and 420m respectively.

A site inspection indicated that the available shoulder sight distances in the northerly and southerly directions along the R327 at the primary vehicle access point to the proposed Motorsport Arena are in excess of 420m, and therefore exceed the minimum sight distance requirements for a passenger car and heavy vehicle for a 100km/h speed limit. The proposed access location is therefore considered acceptable in terms of the sight distance requirements.

Based on the planned future development of the land to the west of the R327 between Mossdustria and the N2, as shown in Figure 4-1, consideration should be given to the reduction of the speed limit on the R327 as the area develops and vehicle volumes increase. A speed limit reduction from 100km/h to 80km/h on the R327 would for example reduce the minimum shoulder sight distance requirements at the access intersections and improve general road safety for all road users along this road section.

It is recommended that a minimum shoulder sight distance of 300m be maintained for single unit trucks at the site's primary vehicle access point on the R327 during the construction phase, by ensuring there are no objects (temporary road signs, dirt bins, etc.) present that can obstruct the sight distances of construction vehicles exiting the site.

6 EXISTING AND FUTURE PEAK HOUR TRAFFIC

6.1 Historical Traffic Data

Two traffic data sources were consulted to gain insight into historical traffic flow trends in the study area on the N2 and R327.

Count Station 727 Mossgas (SANRAL):

Count Station 727 Mossgas was located on the N2, approximately 290m west of the R327 intersection. Liaison with Mikros and SANRAL during March 2023 confirmed that Count Station 727 is no longer active and was removed from site, but historical traffic data is available for this station up to February 2019. Below is a summary of the key 2019 statistics for this station:

- Average Daily Traffic (ADT) = 8482 vehicles
- Annual Average Daily Traffic (AADT) = 1155 vehicles
- % Heavies = 13.6%
- Average Speed = 96.1km/h
- 85th Percentile Speed = 108km/h
- Highest Volume Date = 15 February 2019 (Friday)
- Highest Volume Time = 17:00
- Highest Hourly Volume = 1058 vehicles

Count Station 2266C (Western Cape Government):

The Western Cape Government's Road Network Information System website contains historical traffic data for Count Station 2266C, which is located on the R327 (MR00342) at the intersection with the N2. Historical traffic data is available for this station up to February 2020 and is enclosed in Appendix A. Below is a summary of the key statistics as counted on Tuesday 18 February 2020 at this station:

- Annual Average Daily Traffic (AADT) = 2002 vehicles
- % Heavies = 11.7%
- Highest Volume Time = 14:00 – 15:00
- Highest Hourly Volume = 181 vehicles

6.2 Base Year Traffic (2023)

Based on the available count station data, it was concluded that a Friday afternoon is the peak period for traffic on the N2, which is the highest order road in the study area.

Traffic counts of 2-hour durations were undertaken on Friday afternoon (PM), 3 March 2023, and Saturday morning (AM), 4 March 2023, to determine the peak hour traffic volumes and heavy vehicle presence on these typical days at the following intersections in the study area:

- National Road N2 / Provincial Road R327
- Provincial Road R327 / Unicorn Street

The Friday PM peak hour was identified to occur between 15:45 and 16:45 while the Saturday AM peak hour occurs between 11:45 and 12:45. Given the absence of traffic signals at either of the intersections in the study area, traffic flow was not impacted by loadshedding during the time of the traffic surveys. The 2023 Friday PM and Saturday AM traffic count data is contained in Appendix B.

The traffic volumes for the Friday PM and Saturday AM peak hours for the 2023 Base Year, as determined from the traffic survey, is shown in Figure 6-1.

6.3 Traffic Growth

The Mossdustria Industrial / Raceway Development will be completed and become operational during the next five years. The Design Horizon specified for a TIA in the *South African Traffic Impact and Site Traffic Assessment Manual,* TMH16 (COTO, 2012) is five years, hence the Design Horizon for this TIA is 2028.

The *South African Trip Data Manual,* TMH17 (COTO, 2013) provides estimates of traffic growth rates ranging from low growth areas (0 – 3% p.a.), average growth areas (3 – 4% p.a.) and above average growth areas (4 – 6% p.a.). Mossdustria is not fully developed at present and future growth in traffic can be expected in the study area.

Given the availability of the historical count station traffic data for the N2 and R327, it was possible to calculate annual traffic growth rates for both roads. The Count Station 2266C data indicates annual traffic growth rates of +1.31% and +1.85% on the respective legs of the N2 at the R327 intersection. An average annual traffic growth rate of +1.6% was calculated and applied to N2 through traffic up to the 2028 Design Horizon.

The Count Station 2266C data indicates an annual traffic growth rate of +3.28% for the R327 leg at the N2 intersection. A comparison of the volume of traffic counted on the R327 during the 2023 Friday PM peak hour and the same 1-hour period of the 2020 Count Station 2266C data revealed a very similar annual growth rate over the 3-year period:

- Comparable Peak 1-hour Period = 16:00 – 17:00

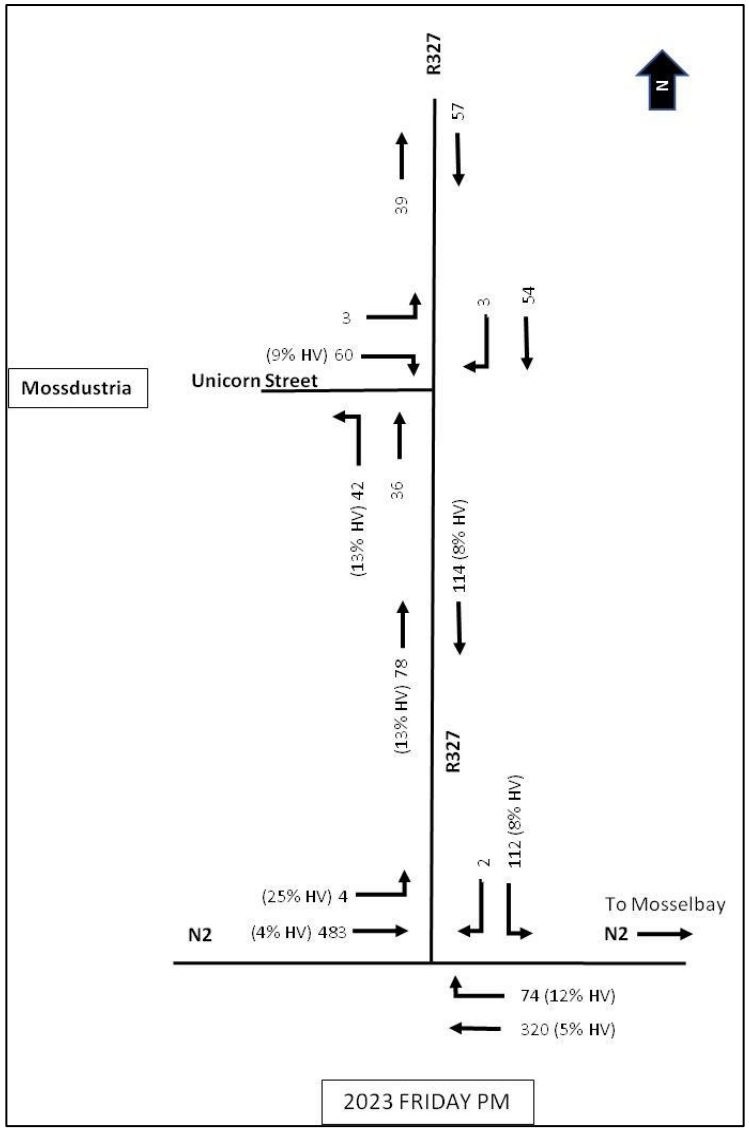
- 2023 Traffic Volume on R327 = 184 vehicles
- 2020 Traffic Volume on R327 = 157 vehicles
- Annual Growth Rate over 3-years = +3.22%

Based on the above, an average annual traffic growth rate of +3.25% was calculated and applied to the R327 traffic up to the 2028 Design Horizon. The calculated growth rate compares well to the 3% - 4% range recommended for average growth areas in the TMH17 Manual, and should adequately provide for general traffic growth in the study area as Mossdustria is fully developed up to the 2028 Design Horizon.

6.4 Background and Design Year Traffic (2028)

The future (2028) Friday PM and Saturday AM peak hour escalated background traffic resulting from the normal annual traffic growth over the 5-year period is shown in Figure 6-2.

The escalated background traffic was used with the addition of the new development traffic to assess the affected intersections within the study area for the 2028 Design Year, as shown in Figure 7-2.



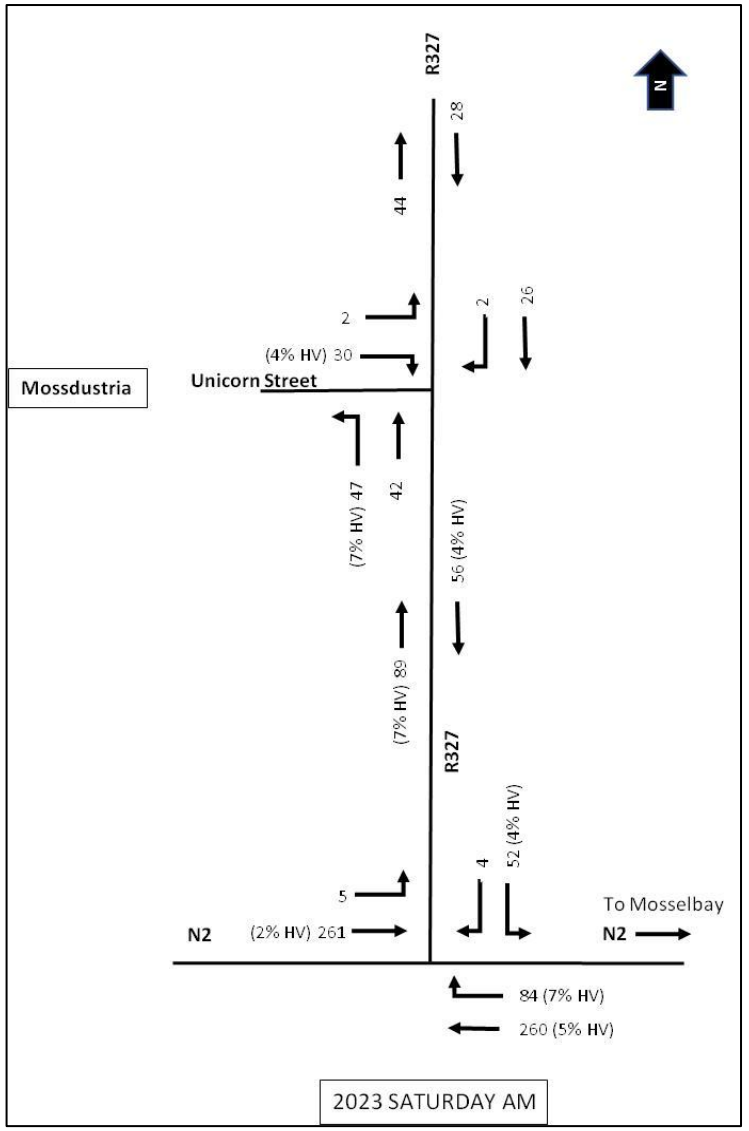


Figure 6-1: 2023 Base Year Friday PM (15:45 – 16:45) and Saturday AM (11:45 – 12:45) Peak Hour Traffic Volumes

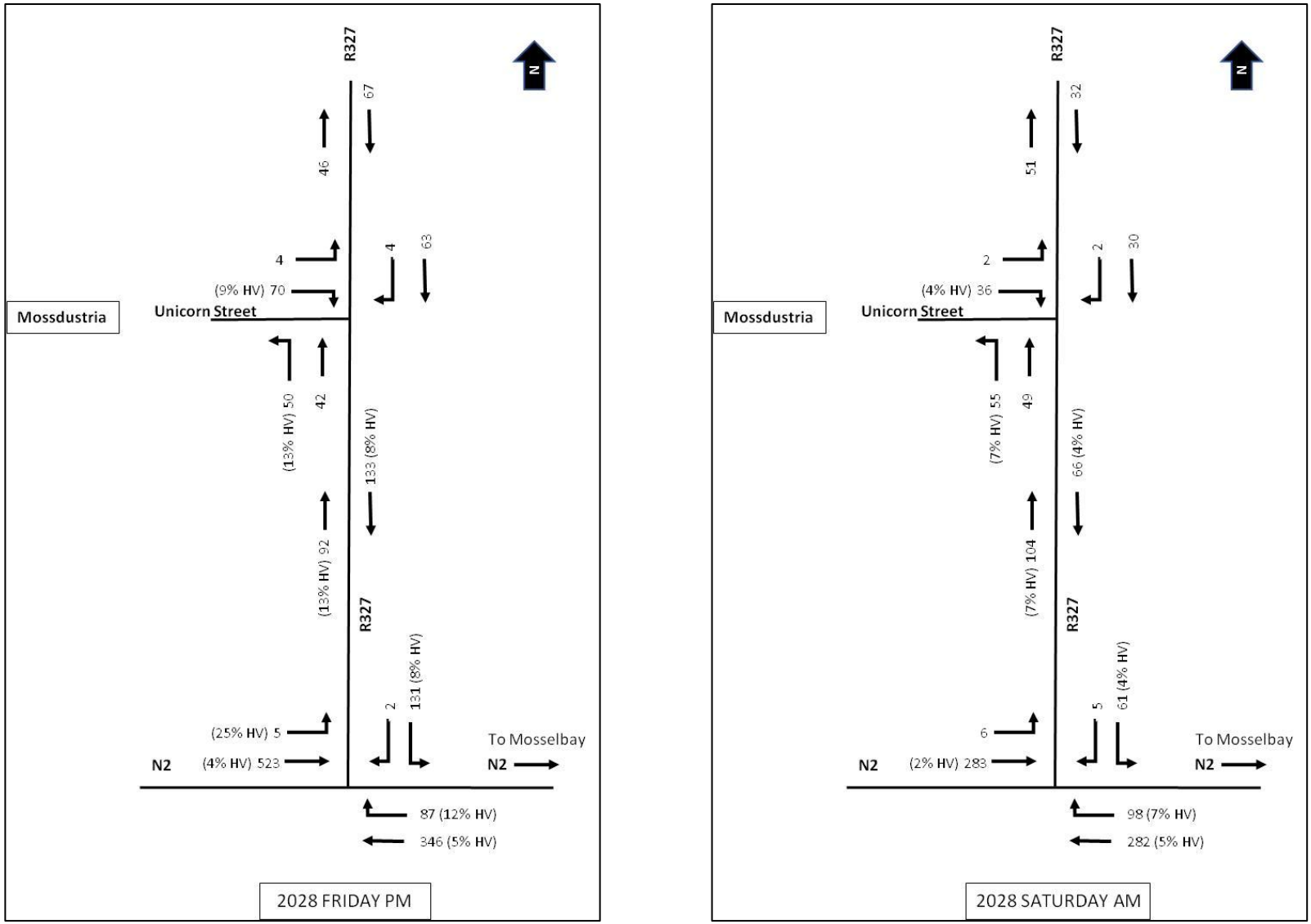


Figure 6-2: Escalated Background Traffic: 2028 Friday PM and Saturday AM Peak Hour Traffic Volumes

7 TRIP GENERATION AND DISTRIBUTION

7.1 Development Traffic

Based on the SDP shown in Figure 1-2, the proposed Mossdustria Industrial / Raceway Development will consist of the following land-use components (and sizes), each having their own peak hour vehicle trip generation characteristics:

- Industrial Expansion (13 ha)
- Motorsport Arena (38 ha)
- Conservation (15 ha)
- Alternative Energy (22 ha)

The *South African Trip Data Manual,* TMH17 (COTO, 2013) was used as far as possible to determine the potential peak hour vehicle trip generation for the respective development components. Due to the absence of essential information like the Gross Leasable Area (GLA) of the proposed industrial and business erven, the peak hour vehicle trip generation was calculated based on the trip generation characteristics observed at Mossdustria during the 2023 traffic counts, which is discussed below.

Industrial Erven:

The TMH17 trip rates for an Industrial Area (Code 130) can be applied to the Industrial Expansion area, and consists of the following:

- Weekday PM: 0.8 trips / 100m^2 GLA with directional spilt = 25 / 75
- Saturday: 0.4 trips / 100m^2 GLA with directional spilt = 30 / 70

However, given the absence of GLA information for the 27 industrial erven proposed, the TMH17 rate cannot be easily applied and an alternative method was followed.

The cadastral plan for Mossdustria indicates that the area consists of 80 industrial erven. The latest aerial imagery (Google Earth, dated 20 November 2022) for Mossdustria indicates that 56 erven are currently developed, with 29 erven being vacant. This represents a 70% uptake of the erven available in Mossdustria, which generates vehicle trips during the respective peak traffic periods.

Given that the GLA of the existing industrial buildings in Mossdustria is unknown, a trip generation rate (refer to Table 7-1) per developed erf was calculated for the Friday PM and Saturday AM peak traffic periods based on the 2023 traffic count data for the R327 / Unicorn Street intersection, which is currently the only access intersection for Mossdustria.

Table 7-1: Industrial Erven: Calculated Peak Hour Vehicle Trip Generation

Land Use	No. of Erven	Peak Hour Trip Rate	Direction Split % (IN / OUT)	Friday PM Peak Hour			Saturday AM Peak Hour		
				No. of Trips	IN	OUT	No. of Trips	IN	OUT
Industrial Erven (Mossdustria)	56*	1.93 trips / erf (Friday PM)	40 / 60 (Friday PM)	108	45	63	-	-	-
		1.45 trips / erf (Saturday AM)	60 / 40 (Saturday AM)	-	-	-	81	49	32

* Based on 56 developed erven in Mossdustria, i.e. 70% land uptake.

Motorsport Arena

The TMH17 trip rates for an Amusement Park (Code 480) can be applied to the Motorsport Arena since the function and trip generation characteristics of these two land-uses are considered similar, as shown in Table 7-3. The Amusement Park trip rates are as follow:

- Weekday PM: 10 trips / 1 ha with directional spilt = 60 / 40
- Saturday: 47 trips / 1 ha with directional spilt = 60 / 40

The arrival and departure times of traffic at the Motorsport Arena will depend on the opening and closing times of events held at the arena, which is currently unknown. Based on similar motoring events held elsewhere in South Africa it was assumed that the events are held on a Friday evening (17:00 – 21:00) and on a Saturday afternoon / evening (14:00 – 21:00).

Spectator traffic would typically arrive over a 2-hour period before the event start and depart over a 1-hour period at the event close. The arrival rate of spectator traffic was assumed to be 30% in the first hour and 70% in the second hour, with 100% of spectator traffic departing in the 1-hour period after the event close. These assumptions were applied to the distribution of the traffic generated by the Motorsport Arena to assess how the arrival of spectator traffic would coincide with the peak traffic periods analysed, as shown in Table 7-2.

Table 7-2: Motorsport Arena: Spectator Traffic impact on Peak Traffic Periods

	Timeline			
	Spectator Arrival		**Event Duration**	**Spectator Departure**
Friday Evening Event	15:00 – 16:00 (1hr)	16:00 – 17:00 (1hr)	17:00 – 21:00 (4hrs)	21:00 – 22:00 (1hr)
Generated Vehicle Traffic (%)	30%	70%	0%	100%
Friday PM Peak Traffic Period		15:45 – 16:45 (1hr)		
Saturday Afternoon / Evening Event	12:00 – 13:00 (1hr)	13:00 – 14:00 (1hr)	14:00 – 21:00 (7hrs)	21:00 – 22:00 (1hr)
Generated Vehicle Traffic (%)	30%	70%	0%	100%
Saturday AM Peak Traffic Period	11:45 – 12:45 (1hr)			

Therefore, for a Friday evening event, 70% of the Motorsport Arena traffic (spectator traffic) was allocated to the Friday PM peak traffic hour for analysis purposes, whilst for a Saturday afternoon / evening event, 30% of spectator traffic was allocated to the Saturday AM peak traffic hour, which is also reflected in Table 7-3.

Motorsport Arena: Business Erven:

The SDP indicates that 11 business erven will be located at the primary access intersection. Current indications are that these businesses will be motoring related, e.g. vehicle sales, parts sale, etc. The TMH17 trip rates for Motor Dealerships and Parts Sales (Code 841) can be applied to the 11 business erven, and consists of the following:

- Friday PM: 2.3 trips / 100m^2 GLA with directional spilt = 50 / 50
- Saturday: 2.2 trips / 100m^2 GLA with directional spilt = 45 / 55

Based on the size of the 11 business erven, comparisons with other similar land-use erven were made and the following assumptions applied based on typical Town Planning guidelines:

- Erf size = 1000m^2
- Coverage = 80%
- GLA = 80% of coverage = 640m^2 / business erf

Given that the 11 business erven are located in the Motorsport Arena, it is considered appropriate to assume that the number of trips generated by the business erven are included in the trip generation of the Motorsport Arena, as shown in Table 7-3, since visitors to the business erven will in all likelihood also be visitors to the Motorsport Arena and vice-versa.

Conservation Area:

No vehicle trip generation is anticipated for the Conservation Area during the peak traffic periods analysed.

Alternative Energy Area:

The Alternative Energy area will accommodate a Solar PV facility. The vehicle trip generation of such a development is generally low and is typically limited to maintenance vehicles that will access the site on a day-to-day basis. No vehicle trip generation is however anticipated for this land-use during the peak traffic periods analysed.

Reduction for Public Transport:

The TMH17 Manual makes provision for vehicle trip reduction factors for developments located within a reasonable walking distance to public transport nodes or stops on a corridors. Observations during the 2023 traffic count confirmed the presence of public transport (minibus taxis) serving Mossdustria, travelling to / from Mossel Bay via the R327 and N2.

It is therefore assumed that the current public transport services will remain operational up to the 2028 Design Year, and that the new Industrial Expansion area and Motorsport Arena will also be served by public transport, in which case a 15% trip reduction factor can be applied to the development traffic, as shown in Table 7-3.

Trip Generation Summary:

The potential peak hour vehicle trip generation for the respective development components are summarised in Table 7-3, along with an indication of whether a TMH17 trip rate or a calculated trip rate was applied.

Table 7-3: Summary of Peak Hour Vehicle Trip Generation

Land Use	Area / GLA / Units	Peak Hour Trip Rate	Direction Split % (IN / OUT)	Friday PM Peak Hour			Saturday AM Peak Hour		
				No. of Trips	IN	OUT	No. of Trips	IN	OUT
a) Industrial Expansion	13 ha (130 000m^2) / 27 Erven	1.93 / erf * (Friday PM)	40 / 60 (Friday PM)	52	21	31	-	-	-
		1.45 / erf * (Saturday AM)	60 / 40 (Saturday AM)	-	-	-	39	23	16
	Less 15% reduction for public transport availability			**44**	**18**	**26**	**33**	**20**	**13**
b) Motorsport Arena (TMH17: 480 Amusement Park)	38 ha (380 000m^2)	10 / 1 ha (PM)	60 / 40	380	228	152	-	-	-
		47 / 1 ha (Saturday)		-	-	-	1786	1072	714
	Adjustment for spectator trip allocation to Peak Traffic Period (70% for Friday PM and 30% for Saturday AM)			*266*	*160*	*106*	*536*	*322*	*214*
	Less 15% reduction for public transport availability			**226**	**136**	**90**	**456**	**274**	**182**
Motorsport Arena: Business Erven (TMH17: 841 Motor Dealership, including parts sales), *included in Motorsport Arena trips above*	11 Erven (640m^2 GLA / erf)	2.3 / 100m^2 GLA (Friday PM)	50 / 50 (Friday PM)	162	81	81	-	-	-
		2.2 / 100m^2 GLA (Saturday)	45 / 55 (Saturday)	-	-	-	155	70	85
	Less 15% reduction for public transport availability			**138**	**69**	**69**	**132**	**60**	**72**
c) Conservation	15 ha (150 000m^2)	No vehicle trip generation during peak traffic periods analysed							
d) Alternative Energy	22 ha (220 000m^2)	No vehicle trip generation during peak traffic periods analysed							
Total Development Vehicle Trips (a+b) #				**270**	**154**	**116**	**489**	**294**	**195**

* Calculated trip rate based on 2023 traffic counts.
# Inclusive of 15% trip reduction factor for public transport nodes or corridors.

7.2 Trip Distribution

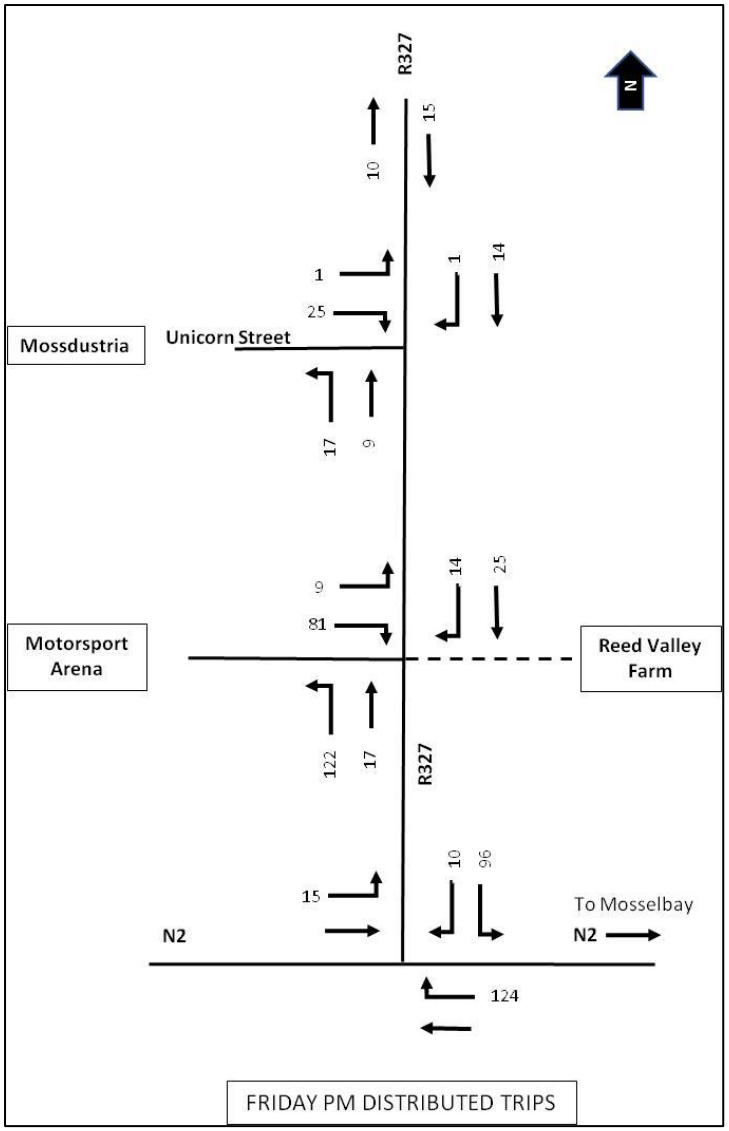
The trips generated by the Industrial Expansion erven would travel to / from this area via Unicorn Street and the R327. The generated trips were split pro-rata to the existing traffic patterns observed at the R327 / Unicorn Street and N2 / R327 intersections, which results in approximately 5% travelling to / from the north via the R327, approximately 90% travelling to / from the east (Mossel Bay) and approximately 5% travelling to / from the west (Albertinia and Riversdale) during the Friday PM and Saturday AM peak traffic periods.

The trips generated by the Motorsport Arena would travel to / from the new venue access via the R327 and the N2. Based on the traffic patterns observed on the N2 during the 2023 traffic counts, the east-west directional split of the N2 traffic was found to be relatively well balanced, especially during the Saturday AM peak traffic hour.

However, considering the travel distance from the Motorsport Arena to the nearest urban towns, which is approximately 10km to the Mossel Bay CBD, 40km to Albertinia and 75km to Riversdale respectively, the trips generated by the Motorsport Arena were split relative to the distance of these towns from the venue, since spectator traffic would primarily travel to / from these urban centres.

The generated trips was therefore distributed with 10% travelling to / from the north via the R327, 80% travelling to / from the east (Mossel Bay) and 10% travelling to / from the west (Albertinia and Riversdale) during the Friday PM and Saturday AM peak traffic periods.

The distribution and assignment of the development generated peak hour traffic onto the adjacent road network for the Friday PM and Saturday AM peak traffic hours is show in Figure 7-1. The resultant 2028 Design Year traffic, consisting of the escalated background traffic plus the new development traffic, is shown in Figure 7-2.



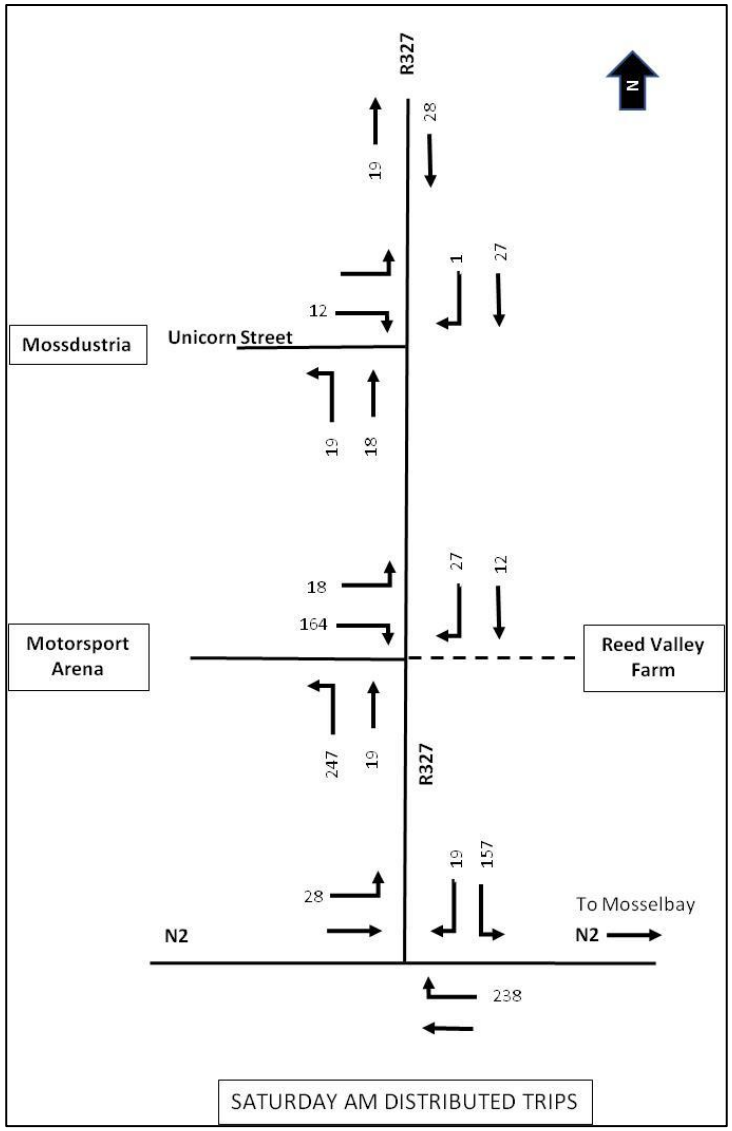


Figure 7-1: Friday PM and Saturday AM Peak Hour Development Trip Distribution

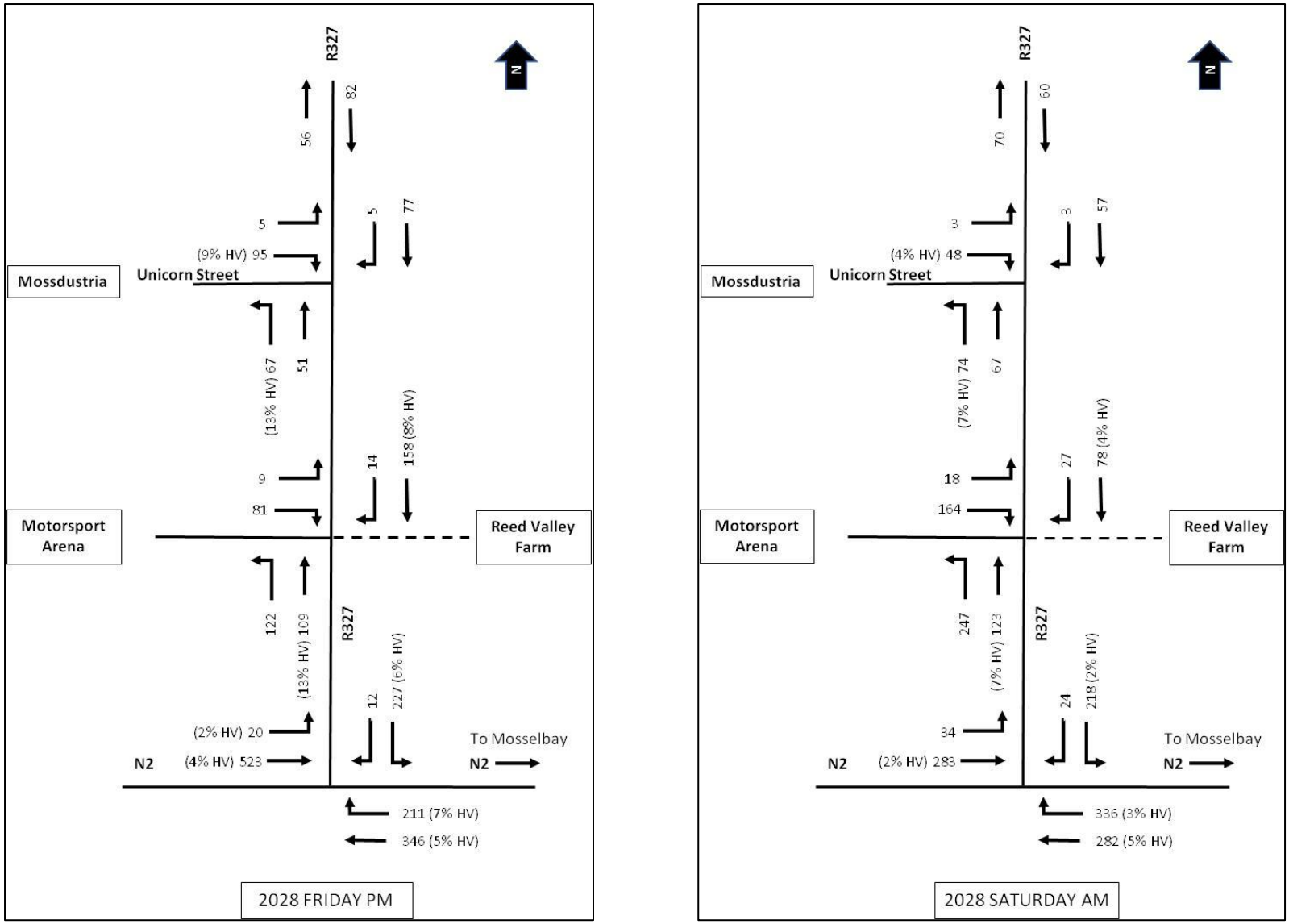


Figure 7-2: 2028 Design Year Friday PM and Saturday AM Peak Hour Traffic Volumes

8 INTERSECTION OPERATIONAL ANALYSIS

An operational analysis was undertaken with the SIDRA computer software package for the 2023 base year and 2028 design year Friday PM and Saturday AM peak periods for each of the affected intersections shown in Table 8-1, to determine whether any road improvements are necessary.

SIDRA analyses was completed for the following traffic scenarios:

- 2023 Base Year Traffic (Excluding Development Traffic) - Figure 6-1
- 2028 Design Year Traffic (Excluding Development Traffic) - Figure 6-2
- 2028 Design Year Traffic + Mossdustria Development Traffic - Figure 7-2

The Level of Service (LOS) is a measure that is used to assess the operation of existing transportation infrastructure, as well as the effectiveness of proposed infrastructure improvements. LOS is categorised by the letters A to F (with A being the best and F being the worst) based on the average control delay experienced by vehicles on the section of roadway under investigation. The following is a description of the LOS represented by each letter from A to F:

A = Free Flow
B = Reasonable Free Flow
C = Stable Flow
D = Approaching Unstable Flow
E = Unstable Flow
F = Forced or Breakdown Flow

A summary of the Level of Service (LOS) at each intersection for each traffic scenario analysed is shown in Table 8-1 for the Friday PM and Saturday AM peak hours, respectively. The detailed output from the SIDRA analysis is contained in Appendix C.

Note that SIDRA does not calculate the overall intersection LOS for two-way stop-controlled intersections, therefore the LOS of the most critical movement at each of these intersections is shown. Refer to the SIDRA appendix for the LOS of each individual movement.

A diagrammatic sketch of the existing and proposed intersection layouts for each of the analysed intersections on which the SIDRA analysis is based is included in the SIDRA appendix.

Based on the SIDRA analysis it was determined that some of the intersections analysed require geometric intersection or road upgrading over the next five years to accommodate the peak hour traffic generated by the proposed development, as specified below.

8.1 National Road N2 / Provincial Road R327 Intersection

The SIDRA results for the 2023 Base Year indicate that this intersection currently operates with minimal overall delay during both the Friday PM and Saturday AM peak hours. During the Friday PM peak hour, the worst movement operates at a LOS D which applies to two vehicles turning right from the R327 to the N2. Similarly, during the Saturday AM peak hour, the worst movement operates at a LOS C which applies to four vehicles turning right from the R327 to the N2.

Table 8-1: Intersection Level of Service and Average Vehicle Delay (Seconds)

Intersection	Peak Hour Traffic Period															
	2023 Base Year				2028 Design Year (Excl. Development Traffic)				2028 Design Year + Development Traffic							
	Existing Intersection Layout				Existing Intersection Layout				Existing Intersection Layout				Proposed Intersection Layout			
	FRIDAY PM		SATURDAY AM		FRIDAY PM		SATURDAY AM		FRIDAY PM		SATURDAY AM		FRIDAY PM		SATURDAY AM	
	LOS*	Delay	LOS*	Delay	LOS*	Delay	LOS*	Delay	LOS*	Delay	LOS*	Delay	LOS*	Delay	LOS*	Delay
N2 / R327	D	2.1	C	1.9	E	2.4	C	2.0	F	4.6	E	5.6	E	3.6	D	4.8
R327 / Unicorn Street	A	4.0	A	3.6	A	4.1	A	3.7	A	4.3	A	3.5	-	-	-	-
R327 / Motorsport Arena Access	-	-	-	-	-	-	-	-	-	-	-	-	B	3.9	B	6.1

* LOS of most critical movement at intersection

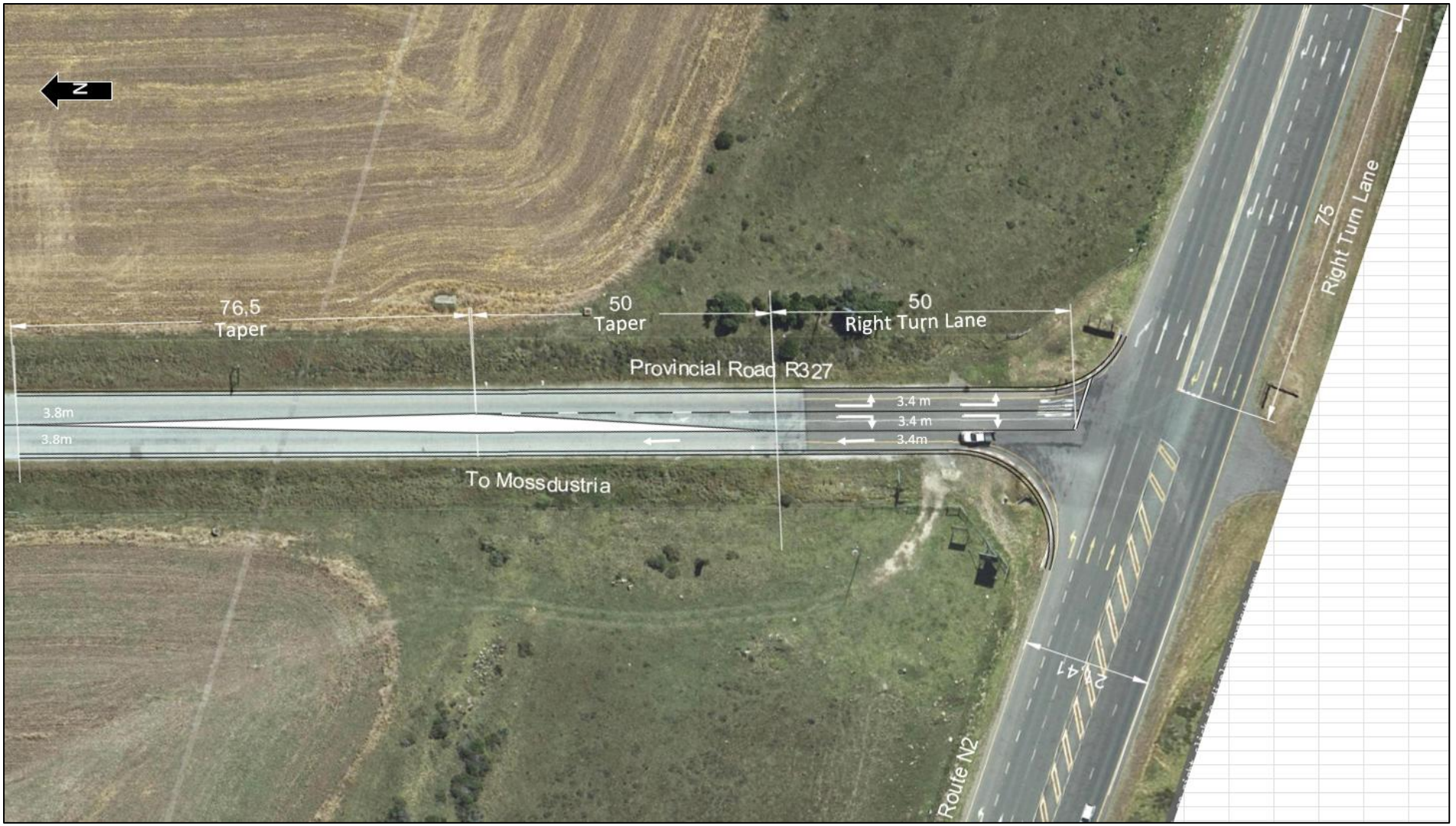


Figure 8-1: Proposed R327 / N2 Intersection Layout

The SIDRA results for the 2028 Design Year, excluding any development traffic, indicate that this intersection will continue to operate with minimal overall delay, but the LOS for the right turning traffic from the R327 to the N2 will worsen to a LOS E during the Friday PM peak.

With the addition of development traffic in the 2028 Design Year, the intersection will operate with minimal overall delay, but the LOS for the right turning traffic from the R327 to the N2 will worsen to a LOS F during the Friday PM peak hour, and a LOS E during the Saturday AM peak hour. Vehicle queuing will however be limited during the Friday PM and Saturday AM peak hours.

In view of the above, it is recommended that the R327 approach to the N2 be upgraded by introducing a left turn slip lane (50m length) that can link to the existing eastbound acceleration taper on the N2, and a separate right turn lane, as shown in Figure 8-1.

The SIDRA results for the 2028 Design Year, including development traffic and based on the upgraded intersection layout, indicate that this intersection will operate with minimal overall delay, and the LOS for the right turning traffic from the R327 to the N2 will improve to a LOS E during the Friday PM peak hour, and a LOS D during the Saturday AM peak hour. Vehicle queuing will remain limited during the Friday PM and Saturday AM peak hours.

8.2 Provincial Road R327 / Unicorn Street Intersection

The SIDRA results for the 2023 Base Year indicate that this intersection currently operates with minimal overall delay with no movement at a LOS worse than A during both the Friday PM and Saturday AM peak hours.

The SIDRA results for the 2028 Design Year, excluding any development traffic, indicate that this intersection will continue to operate with minimal overall delay, with no movement at a LOS worse than A during both the Friday PM and Saturday AM peak hours.

With the addition of development traffic in the 2028 Design Year, the intersection will operate with minimal overall delay, with no movement at a LOS worse than A during both the Friday PM and Saturday AM peak hours. No vehicle queuing problems are anticipated at this intersection.

8.3 Provincial Road R327 / Motorsport Arena Access Intersection

The SIDRA results for the 2028 Design Year, including development traffic and based on the proposed access intersection layout, indicate that this intersection will operate with minimal overall delay and no movement at a LOS worse than B during both the Friday PM and Saturday AM peak hours. Limited vehicle queuing is anticipated on the Motorsport Arena access road.

8.4 Post-event Motorsport Arena Departing Spectator Traffic

Given the unique nature of the vehicle trip generation characteristics of the proposed Motorsport Arena, an operational analysis was undertaken of the two intersections that would be impacted most by departing spectator traffic over a 1-hour period at the event close, i.e. 21:00 – 22:00 on a Friday and Saturday evening, as shown in Table 8-2.

This is considered an important test to assess how the Motorsport Arena's primary access intersection and the upgraded N2 / R327 intersection layout will operate during this 1-hour period. During this period other non-event traffic will be at a minimum. The detailed output from the SIDRA analysis is contained in Appendix C.

The SIDRA results indicate that the Motorsport Arena's primary access intersection will operate with minimal overall delay and no movement at a LOS worse than A and C during the Friday PM and Saturday PM post-event periods, respectively. Excessive vehicle queuing is however anticipated on the Motorsport Arena access road during the Saturday PM post-event period as spectator vehicles depart the area, which is typical of large public events.

The SIDRA results furthermore indicate that the upgraded N2 / R327 intersection layout will operate with minimal overall delay and no movement at a LOS worse than A during the Friday PM and Saturday PM post-event periods. Limited vehicle queuing is anticipated on the R327.

Table 8-2: Motorsport Arena Departing Traffic: Intersection LOS and Average Vehicle Delay (Seconds)

Intersection	**Peak Hour Traffic Period (21:00 – 22:00)**			
	2028 Motorsport Arena Departing Spectator Traffic			
	Proposed Intersection Layout			
	FRIDAY PM		**SATURDAY PM**	
	LOS*	**Delay**	**LOS***	**Delay**
R327 / Motorsport Arena Access	A	8.0	C	15.4
N2 / R327	A	4.1	A	5.9

* LOS of most critical movement at intersection

9 PARKING

The Site Development Plan indicates that on-site parking will be provided for the Motorsport Arena, and although not indicated on the SDP, it is specified that 2 600 parking bays will be provided. On-site parking will also be required for the Industrial Expansion erven.

The Department of Transport's *Parking Standards (PG3/85), Second Edition* (DOT, 1985) specifies the required on-site parking rates for various land-uses, which can be applied to the proposed development as follow:

- Industrial: Manufacturing / Warehousing = 1 bay / 100m^2 GLA
- Business: Single Shops = 6 bays / 100m^2 GLA (Mosselbay Municipality requires minimum 4 bays / 100m^2)
- Public Garages: Spares Sales = 2 bays / 100m^2 GLA

The DOT Manual does not specify minimum parking requirements for a public event land-use like the proposed Motorsport Arena. It is therefore recommended that the minimum on-site parking provision for the Motorsport Arena should cater for the maximum number of inbound vehicle trips anticipated for an event, which will be for a Saturday afternoon / evening event:

- On-site parking provision (minimum) = 1072 inbound trips – 15% Public Transport reduction = 911 bays

The provision of 2 600 parking bays at the Motorsport Arena would therefore exceed the minimum on-site parking requirement of 911 bays recommended for the Motorsport Arena, which is considered adequate.

Parking bays for passenger vehicles should be a minimum of 2.5m wide and 5m deep (for 90^o parking bays) with a 7m (minimum) wide aisle and 3.5m wide for a mobility impaired parking space, which should also be provided in strategic locations at the venue.

10 PEDESTRIAN AND PUBLIC TRANSPORT FACILITIES

Site observations indicate that Mossdustria is currently served by public transport, although there are no formal public transport stops visible along the N2, the R327 or Mossdustria's internal road network. There are also no formal pedestrian walkways present along the N2, the R327 or in Mossdustria.

In view of the proposed Industrial Expansion in Mossdustria and the proposed Motorsport Arena, which will both be served by public transport, it is recommended that formal public transport stops / embayments, pedestrian walkways, road crossings and street lighting be provided in the vicinity of Unicorn Street and on the Motorsport Arena site, to provide the facilities necessary for pedestrians to safely access these venues.

11 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this TIA are summarised as follows:

1) The Mossdustria Industrial / Raceway Development is proposed in the area to the south of the existing Mossdustria development on Municipal land, bordered to the east by the Provincial Road R327 which intersects with the National Road N2 approximately 2 km to the south. The development will be completed and become operational during the next five years (2028).
2) According to the Mossel Bay Municipality's 2022-2027 IDP, the 'Motorsport Mecca' development is an important catalyst project that will house several motorsport disciplines with the objective of attracting possible events to the area to stimulate the tourism industry.
3) To the south of existing developed portion of Mossdustria, the proposed Industrial Expansion area (27 erven) will be accessible via a southward extension of Barrie Street. The road extension will provide direct property access to the new industrial properties.
4) Access to the Motorsport Arena and related businesses will be provided via two new accesses. The primary access intersection will be located on the R327, opposite the existing access to the Reed Valley Farm. An alternative / emergency access to the Motorsport Arena may be provided from the north via a new link road extension of Barrie Street.
5) The Motorsport Arena's primary access will have a 995m (approximate) spacing to the north to the R327/Unicorn Street intersection, and a 1445m (approximate) spacing to the south to the N2/R327 intersection, which is considered acceptable.
6) The available shoulder sight distances in the northerly and southerly directions along the R327 at the Motorsport Arena's primary access exceed the minimum requirements for a passenger car and heavy vehicle for a 100km/h speed limit. It is recommended that a minimum shoulder sight distance of 300m be maintained for single unit trucks at the site's primary vehicle access point on the R327 during the construction phase, by ensuring there are no objects (temporary road signs, dirt bins, etc.) present that can obstruct the sight distances of construction vehicles exiting the site.
7) The primary access with the R327 should operate under Stop control, with the R327 having priority. The primary access road should have one inbound lane, one outbound right turn lane and one outbound left turn lane, each being 3.4m wide. Right turn lanes (3.1m wide) should be introduced on the R327 to improve the safety of stationary vehicles waiting to turn right at the intersection. The bell-mouth radii of the new access should be at least 15m to accommodate the turning movements of larger heavy vehicles. Should security access control be present at the new access, the checkpoint or gate should be located far enough (20m minimum) from the

western road edge of the R327 so that stationary vehicles (especially large trucks) do not back-up onto the R327 roadway.

8) At the primary access, the road section between the R327 and the proposed traffic circle should provide one inbound and one outbound traffic lane (minimum 3.4m lane width) and an additional 2.5m wide on-street parking lane allowed on both sides of the road to serve the adjacent businesses. The start/end of the parking bays should have a 50m spacing (minimum) from the R327 access. The traffic circle should have an inscribed circle diameter of at least 25m to allow for the turning movements of buses and trucks, which will also allow for two-lane operation by passenger cars.

9) Should an alternative / emergency access to the Motorsport Arena be provided from the north via a new link road extension of Barrie Street, the road should be at least 6.8m wide to provide two 3.4m wide traffic lanes for two-way traffic.

10) The Motorsport Arena's new internal roads should be at least 6.8m wide to provide two 3.4m wide traffic lanes for two-way traffic. The bell-mouth radii of intersections along the internal roads should be at least 15m to accommodate the turning movements of trucks and buses. Turning circles of minimum 30m diameter should be provided on the internal road network where the turning around of large vehicles is anticipated.

11) The Alternative Energy area will accommodate a Solar PV facility. The vehicle trip generation of such a development is generally low and is typically limited to maintenance vehicles that will access the site on a day-to-day basis. Access could therefore be provided via a 4m wide gravel access road from Mossdustria's internal road network, via the Motorsport Arena or from the PetroSA access road located to the west of the site.

12) Given the planned future development of the land to the west of the R327 between Mossdustria and the N2, consideration should be given to the reduction of the speed limit from 100km/h to 80km/h on the R327 as the area develops and vehicle volumes increase, which would reduce the minimum shoulder sight distance requirements at the access intersections and improve general road safety for all road users.

13) The Friday PM peak hour was identified to occur between 15:45 and 16:45 while the Saturday AM peak hour occurred between 11:45 and 12:45 in the study area.

14) The arrival and departure times of traffic at the Motorsport Arena will depend on the opening and closing times of events held at the arena, which is unknown. Based on similar motoring events held elsewhere it was assumed that the events are held on a Friday evening (17:00 – 21:00) and on a Saturday afternoon / evening (14:00 – 21:00).

15) Spectator traffic would typically arrive over a 2-hour period before the event start and depart over a 1-hour period at the event close. The arrival rate of spectator traffic was assumed to be 30% in the first hour and 70% in the second hour, with 100% of spectator traffic departing in the 1-hour period after the event close. These assumptions were applied to the distribution of the traffic generated by the Motorsport Arena to assess how the arrival of spectator traffic would coincide with the peak traffic periods analysed.

16) Observations during the 2023 traffic count confirmed the presence of public transport (minibus taxis) serving Mossdustria, travelling to / from Mossel Bay via the R327 and N2. It was therefore assumed that the current public transport services will remain operational up to the 2028 Design Year, and that the new Industrial Expansion area and Motorsport Arena will also be served by public transport, in which case a 15% trip reduction factor could be applied to the development traffic.

17) The potential peak hour vehicle trip generation for the respective development components are 252 trips during the Friday PM peak hour and 476 trips during the Saturday AM peak hour.

18) Based on the SIDRA analysis it was determined that the N2 / R327 intersection requires geometric upgrading over the next five years to accommodate the peak hour traffic generated by the proposed development combined with normal traffic growth. The R327 approach to the N2 should be upgraded by introducing a left turn slip lane (50m length) that can link to the existing eastbound acceleration taper on the N2, and a separate right turn lane, as shown in Figure 8-1.

19) On-site parking provision for the Industrial Expansion erven should be in accordance with the Department of Transport's Parking Standards. The minimum on-site parking provision for the Motorsport Arena should cater for the maximum number of inbound vehicle trips anticipated at an event, which is calculated as 911 bays. Although not indicated on the SDP, it is specified that 2 600 parking bays will be provided at the Motorsport Arena, which therefore exceeds the minimum on-site parking requirement.

20) It is recommended that formal public transport stops / embayments, pedestrian walkways, road crossings and street lighting be provided in the vicinity of Unicorn Street and on the Motorsport Arena site, to provide the facilities necessary for pedestrians to safely access these venues.

----------ooOoo----------

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APPENDIX A: TRAFFIC COUNT STATION DATA

Traffic Counts

Time	Light	Heavy	Taxis	Buses
00-01h00				
01-02h00				
02-03h00				
03-04h00				
04-05h00	2	2	0	0
05-06h00	12	0	1	0
Sub-Totals	**14**	**2**	**1**	**0**
06-07h00	113	9	24	1
07-08h00	157	17	0	1
08-09h00	104	23	0	0
09-10h00	152	15	0	0
10-11h00	133	28	2	0
11-12h00	141	28	0	0
12-13h00	135	11	2	0
13-14h00	130	12	1	0
14-15h00	134	46	1	0
15-16h00	136	1	8	0
16-17h00	136	15	6	0
17-18h00	145	13	12	0
Sub-Totals	**1616**	**218**	**56**	**2**
18-19h00	46	5	1	0
19-20h00	17	4	0	0
20-21h00	9	3	0	0
21-22h00	6	2	0	0
22-23h00				
23-24h00				
Sub-Totals	**78**	**14**	**1**	**0**
Totals	**1708**	**234**	**58**	**2**

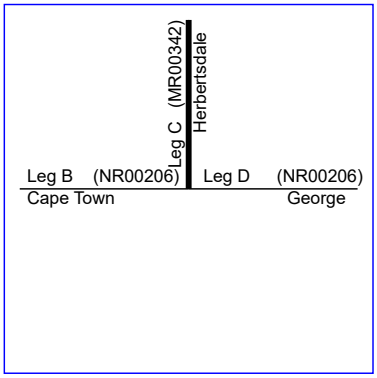
Station AADT's

	Light	Heavy	Taxis	Buses
	1708	**234**	**58**	**2**
Total	**2002**			

Station Data

Station No	**2266C**
Road No	**MR00342**
Km Distance	**0.00**
Count Date	**18/02/2020**
Hours Counted	**18**
Day Counted	**Tuesday**
Counted by	**C**
Expansion Factor	**1.00**
Stratum	**BA**
Peak Hour Ratio	**9.20**
Total AADT	**2002**

Sketch (Click on Leg to Display Data)



Print

Print

Intersection

Diagram

Growth Rate

Growth Rate Chart

Historical Data 1 of 1

< 2020/02/18 >

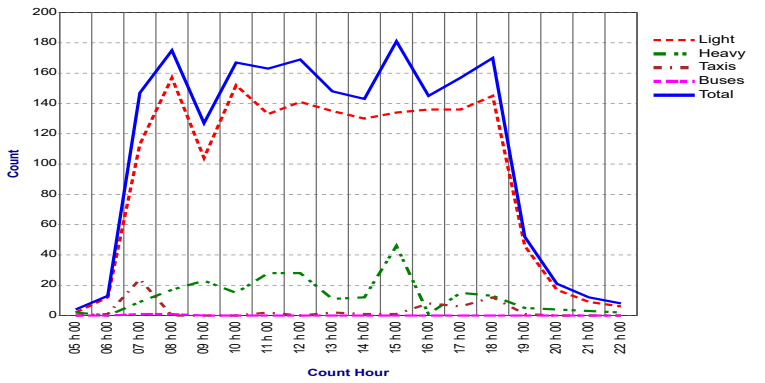
Exit

Station Data

Station Counts Chart

Light Heavy Taxis Buses Total

Stratum Pattern



Western Cape Government

Intersection Diagram

Node- 2266 Leg- C Growth Rate: 3.28 (E)

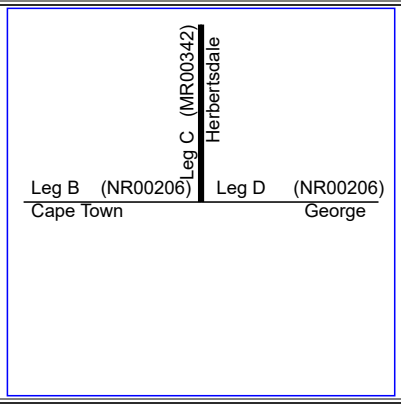
Date	Light	Heavy	Taxis	Buses	Total
18/02/20	1708	234	58	2	2002
10/03/16	1282	154	46	6	1488
18/11/13	1344	146	32	3	1525
20/08/08	1702	223	55	30	2010
14/09/04	867	113	14	13	1007
20/07/00	570	32	9	15	626
14/06/90	435	54			489
02/05/87	119	16			135

Km per Leg

Node	Leg	Road No	Km
2266	B	NR00206	78.14
2266	C	MR00342	0.00
2266	D	NR00206	78.14

Node- 2266 Leg- B Growth Rate: 1.31 (C)

Date	Light	Heavy	Taxis	Buses	Total
18/02/20	6560	1140	42	41	7783
10/03/16	6740	1030	23	52	7845
18/11/13	7212	772	13	38	8035
20/08/08	6459	997	113	73	7642
14/09/04	5267	808	24	30	6129
20/07/00	4307	531	8	26	4872



Node- 2266 Leg- D Growth Rate: 1.85 (C)

Date	Light	Heavy	Taxis	Buses	Total
18/02/20	8059	1267	89	39	9454
10/03/16	7904	1037	56	54	9051
18/11/13	8349	866	46	40	9301
20/08/08	7165	961	138	82	8346
14/09/04	5937	871	36	39	6883
20/07/00	4801	538	17	34	5390

Print Exit

Western Cape Government

Growth Rate Chart

Station Data

Road Number:	**MR00342**
Km Distance:	**0.00**
Growth Rate: (Based on the last 5 available counts)	**3.28 (E)**
Recalculated Growth Rate: (Based on Selected Counts)	**7.20**
Node:	**2266**
Leg:	**C**

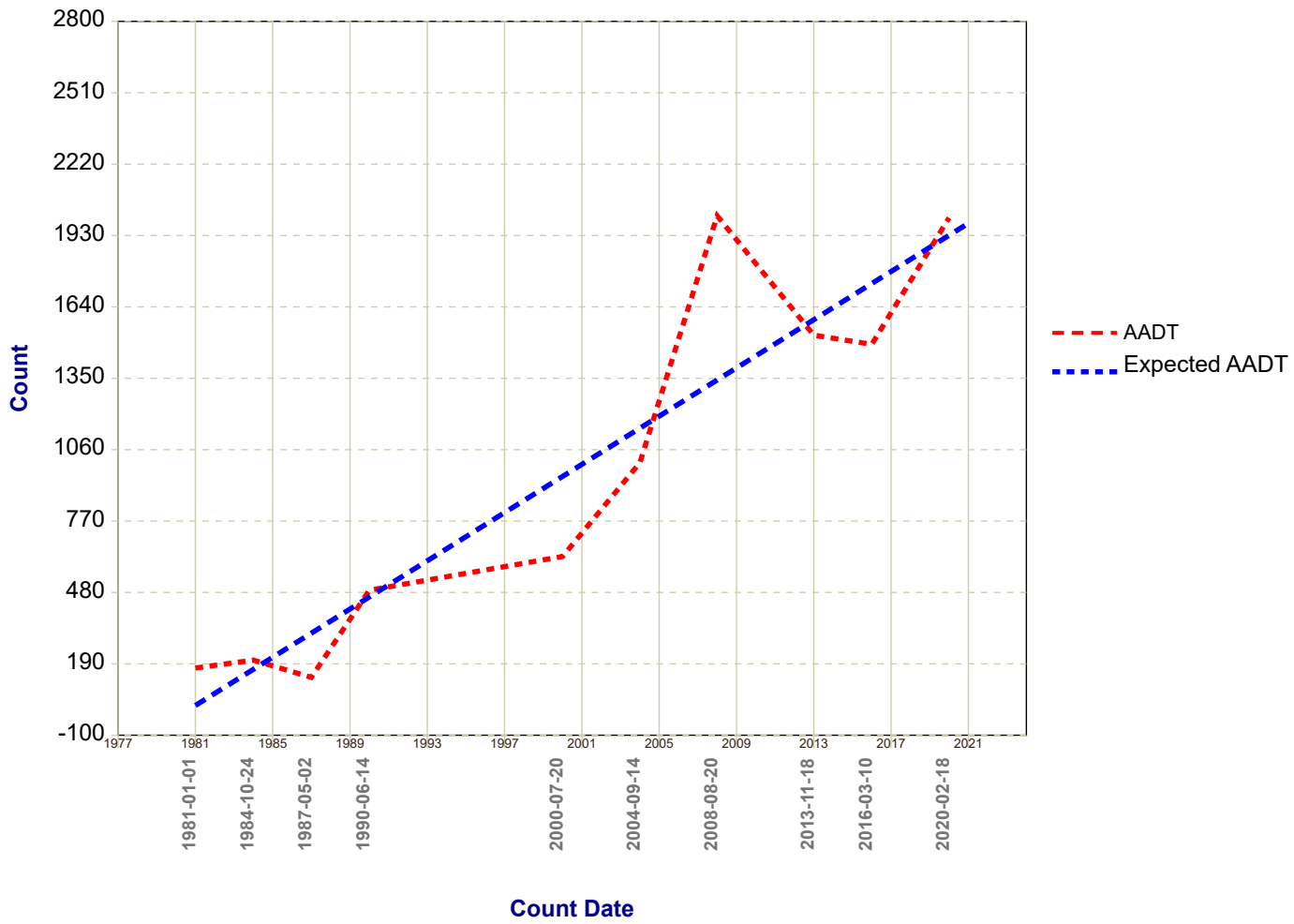
Count Dates

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1981-01-01
1984-10-24
1987-05-02
1990-06-14
2000-07-20
2004-09-14
2008-08-20

Print

Exit



APPENDIX B: 2023 TRAFFIC COUNT DATA

NATION ROAD N2 / PROVINCIAL ROAD R327 INTERSECTION

Period	Road	N2						N2						R327											
	Direction	Eastbound						Westbound						Southbound											
	Movement	L1-Left		S1-Straight						S2 -Straight		R2-Right		L3-Left				R3-Right		L4-Left		S4 -Straight		R4-Right	
	Mode	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus	Car	Truck/ Bus
2023/03/03	15:30 - 15:45	1	1	69	2					67	11	13	4	25	4			0	0						
	15:45 - 16:00	0	0	114	7					69	4	17	5	24	3			0	0						
	16:00 - 16:15	1	1	142	5					95	4	11	3	28	0			1	0						
	16:15 - 16:30	0	0	108	2					68	4	17	1	30	2			1	0						
	16:30 - 16:45	2	0	102	3					71	5	20	0	21	4			0	0						
	16:45 - 17:00	1	1	92	7					82	5	18	3	14	3			1	0						
	17:00 - 17:15	0	0	69	4					90	9	15	1	28	0			1	0						
	17:15 - 17:30	0	0	76	8					49	9	9	2	32	0			2	0						
	Sub-Total	**5**	**3**	**772**	**38**	**0**	**0**	**0**	**0**	**591**	**51**	**120**	**19**	**202**	**16**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	TOTAL	**8**		**810**		**0**		**0**		**642**		**139**		**218**		**0**		**6**		**0**		**0**		**0**	
	% Heavy Veh.	**38%**		**5%**		**#DIV/0!**		**#DIV/0!**		**8%**		**14%**		**7%**		**#DIV/0!**		**0%**		**#DIV/0!**		**#DIV/0!**		**#DIV/0!**	
2023/03/04	11:00 - 11:15	1	0	39	6					56	6	20	1	13	1			0	1						
	11:15 - 11:30	1	0	46	8					69	3	13	1	14	1			2	0						
	11:30 - 11:45	1	0	44	2					60	3	12	1	11	0			0	0						
	11:45 - 12:00	2	0	77	0					72	4	22	2	11	1			2	0						
	12:00 - 12:15	0	0	57	1					64	1	19	0	11	0			0	0						
	12:15 - 12:30	1	0	56	2					63	4	23	2	13	1			1	0						
	12:30 - 12:45	2	0	65	3					49	3	14	2	15	0			1	0						
	12:45 - 13:00	2	1	65	4					61	9	11	0	14	0			2	0						
	Sub-Total	**10**	**1**	**449**	**26**	**0**	**0**	**0**	**0**	**494**	**33**	**134**	**9**	**102**	**4**	**0**	**0**	**8**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
	TOTAL	**11**		**475**		**0**		**0**		**527**		**143**		**106**		**0**		**9**		**0**		**0**		**0**	
	% Heavy Veh.	**9%**		**5%**		**#DIV/0!**		**#DIV/0!**		**6%**		**6%**		**4%**		**#DIV/0!**		**11%**		**#DIV/0!**		**#DIV/0!**		**#DIV/0!**	

APPENDIX C: INTERSECTION LEVEL OF SERVICE ANALYSIS (SIDRA)

Note : A basic saturation flow of 1950 veh/hr/lane was used in all SIDRA runs.

A. NATIONAL ROAD N2 / PROVINCIAL ROAD R327 INTERSECTION

SIDRA ANALYSIS :

1. Existing Intersection Layout (Stop control)

2. 2023 Base Year Friday PM Peak Hour Traffic (Excluding Development Traffic)
3. 2023 Base Year Saturday AM Peak Hour Traffic (Excluding Development Traffic)

4. 2028 Design Year Friday PM Peak Hour Traffic (Excluding Development Traffic)
5. 2028 Design Year Saturday AM Peak Hour Traffic (Excluding Development Traffic)

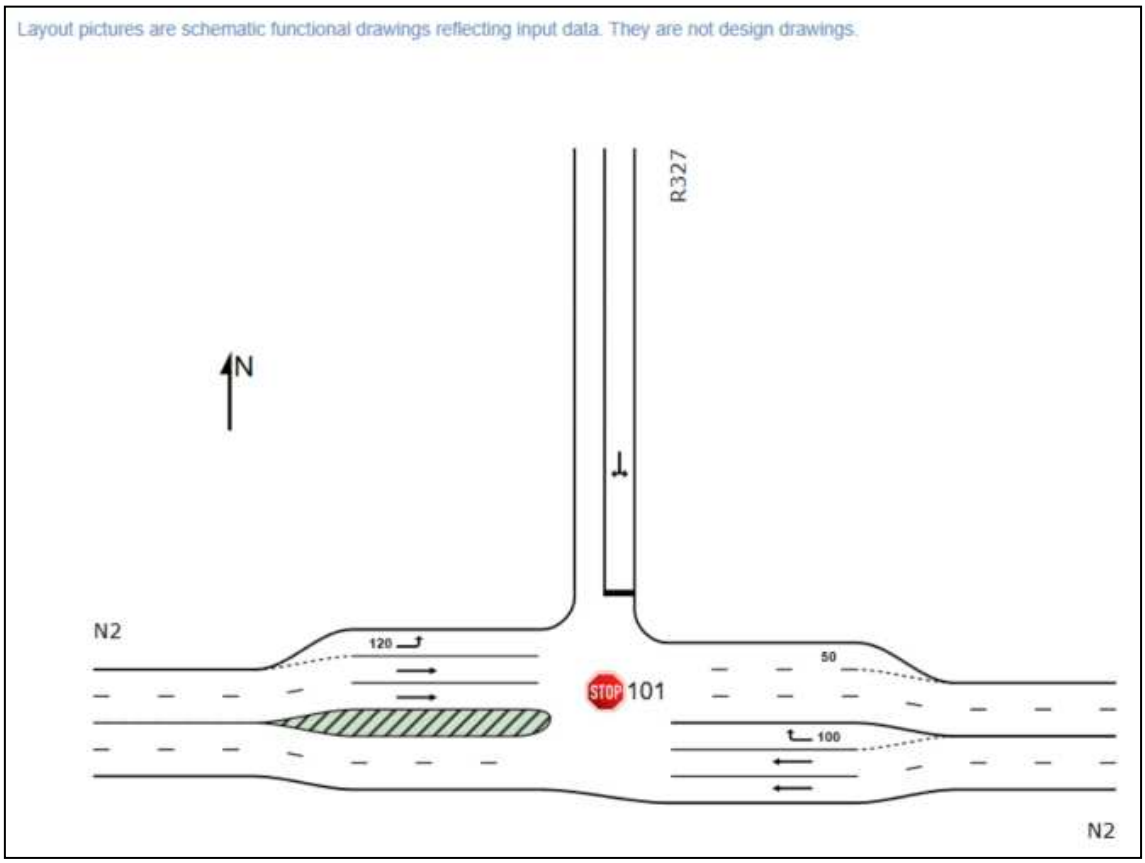
6. 2028 Design Year Friday PM Peak Hour + Development Traffic
7. 2028 Design Year Saturday AM Peak Hour + Development Traffic

8. Proposed Intersection Layout (Stop control)

9. 2028 Design Year Friday PM Peak Hour + Development Traffic
10. 2028 Design Year Saturday AM Peak Hour + Development Traffic

11. 2028 Friday PM Motorsport Arena Departure Traffic
12. 2028 Saturday PM Motorsport Arena Departure Traffic

Existing Intersection Layout



(Stop Control)

MOVEMENT SUMMARY

Site: 101 [2023 Friday PM (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

National Road N2 / Provincial Road R327 Intersection
2023 Friday PM Peak Hour Traffic (15:45 - 16:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	320	5,0	320	5,0	0,085	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	74	12,0	74	12,0	0,150	10,6	LOS B	0,5	3,9	0,53	0,79	0,53	56,3
Approach			394	6,3	394	6,3	0,150	2,0	NA	0,5	3,9	0,10	0,15	0,10	58,8
North: R327															
7	L2	All MCs	112	8,0	112	8,0	0,123	9,9	LOS A	0,5	3,5	0,26	0,89	0,26	56,8
9	R2	All MCs	2	0,0	2	0,0	0,123	32,5	LOS D	0,5	3,5	0,26	0,89	0,26	57,0
Approach			114	7,9	114	7,9	0,123	10,3	LOS B	0,5	3,5	0,26	0,89	0,26	56,8
West: N2															
10	L2	All MCs	4	25,0	4	25,0	0,003	5,8	LOS A	0,0	0,0	0,00	0,57	0,00	57,3
11	T1	All MCs	483	4,0	483	4,0	0,195	0,3	LOS A	0,0	0,0	0,00	0,00	0,00	59,9
Approach			487	4,2	487	4,2	0,195	0,3	NA	0,0	0,0	0,00	0,00	0,00	59,9
All Vehicles			995	5,4	995	5,4	0,195	2,1	NA	0,5	3,9	0,07	0,16	0,07	58,9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2023 Saturday AM (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

National Road N2 / Provincial Road R327 Intersection
2023 Saturday AM Peak Hour Traffic (11:45 - 12:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	260	5,0	260	5,0	0,069	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	84	7,0	84	7,0	0,117	7,6	LOS A	0,4	3,0	0,38	0,65	0,38	57,1
Approach			344	5,5	344	5,5	0,117	1,9	NA	0,4	3,0	0,09	0,16	0,09	58,9
North: R327															
7	L2	All MCs	52	4,0	52	4,0	0,061	8,8	LOS A	0,2	1,6	0,19	0,89	0,19	56,8
9	R2	All MCs	4	0,0	4	0,0	0,061	18,7	LOS C	0,2	1,6	0,19	0,89	0,19	56,9
Approach			56	3,7	56	3,7	0,061	9,5	LOS A	0,2	1,6	0,19	0,89	0,19	56,8
West: N2															
10	L2	All MCs	5	0,0	5	0,0	0,003	5,5	LOS A	0,0	0,0	0,00	0,58	0,00	57,7
11	T1	All MCs	261	2,0	261	2,0	0,104	0,1	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
Approach			266	2,0	266	2,0	0,104	0,2	NA	0,0	0,0	0,00	0,01	0,00	59,9
All Vehicles			666	3,9	666	3,9	0,117	1,9	NA	0,4	3,0	0,06	0,16	0,06	59,0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Friday PM (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

National Road N2 / Provincial Road R327 Intersection
2028 Friday PM Peak Hour Traffic (15:45 - 16:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	346	5,0	346	5,0	0,092	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	87	12,0	87	12,0	0,189	11,3	LOS B	0,6	4,9	0,56	0,81	0,56	56,1
Approach			433	6,4	433	6,4	0,189	2,3	NA	0,6	4,9	0,11	0,16	0,11	58,7
North: R327															
7	L2	All MCs	131	8,0	131	8,0	0,145	10,0	LOS B	0,6	4,2	0,28	0,89	0,28	56,8
9	R2	All MCs	2	0,0	2	0,0	0,145	38,9	LOS E	0,6	4,2	0,28	0,89	0,28	56,9
Approach			133	7,9	133	7,9	0,145	10,5	LOS B	0,6	4,2	0,28	0,89	0,28	56,8
West: N2															
10	L2	All MCs	5	25,0	5	25,0	0,003	5,8	LOS A	0,0	0,0	0,00	0,57	0,00	57,3
11	T1	All MCs	523	4,0	523	4,0	0,211	0,3	LOS A	0,0	0,0	0,00	0,00	0,00	59,9
Approach			528	4,2	528	4,2	0,211	0,4	NA	0,0	0,0	0,00	0,01	0,00	59,9
All Vehicles			1094	5,5	1094	5,5	0,211	2,4	NA	0,6	4,9	0,08	0,18	0,08	58,8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Saturday AM (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

National Road N2 / Provincial Road R327 Intersection
2028 Saturday AM Peak Hour Traffic (11:45 - 12:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	282	5,0	282	5,0	0,075	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	98	7,0	98	7,0	0,140	7,9	LOS A	0,5	3,7	0,41	0,66	0,41	57,0
Approach			380	5,5	380	5,5	0,140	2,1	NA	0,5	3,7	0,10	0,17	0,10	58,8
North: R327															
7	L2	All MCs	61	4,0	61	4,0	0,075	8,9	LOS A	0,3	2,0	0,20	0,89	0,20	56,8
9	R2	All MCs	5	0,0	5	0,0	0,075	20,7	LOS C	0,3	2,0	0,20	0,89	0,20	56,9
Approach			66	3,7	66	3,7	0,075	9,8	LOS A	0,3	2,0	0,20	0,89	0,20	56,8
West: N2															
10	L2	All MCs	6	0,0	6	0,0	0,003	5,5	LOS A	0,0	0,0	0,00	0,58	0,00	57,7
11	T1	All MCs	283	2,0	283	2,0	0,113	0,1	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
Approach			289	2,0	289	2,0	0,113	0,2	NA	0,0	0,0	0,00	0,01	0,00	59,9
All Vehicles			735	4,0	735	4,0	0,140	2,0	NA	0,5	3,7	0,07	0,17	0,07	58,9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Friday PM+Development_Rev2 (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

National Road N2 / Provincial Road R327 Intersection
2028 Friday PM Peak Hour Traffic + Development Traffic (15:45 - 16:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	346	5,0	346	5,0	0,092	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	211	7,0	211	7,0	0,443	13,6	LOS B	2,2	16,2	0,65	0,94	0,93	53,9
Approach			557	5,8	557	5,8	0,443	5,2	NA	2,2	16,2	0,25	0,36	0,35	57,2
North: R327															
7	L2	All MCs	227	6,0	227	6,0	0,350	10,2	LOS B	1,6	11,4	0,42	0,83	0,42	54,9
9	R2	All MCs	12	0,0	12	0,0	0,350	61,9	LOS F	1,6	11,4	0,42	0,83	0,42	55,1
Approach			239	5,7	239	5,7	0,350	12,8	LOS B	1,6	11,4	0,42	0,83	0,42	54,9
West: N2															
10	L2	All MCs	20	2,0	20	2,0	0,011	5,6	LOS A	0,0	0,0	0,00	0,58	0,00	56,8
11	T1	All MCs	523	4,0	523	4,0	0,211	0,3	LOS A	0,0	0,0	0,00	0,00	0,00	59,9
Approach			543	3,9	543	3,9	0,211	0,5	NA	0,0	0,0	0,00	0,02	0,00	59,8
All Vehicles			1339	5,0	1339	5,0	0,443	4,6	NA	2,2	16,2	0,18	0,30	0,22	57,6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Saturday AM+Development_Rev2 (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

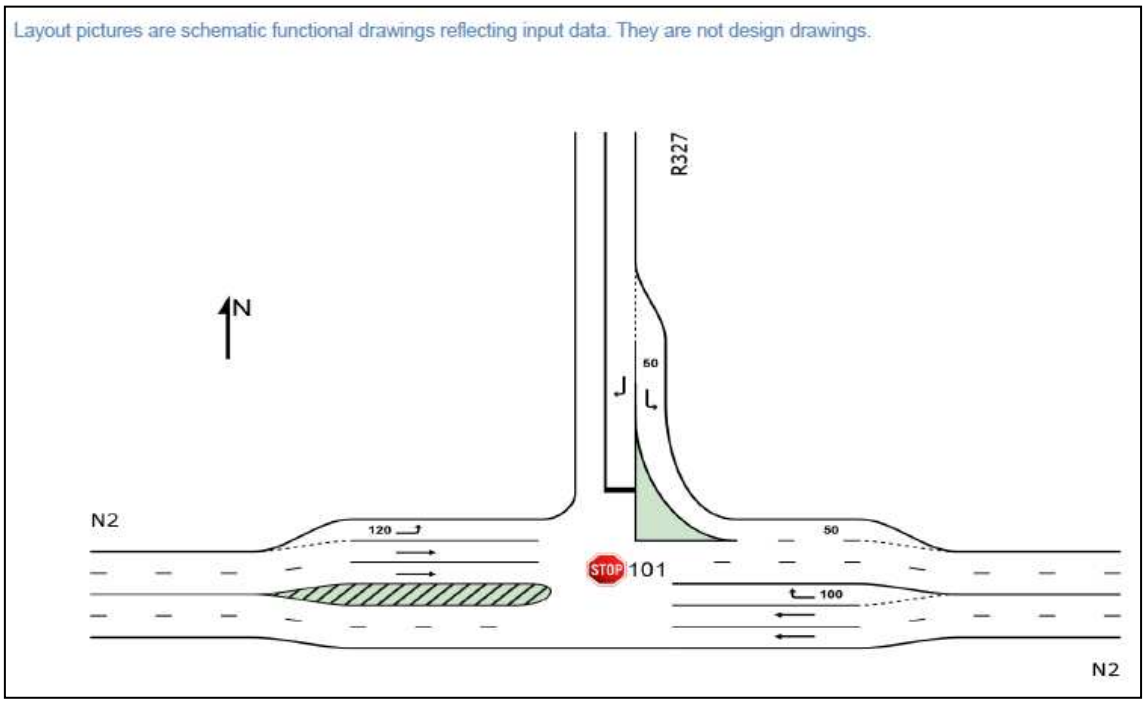
National Road N2 / Provincial Road R327 Intersection
2028 Saturday AM Peak Hour Traffic + Development Traffic (11:45 - 12:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	282	5,0	282	5,0	0,075	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	336	3,0	336	3,0	0,483	9,9	LOS A	3,0	21,7	0,55	0,80	0,75	55,2
Approach			618	3,9	618	3,9	0,483	5,4	NA	3,0	21,7	0,30	0,43	0,41	57,0
North: R327															
7	L2	All MCs	218	2,0	218	2,0	0,360	9,0	LOS A	1,7	11,9	0,34	0,82	0,34	54,8
9	R2	All MCs	24	0,0	24	0,0	0,360	43,1	LOS E	1,7	11,9	0,34	0,82	0,34	54,9
Approach			242	1,8	242	1,8	0,360	12,4	LOS B	1,7	11,9	0,34	0,82	0,34	54,8
West: N2															
10	L2	All MCs	34	0,0	34	0,0	0,018	5,5	LOS A	0,0	0,0	0,00	0,58	0,00	56,8
11	T1	All MCs	283	2,0	283	2,0	0,113	0,1	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
Approach			317	1,8	317	1,8	0,113	0,7	NA	0,0	0,0	0,00	0,06	0,00	59,5
All Vehicles			1177	2,9	1177	2,9	0,483	5,6	NA	3,0	21,7	0,23	0,41	0,28	57,1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

Proposed Intersection Layout



(Stop Control)

MOVEMENT SUMMARY

Site: 101 [2028 Friday PM+Development (Upgraded)_Rev2 (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

National Road N2 / Provincial Road R327 Intersection
2028 Friday PM Peak Hour Traffic + Development Traffic (15:45 - 16:45)
Upgraded Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	346	5,0	346	5,0	0,092	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	211	7,0	211	7,0	0,432	13,2	LOS B	2,1	15,8	0,64	0,93	0,90	54,1
Approach			557	5,8	557	5,8	0,432	5,0	NA	2,1	15,8	0,24	0,35	0,34	57,3
North: R327															
7	L2	All MCs	227	6,0	227	6,0	0,125	6,3	LOS A	0,0	0,0	0,00	0,53	0,00	56,9
9	R2	All MCs	12	0,0	12	0,0	0,115	40,6	LOS E	0,3	2,3	0,88	1,00	0,88	46,8
Approach			239	5,7	239	5,7	0,125	8,0	LOS A	0,3	2,3	0,04	0,55	0,04	56,3
West: N2															
10	L2	All MCs	20	2,0	20	2,0	0,011	5,6	LOS A	0,0	0,0	0,00	0,58	0,00	56,8
11	T1	All MCs	523	4,0	523	4,0	0,138	0,1	LOS A	0,0	0,0	0,00	0,00	0,00	59,9
Approach			543	3,9	543	3,9	0,138	0,3	NA	0,0	0,0	0,00	0,02	0,00	59,8
All Vehicles			1339	5,0	1339	5,0	0,432	3,6	NA	2,1	15,8	0,11	0,25	0,15	58,0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Saturday AM+Development (Upgraded)_Rev2 (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

National Road N2 / Provincial Road R327 Intersection
2028 Saturday AM Peak Hour Traffic + Development Traffic (11:45 - 12:45)
Upgraded Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	282	5,0	282	5,0	0,075	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	336	3,0	336	3,0	0,480	9,9	LOS A	3,0	21,6	0,55	0,79	0,74	55,3
Approach			618	3,9	618	3,9	0,480	5,4	NA	3,0	21,6	0,30	0,43	0,40	57,1
North: R327															
7	L2	All MCs	218	2,0	218	2,0	0,117	6,0	LOS A	0,0	0,0	0,00	0,53	0,00	57,0
9	R2	All MCs	24	0,0	24	0,0	0,167	32,0	LOS D	0,5	3,6	0,84	1,00	0,85	49,1
Approach			242	1,8	242	1,8	0,167	8,6	LOS A	0,5	3,6	0,08	0,58	0,08	56,1
West: N2															
10	L2	All MCs	34	0,0	34	0,0	0,018	5,5	LOS A	0,0	0,0	0,00	0,58	0,00	56,8
11	T1	All MCs	283	2,0	283	2,0	0,074	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
Approach			317	1,8	317	1,8	0,074	0,6	NA	0,0	0,0	0,00	0,06	0,00	59,5
All Vehicles			1177	2,9	1177	2,9	0,480	4,8	NA	3,0	21,6	0,17	0,36	0,23	57,4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Friday PM+Dev - Departure (Upgraded)_Rev2 (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

National Road N2 / Provincial Road R327 Intersection
2028 Friday PM Motorsport Arena Departure Traffic (21:00 - 22:00)
Upgraded Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	34	5,0	34	5,0	0,009	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	1	0,0	1	0,0	0,001	5,8	LOS A	0,0	0,0	0,14	0,52	0,14	56,7
Approach			35	4,9	35	4,9	0,009	0,2	NA	0,0	0,0	0,00	0,01	0,00	59,9
North: R327															
7	L2	All MCs	156	0,0	156	0,0	0,082	5,7	LOS A	0,0	0,0	0,00	0,53	0,00	57,0
9	R2	All MCs	19	0,0	19	0,0	0,028	9,2	LOS A	0,1	0,6	0,22	0,88	0,22	55,8
Approach			175	0,0	175	0,0	0,082	6,1	LOS A	0,1	0,6	0,02	0,57	0,02	56,9
West: N2															
10	L2	All MCs	1	0,0	1	0,0	0,001	5,5	LOS A	0,0	0,0	0,00	0,58	0,00	56,8
11	T1	All MCs	52	4,0	52	4,0	0,014	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
Approach			53	3,9	53	3,9	0,014	0,1	NA	0,0	0,0	0,00	0,01	0,00	59,9
All Vehicles			263	1,4	263	1,4	0,082	4,1	NA	0,1	0,6	0,02	0,38	0,02	57,7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Saturday PM+Dev - Departure (Upgraded) _Rev2 (Site Folder: N2 / R327 Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

National Road N2 / Provincial Road R327 Intersection
2028 Saturday PM Motorsport Arena Departure Traffic (21:00 - 22:00)
Upgraded Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: N2															
5	T1	All MCs	28	5,0	28	5,0	0,007	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
6	R2	All MCs	1	0,0	1	0,0	0,001	5,7	LOS A	0,0	0,0	0,09	0,53	0,09	56,7
Approach			29	4,8	29	4,8	0,007	0,2	NA	0,0	0,0	0,00	0,02	0,00	59,9
North: R327															
7	L2	All MCs	729	0,0	729	0,0	0,385	6,0	LOS A	0,0	0,0	0,00	0,53	0,00	56,9
9	R2	All MCs	91	0,0	91	0,0	0,126	9,0	LOS A	0,5	3,2	0,19	0,90	0,19	55,8
Approach			820	0,0	820	0,0	0,385	6,3	LOS A	0,5	3,2	0,02	0,57	0,02	56,7
West: N2															
10	L2	All MCs	1	0,0	1	0,0	0,001	5,5	LOS A	0,0	0,0	0,00	0,58	0,00	56,8
11	T1	All MCs	28	2,0	28	2,0	0,007	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
Approach			29	1,9	29	1,9	0,007	0,2	NA	0,0	0,0	0,00	0,02	0,00	59,9
All Vehicles			878	0,2	878	0,2	0,385	5,9	NA	0,5	3,2	0,02	0,53	0,02	56,9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

B. PROVINCIAL ROAD R327 / UNICORN STREET INTERSECTION

SIDRA ANALYSIS :

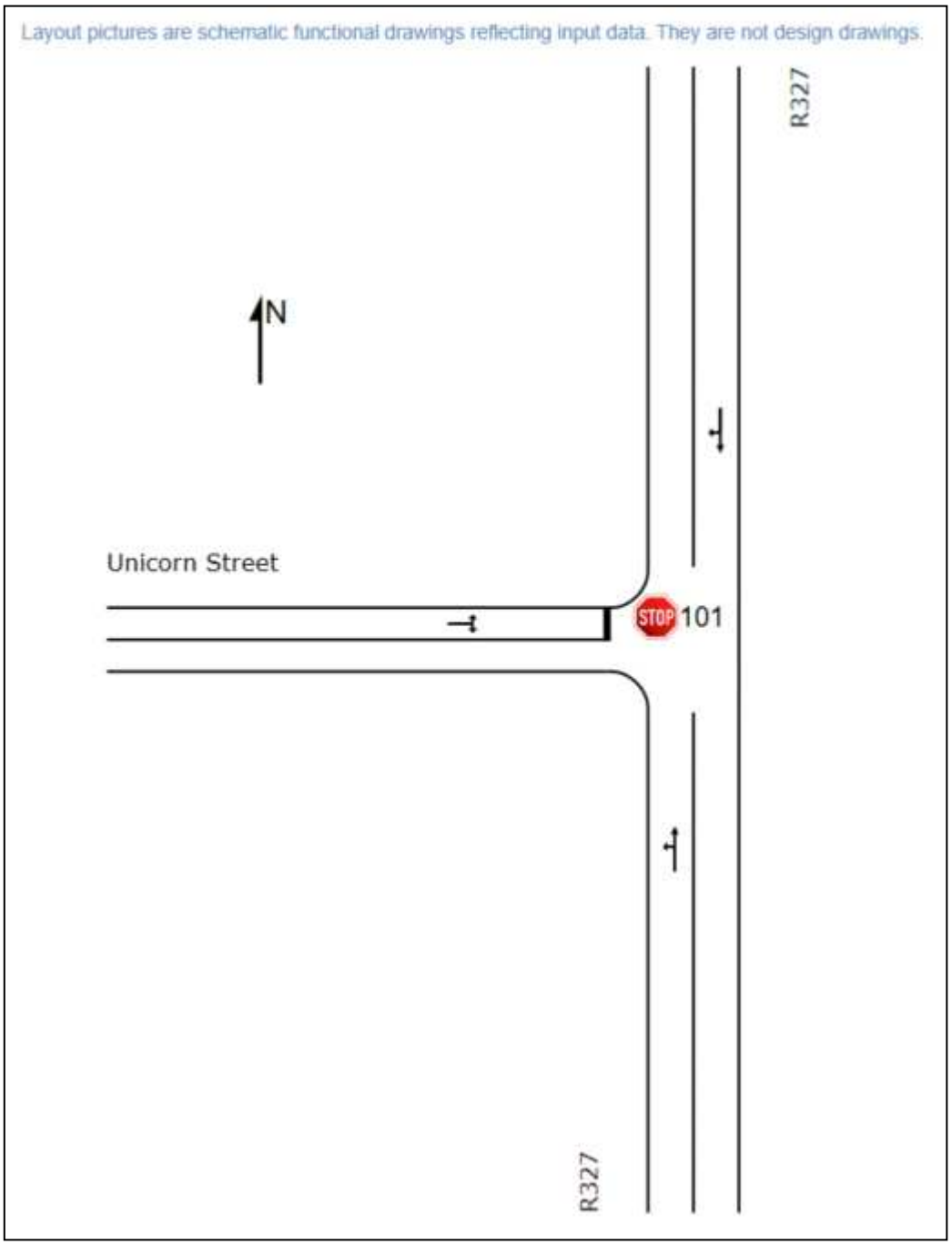
1. Existing Intersection Layout (Stop control)

2. 2023 Base Year Friday PM Peak Hour Traffic (Excluding Development Traffic)
3. 2023 Base Year Saturday AM Peak Hour Traffic (Excluding Development Traffic)

4. 2028 Design Year Friday PM Peak Hour Traffic (Excluding Development Traffic)
5. 2028 Design Year Saturday AM Peak Hour Traffic (Excluding Development Traffic)

6. 2028 Design Year Friday PM Peak Hour + Development Traffic
7. 2028 Design Year Saturday AM Peak Hour + Development Traffic

Existing Intersection Layout



(Stop Control)

MOVEMENT SUMMARY

Site: 101 [2023 Friday PM (Site Folder: R327 / Unicorn St Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Provincial Road R327 / Unicorn Street Intersection
2023 Friday PM Peak Hour Traffic (15:45 - 16:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	42	13,0	42	13,0	0,042	5,7	LOS A	0,0	0,0	0,00	0,32	0,00	57,7
2	T1	All MCs	36	0,0	36	0,0	0,042	0,0	LOS A	0,0	0,0	0,00	0,32	0,00	59,0
Approach			78	7,0	78	7,0	0,042	3,1	NA	0,0	0,0	0,00	0,32	0,00	58,3
North: R327															
8	T1	All MCs	54	0,0	54	0,0	0,029	0,0	LOS A	0,0	0,1	0,02	0,03	0,02	59,9
9	R2	All MCs	3	0,0	3	0,0	0,029	5,7	LOS A	0,0	0,1	0,02	0,03	0,02	54,5
Approach			57	0,0	57	0,0	0,029	0,3	NA	0,0	0,1	0,02	0,03	0,02	59,8
West: Unicorn Street															
10	L2	All MCs	3	0,0	3	0,0	0,063	8,1	LOS A	0,2	1,6	0,20	0,91	0,20	45,6
12	R2	All MCs	60	9,0	60	9,0	0,063	8,5	LOS A	0,2	1,6	0,20	0,91	0,20	56,0
Approach			63	8,6	63	8,6	0,063	8,5	LOS A	0,2	1,6	0,20	0,91	0,20	55,8
All Vehicles			198	5,5	198	5,5	0,063	4,0	NA	0,2	1,6	0,07	0,42	0,07	58,0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2023 Saturday AM (Site Folder: R327 / Unicorn St Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Provincial Road R327 / Unicorn Street Intersection
2023 Saturday AM Peak Hour Traffic (11:45 - 12:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	47	7,0	47	7,0	0,047	5,7	LOS A	0,0	0,0	0,00	0,31	0,00	57,8
2	T1	All MCs	42	0,0	42	0,0	0,047	0,1	LOS A	0,0	0,0	0,00	0,31	0,00	59,0
Approach			89	3,7	89	3,7	0,047	3,0	NA	0,0	0,0	0,00	0,31	0,00	58,4
North: R327															
8	T1	All MCs	26	0,0	26	0,0	0,014	0,0	LOS A	0,0	0,1	0,03	0,05	0,03	59,8
9	R2	All MCs	2	0,0	2	0,0	0,014	5,8	LOS A	0,0	0,1	0,03	0,05	0,03	54,2
Approach			28	0,0	28	0,0	0,014	0,4	NA	0,0	0,1	0,03	0,05	0,03	59,7
West: Unicorn Street															
10	L2	All MCs	2	0,0	2	0,0	0,030	8,2	LOS A	0,1	0,7	0,17	0,90	0,17	45,7
12	R2	All MCs	30	4,0	30	4,0	0,030	8,1	LOS A	0,1	0,7	0,17	0,90	0,17	56,1
Approach			32	3,8	32	3,8	0,030	8,1	LOS A	0,1	0,7	0,17	0,90	0,17	55,9
All Vehicles			149	3,0	149	3,0	0,047	3,6	NA	0,1	0,7	0,04	0,39	0,04	58,1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Friday PM (Site Folder: R327 / Unicorn St Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Provincial Road R327 / Unicorn Street Intersection
2028 Friday PM Peak Hour Traffic (15:45 - 16:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	50	13,0	50	13,0	0,050	5,7	LOS A	0,0	0,0	0,00	0,32	0,00	57,6
2	T1	All MCs	42	0,0	42	0,0	0,050	0,1	LOS A	0,0	0,0	0,00	0,32	0,00	59,0
Approach			92	7,1	92	7,1	0,050	3,1	NA	0,0	0,0	0,00	0,32	0,00	58,3
North: R327															
8	T1	All MCs	63	0,0	63	0,0	0,034	0,0	LOS A	0,0	0,2	0,03	0,04	0,03	59,8
9	R2	All MCs	4	0,0	4	0,0	0,034	5,8	LOS A	0,0	0,2	0,03	0,04	0,03	54,4
Approach			67	0,0	67	0,0	0,034	0,3	NA	0,0	0,2	0,03	0,04	0,03	59,8
West: Unicorn Street															
10	L2	All MCs	4	0,0	4	0,0	0,075	8,2	LOS A	0,3	1,9	0,22	0,91	0,22	45,5
12	R2	All MCs	70	9,0	70	9,0	0,075	8,6	LOS A	0,3	1,9	0,22	0,91	0,22	55,9
Approach			74	8,5	74	8,5	0,075	8,6	LOS A	0,3	1,9	0,22	0,91	0,22	55,8
All Vehicles			233	5,5	233	5,5	0,075	4,1	NA	0,3	1,9	0,08	0,43	0,08	57,9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Saturday AM (Site Folder: R327 / Unicorn St Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Provincial Road R327 / Unicorn Street Intersection
2028 Saturday AM Peak Hour Traffic (11:45 - 12:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	55	7,0	55	7,0	0,055	5,7	LOS A	0,0	0,0	0,00	0,31	0,00	57,8
2	T1	All MCs	49	0,0	49	0,0	0,055	0,1	LOS A	0,0	0,0	0,00	0,31	0,00	59,0
Approach			104	3,7	104	3,7	0,055	3,0	NA	0,0	0,0	0,00	0,31	0,00	58,4
North: R327															
8	T1	All MCs	30	0,0	30	0,0	0,016	0,0	LOS A	0,0	0,1	0,03	0,04	0,03	59,8
9	R2	All MCs	2	0,0	2	0,0	0,016	5,9	LOS A	0,0	0,1	0,03	0,04	0,03	54,3
Approach			32	0,0	32	0,0	0,016	0,4	NA	0,0	0,1	0,03	0,04	0,03	59,8
West: Unicorn Street															
10	L2	All MCs	2	0,0	2	0,0	0,037	8,2	LOS A	0,1	0,9	0,19	0,90	0,19	45,6
12	R2	All MCs	36	4,0	36	4,0	0,037	8,2	LOS A	0,1	0,9	0,19	0,90	0,19	56,1
Approach			38	3,8	38	3,8	0,037	8,2	LOS A	0,1	0,9	0,19	0,90	0,19	55,9
All Vehicles			174	3,0	174	3,0	0,055	3,7	NA	0,1	0,9	0,05	0,39	0,05	58,1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Friday PM + Development_Rev2 (Site Folder: R327 / Unicorn St Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Provincial Road R327 / Unicorn Street Intersection
2028 Friday PM Peak Hour Traffic + Development Traffic (15:45 - 16:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	67	13,0	67	13,0	0,064	5,7	LOS A	0,0	0,0	0,00	0,33	0,00	54,8
2	T1	All MCs	51	0,0	51	0,0	0,064	0,0	LOS A	0,0	0,0	0,00	0,33	0,00	58,0
Approach			118	7,4	118	7,4	0,064	3,3	NA	0,0	0,0	0,00	0,33	0,00	56,3
North: R327															
8	T1	All MCs	77	0,0	77	0,0	0,042	0,0	LOS A	0,0	0,2	0,03	0,04	0,03	59,7
9	R2	All MCs	5	0,0	5	0,0	0,042	6,1	LOS A	0,0	0,2	0,03	0,04	0,03	54,3
Approach			82	0,0	82	0,0	0,042	0,4	NA	0,0	0,2	0,03	0,04	0,03	59,5
West: Unicorn Street															
10	L2	All MCs	5	0,0	5	0,0	0,105	8,2	LOS A	0,4	2,7	0,26	0,90	0,26	45,4
12	R2	All MCs	95	9,0	95	9,0	0,105	8,8	LOS A	0,4	2,7	0,26	0,90	0,26	51,4
Approach			100	8,6	100	8,6	0,105	8,8	LOS A	0,4	2,7	0,26	0,90	0,26	51,2
All Vehicles			300	5,8	300	5,8	0,105	4,3	NA	0,4	2,7	0,10	0,44	0,10	55,6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Saturday AM + Development_Rev2 (Site Folder: R327 / Unicorn St Intersection)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Provincial Road R327 / Unicorn Street Intersection
2028 Saturday AM Peak Hour Traffic + Development Traffic (11:45 - 12:45)
Existing Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	74	7,0	74	7,0	0,074	5,7	LOS A	0,0	0,0	0,00	0,31	0,00	55,2
2	T1	All MCs	67	0,0	67	0,0	0,074	0,0	LOS A	0,0	0,0	0,00	0,31	0,00	58,1
Approach			141	3,7	141	3,7	0,074	3,0	NA	0,0	0,0	0,00	0,31	0,00	56,7
North: R327															
8	T1	All MCs	57	0,0	57	0,0	0,030	0,0	LOS A	0,0	0,1	0,03	0,04	0,03	59,7
9	R2	All MCs	3	0,0	3	0,0	0,030	6,2	LOS A	0,0	0,1	0,03	0,04	0,03	54,4
Approach			60	0,0	60	0,0	0,030	0,3	NA	0,0	0,1	0,03	0,04	0,03	59,6
West: Unicorn Street															
10	L2	All MCs	3	0,0	3	0,0	0,052	8,3	LOS A	0,2	1,2	0,24	0,89	0,24	45,5
12	R2	All MCs	48	4,0	48	4,0	0,052	8,5	LOS A	0,2	1,2	0,24	0,89	0,24	51,6
Approach			51	3,8	51	3,8	0,052	8,5	LOS A	0,2	1,2	0,24	0,89	0,24	51,4
All Vehicles			252	2,8	252	2,8	0,074	3,5	NA	0,2	1,2	0,06	0,36	0,06	56,4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

C. PROVINCIAL ROAD R327 / MOTORSPORT ARENA ACCESS INTERSECTION

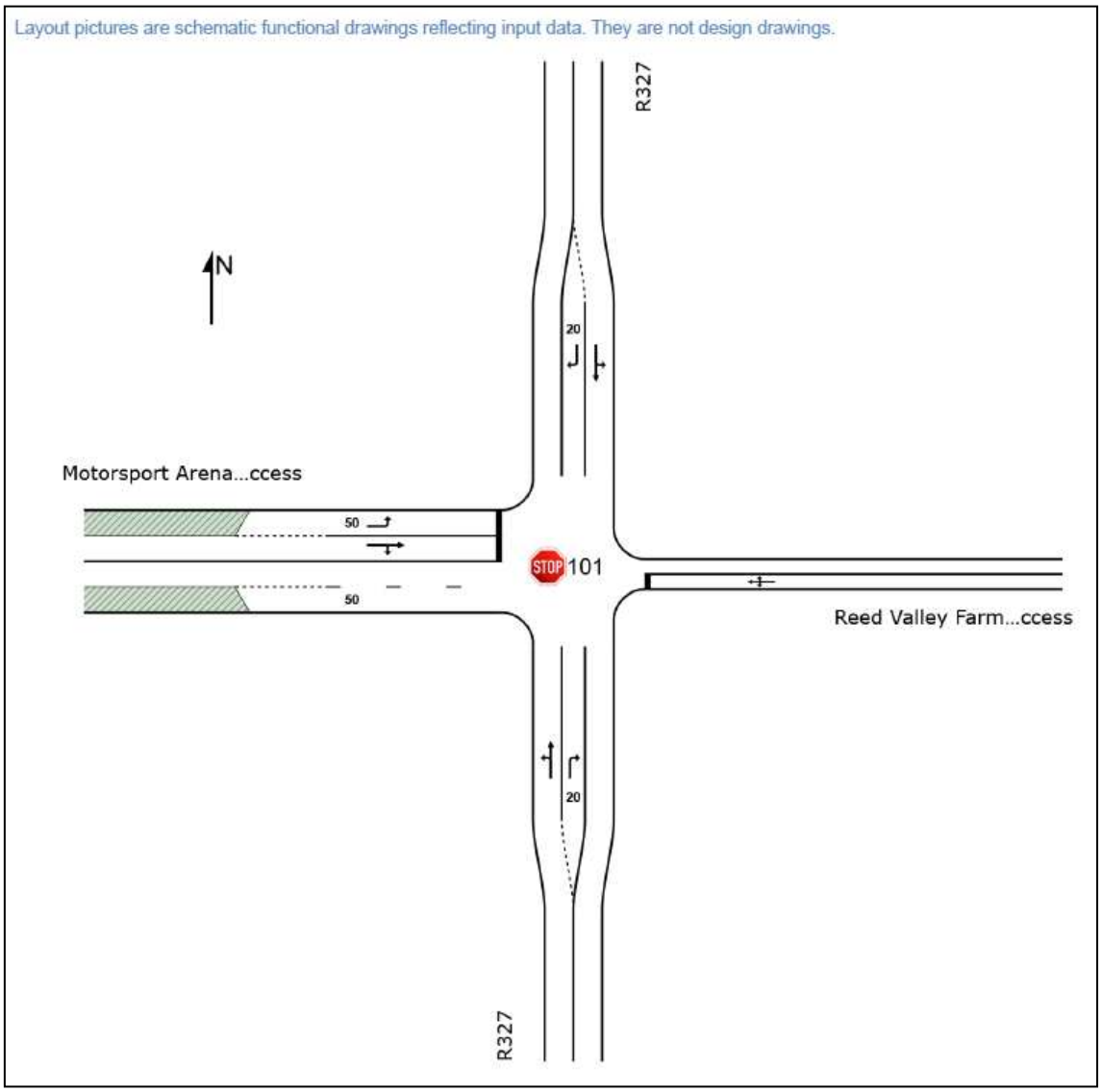
SIDRA ANALYSIS :

1. Proposed Intersection Layout (Stop control)

2. 2028 Design Year Friday PM Peak Hour + Development Traffic
3. 2028 Design Year Saturday AM Peak Hour + Development Traffic

4. 2028 Friday PM Motorsport Arena Departure Traffic
5. 2028 Saturday PM Motorsport Arena Departure Traffic

Proposed Intersection Layout



(Stop Control)

MOVEMENT SUMMARY

Site: 101 [2028 Friday PM+Development_Rev2 (Site Folder: R327 / Motorsport Arena Access)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Provincial Road R327 / Motorsport Arena Access Intersection
2028 Friday PM Peak Hour Traffic + Development Traffic (15:45 - 16:45)
Proposed Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	122	0,0	122	0,0	0,123	5,6	LOS A	0,0	0,0	0,00	0,31	0,00	56,7
2	T1	All MCs	109	13,0	109	13,0	0,123	0,1	LOS A	0,0	0,0	0,00	0,31	0,00	58,7
3	R2	All MCs	1	0,0	1	0,0	0,001	5,9	LOS A	0,0	0,0	0,26	0,53	0,26	55,4
Approach			232	6,1	232	6,1	0,123	3,0	NA	0,0	0,0	0,00	0,31	0,00	57,8
East: Reed Valley Farm Access															
4	L2	All MCs	1	0,0	1	0,0	0,005	8,7	LOS A	0,0	0,1	0,42	0,81	0,42	54,2
5	T1	All MCs	1	0,0	1	0,0	0,005	11,7	LOS B	0,0	0,1	0,42	0,81	0,42	45,6
6	R2	All MCs	1	0,0	1	0,0	0,005	10,8	LOS B	0,0	0,1	0,42	0,81	0,42	52,5
Approach			3	0,0	3	0,0	0,005	10,4	LOS B	0,0	0,1	0,42	0,81	0,42	52,0
North: R327															
7	L2	All MCs	1	0,0	1	0,0	0,084	5,6	LOS A	0,0	0,0	0,00	0,00	0,00	58,2
8	T1	All MCs	158	8,0	158	8,0	0,084	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	59,9
9	R2	All MCs	14	0,0	14	0,0	0,010	6,2	LOS A	0,0	0,3	0,33	0,54	0,33	53,0
Approach			173	7,3	173	7,3	0,084	0,6	NA	0,0	0,3	0,03	0,05	0,03	59,6
West: Motorsport Arena Access															
10	L2	All MCs	9	0,0	9	0,0	0,008	8,5	LOS A	0,0	0,2	0,21	0,87	0,21	52,3
11	T1	All MCs	1	0,0	1	0,0	0,157	11,5	LOS B	0,6	4,3	0,53	0,94	0,53	44,1
12	R2	All MCs	81	0,0	81	0,0	0,157	12,5	LOS B	0,6	4,3	0,53	0,94	0,53	52,6
Approach			91	0,0	91	0,0	0,157	12,1	LOS B	0,6	4,3	0,49	0,93	0,49	52,6
All Vehicles			499	5,4	499	5,4	0,157	3,9	NA	0,6	4,3	0,10	0,34	0,10	57,7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Saturday AM+Development_Rev2 (Site Folder: R327 / Motorsport Arena Access)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Provincial Road R327 / Motorsport Arena Access Intersection
2028 Saturday AM Peak Hour Traffic + Development Traffic (11:45 - 12:45)
Proposed Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	247	0,0	247	0,0	0,194	5,7	LOS A	0,0	0,0	0,00	0,39	0,00	56,3
2	T1	All MCs	123	7,0	123	7,0	0,194	0,1	LOS A	0,0	0,0	0,00	0,39	0,00	58,4
3	R2	All MCs	1	0,0	1	0,0	0,001	5,6	LOS A	0,0	0,0	0,17	0,54	0,17	55,5
Approach			371	2,3	371	2,3	0,194	3,9	NA	0,0	0,0	0,00	0,39	0,00	57,2
East: Reed Valley Farm Access															
4	L2	All MCs	1	0,0	1	0,0	0,005	8,3	LOS A	0,0	0,1	0,36	0,80	0,36	54,1
5	T1	All MCs	1	0,0	1	0,0	0,005	12,8	LOS B	0,0	0,1	0,36	0,80	0,36	45,5
6	R2	All MCs	1	0,0	1	0,0	0,005	10,1	LOS B	0,0	0,1	0,36	0,80	0,36	52,4
Approach			3	0,0	3	0,0	0,005	10,4	LOS B	0,0	0,1	0,36	0,80	0,36	51,9
North: R327															
7	L2	All MCs	1	0,0	1	0,0	0,041	5,6	LOS A	0,0	0,0	0,00	0,01	0,00	58,2
8	T1	All MCs	78	4,0	78	4,0	0,041	0,0	LOS A	0,0	0,0	0,00	0,01	0,00	60,0
9	R2	All MCs	27	0,0	27	0,0	0,022	6,8	LOS A	0,1	0,6	0,42	0,59	0,42	52,8
Approach			106	2,9	106	2,9	0,041	1,8	NA	0,1	0,6	0,11	0,16	0,11	58,8
West: Motorsport Arena Access															
10	L2	All MCs	18	0,0	18	0,0	0,017	8,6	LOS A	0,1	0,4	0,23	0,87	0,23	52,3
11	T1	All MCs	1	0,0	1	0,0	0,321	12,7	LOS B	1,6	10,9	0,58	0,97	0,67	43,1
12	R2	All MCs	164	0,0	164	0,0	0,321	13,7	LOS B	1,6	10,9	0,58	0,97	0,67	52,1
Approach			183	0,0	183	0,0	0,321	13,2	LOS B	1,6	10,9	0,55	0,96	0,63	52,1
All Vehicles			663	1,8	663	1,8	0,321	6,1	NA	1,6	10,9	0,17	0,51	0,19	56,1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Friday PM+Dev - Departure_Rev2 (Site Folder: R327 / Motorsport Arena Access)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Provincial Road R327 / Motorsport Arena Access Intersection
2028 Friday PM Motorsport Arena Departure Traffic (21:00 - 22:00)
Proposed Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	1	0,0	1	0,0	0,001	5,5	LOS A	0,0	0,0	0,00	0,30	0,00	56,9
2	T1	All MCs	1	0,0	1	0,0	0,001	0,0	LOS A	0,0	0,0	0,00	0,30	0,00	58,9
3	R2	All MCs	1	0,0	1	0,0	0,001	5,4	LOS A	0,0	0,0	0,02	0,59	0,02	55,8
Approach			3	0,0	3	0,0	0,001	3,7	NA	0,0	0,0	0,01	0,40	0,01	57,3
East: Reed Valley Farm Access															
4	L2	All MCs	1	0,0	1	0,0	0,003	8,0	LOS A	0,0	0,1	0,03	0,98	0,03	54,9
5	T1	All MCs	1	0,0	1	0,0	0,003	7,8	LOS A	0,0	0,1	0,03	0,98	0,03	47,2
6	R2	All MCs	1	0,0	1	0,0	0,003	7,8	LOS A	0,0	0,1	0,03	0,98	0,03	53,4
Approach			3	0,0	3	0,0	0,003	7,9	LOS A	0,0	0,1	0,03	0,98	0,03	53,0
North: R327															
7	L2	All MCs	1	0,0	1	0,0	0,001	5,5	LOS A	0,0	0,0	0,00	0,30	0,00	56,5
8	T1	All MCs	1	0,0	1	0,0	0,001	0,0	LOS A	0,0	0,0	0,00	0,30	0,00	58,9
9	R2	All MCs	1	0,0	1	0,0	0,001	5,5	LOS A	0,0	0,0	0,02	0,57	0,02	53,8
Approach			3	0,0	3	0,0	0,001	3,7	NA	0,0	0,0	0,01	0,39	0,01	56,9
West: Motorsport Arena Access															
10	L2	All MCs	19	0,0	19	0,0	0,016	8,0	LOS A	0,1	0,4	0,01	0,99	0,01	52,3
11	T1	All MCs	1	0,0	1	0,0	0,197	7,8	LOS A	0,9	6,3	0,06	0,95	0,06	47,0
12	R2	All MCs	175	0,0	175	0,0	0,197	8,1	LOS A	0,9	6,3	0,06	0,95	0,06	54,2
Approach			195	0,0	195	0,0	0,197	8,1	LOS A	0,9	6,3	0,05	0,96	0,05	54,0
All Vehicles			204	0,0	204	0,0	0,197	8,0	NA	0,9	6,3	0,05	0,94	0,05	54,1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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.

MOVEMENT SUMMARY

Site: 101 [2028 Saturday PM+Dev - Departure_Rev2 (Site Folder: R327 / Motorsport Arena Access)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Provincial Road R327 / Motorsport Arena Access Intersection
2028 Saturday PM Motorsport Arena Departure Traffic (21:00 - 22:00)
Proposed Intersection Layout (STOP Control)
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: R327															
1	L2	All MCs	1	0,0	1	0,0	0,001	5,5	LOS A	0,0	0,0	0,00	0,30	0,00	56,9
2	T1	All MCs	1	0,0	1	0,0	0,001	0,0	LOS A	0,0	0,0	0,00	0,30	0,00	58,9
3	R2	All MCs	1	0,0	1	0,0	0,001	5,4	LOS A	0,0	0,0	0,02	0,59	0,02	55,8
Approach			3	0,0	3	0,0	0,001	3,7	NA	0,0	0,0	0,01	0,40	0,01	57,3
East: Reed Valley Farm Access															
4	L2	All MCs	1	0,0	1	0,0	0,003	8,0	LOS A	0,0	0,1	0,03	0,98	0,03	54,9
5	T1	All MCs	1	0,0	1	0,0	0,003	7,8	LOS A	0,0	0,1	0,03	0,98	0,03	47,2
6	R2	All MCs	1	0,0	1	0,0	0,003	7,9	LOS A	0,0	0,1	0,03	0,98	0,03	53,4
Approach			3	0,0	3	0,0	0,003	7,9	LOS A	0,0	0,1	0,03	0,98	0,03	53,0
North: R327															
7	L2	All MCs	1	0,0	1	0,0	0,001	5,5	LOS A	0,0	0,0	0,00	0,30	0,00	56,5
8	T1	All MCs	1	0,0	1	0,0	0,001	0,0	LOS A	0,0	0,0	0,00	0,30	0,00	58,9
9	R2	All MCs	1	0,0	1	0,0	0,001	5,5	LOS A	0,0	0,0	0,02	0,57	0,02	53,8
Approach			3	0,0	3	0,0	0,001	3,7	NA	0,0	0,0	0,01	0,39	0,01	56,9
West: Motorsport Arena Access															
10	L2	All MCs	91	0,0	91	0,0	0,076	8,4	LOS A	0,3	2,0	0,01	0,99	0,01	52,3
11	T1	All MCs	1	0,0	1	0,0	0,980	15,8	LOS C	124,9	874,4	1,00	0,32	1,02	42,1
12	R2	All MCs	820	0,0	820	0,0	0,980	16,3	LOS C	124,9	874,4	1,00	0,32	1,02	51,5
Approach			912	0,0	912	0,0	0,980	15,5	LOS C	124,9	874,4	0,90	0,39	0,92	51,6
All Vehicles			921	0,0	921	0,0	0,980	15,4	NA	124,9	874,4	0,89	0,39	0,91	51,6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
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).
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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.

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JOB NO : 1755.....

PROJECT : MOSSDUSTRIA DEVELOPMENT.....

TITLE : CIVIL ENGINEERING SERVICES REPORT.....

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