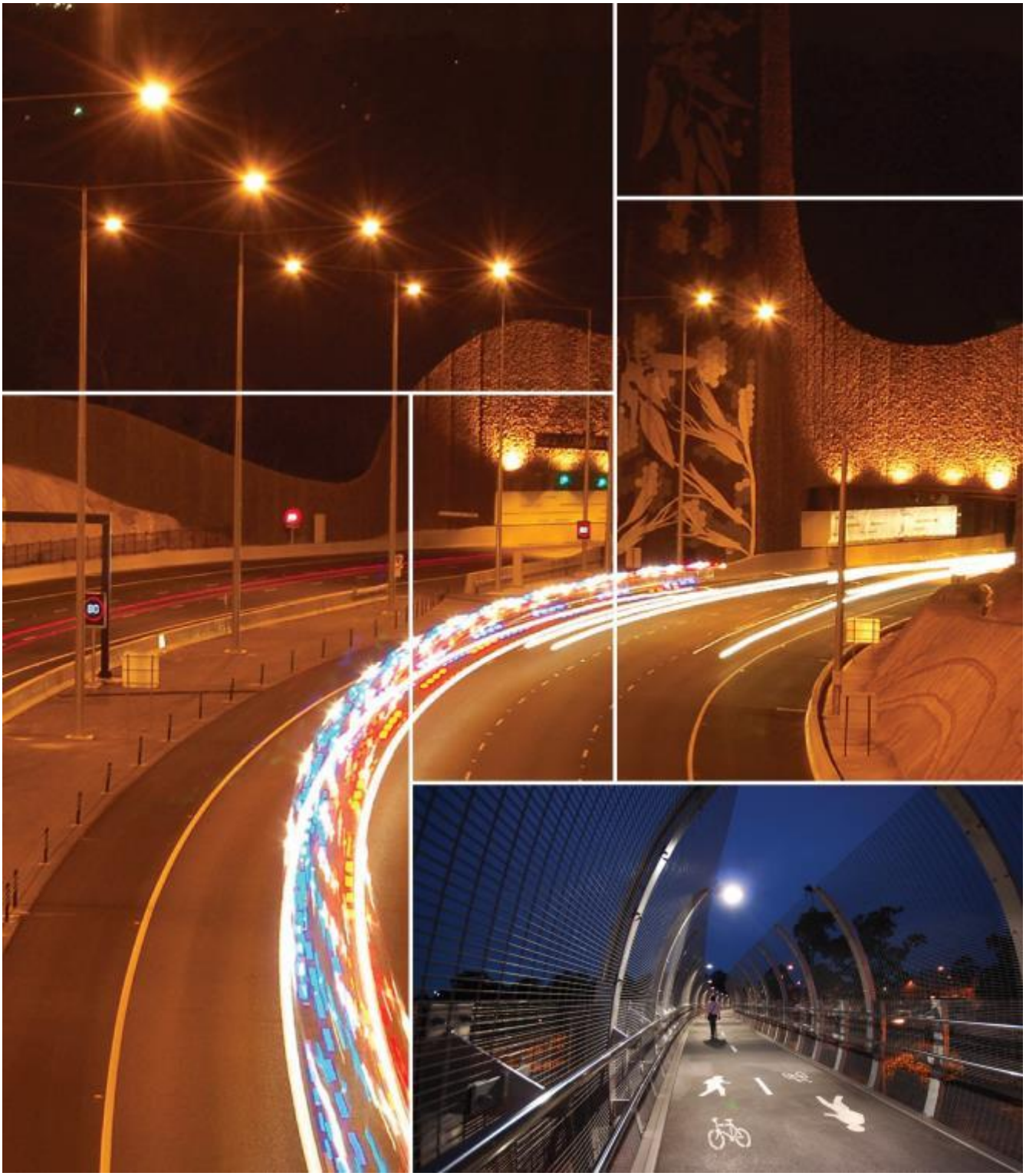


Postmasburg – Northern Cape

Traffic Impact Statement for a Proposed Housing Development in Postmasburg, Northern Cape

Reference: 109473

Prepared for: Savannah Environmental (Pty) Ltd

Revision: 02 - Final
2 September 2013

Document control record

Document prepared by:
Aurecon South Africa (Pty) Ltd
1977/003711/07

PO Box 932
Pinetown
3600
South Africa

T +27 31 714 2500
F +27 31 702 0287
E eThekwini@aurecongroup.com
W aurecongroup.com

Document control						aurecon
Report title	Traffic Impact Statement for a Proposed Housing Development in Postmasburg, Northern Cape					
Document ID		**Project number**	109473			
File path	P:\Projects\109473 KZN Small Projects Trans- De Kellock\Postmasburg Housing\Report\TIS_Postmasburg_Rev1.docx					
Client	Savannah Environmental (Pty) Ltd	**Client contact**				
Rev	**Date**	**Revision details/status**	**Prepared by**	**Author**	**Verifier**	**Approver**
0	15 August 2013	First draft	S Laurence	S Laurence	D Kellock	D Kellock
1	23 August 2013	Minor revisions and additions	S Laurence	S Laurence	D Kellock	D Kellock
2	2 September 2013	Client revisions	S Laurence	S Laurence	D Kellock	D Kellock
Current Revision	**02 - Final**					
Approval						
Author signature			Approver signature			
Name	S Laurence		Name	D Kellock		
Title	Technician		Title	Pr Eng		

Contents

Appendices

Appendix A

Risk / Impact Assessment Methodology

Appendix B

Traffic Counts

Appendix C

Site Layout

Figures

Tables

List of Acronyms

TIA	Traffic Impact Assessment
TIS	Traffic Impact Statement
Veh/day	Vehicles per Day
Veh/h	Vehicles per Hour
LOS	Level of Service

1 INTRODUCTION

Transnet SOC proposes a Residential Development comprising of 185 houses and associated infrastructure located on the outskirts of the town of Postmasburg. The study area falls under the Tsansabane Local Municipality and greater Siyanda District Municipality, in the Northern Cape Province. The proposed residential development is approximately 16 hectares in extent and it will comprise of 185 dwelling units with either two bedroom and three bedroom units. The land that the proposed residential development is to be situated on belongs to Transnet and is currently vacant.

The proposed residential development requires a Basic Assessment (BA) in accordance with the requirements of the National Environmental Management Act (NEMA, 2010). As such, Savannah Environmental (Pty) Ltd has appointed Aurecon (Pty) Ltd to carry out a Traffic Statement as part of their BA application. The purpose of this report is to assess the traffic impact of the proposed residential development on the existing road network. The report examines the existing peak hour traffic conditions on relevant roads, the impact of the peak hour traffic generated by the development on the road network and lastly, makes recommendations on access requirements or any improvements required to the road network in order to accommodate the additional vehicle and pedestrian traffic generated by the development.

2 PROJECT DESCRIPTION

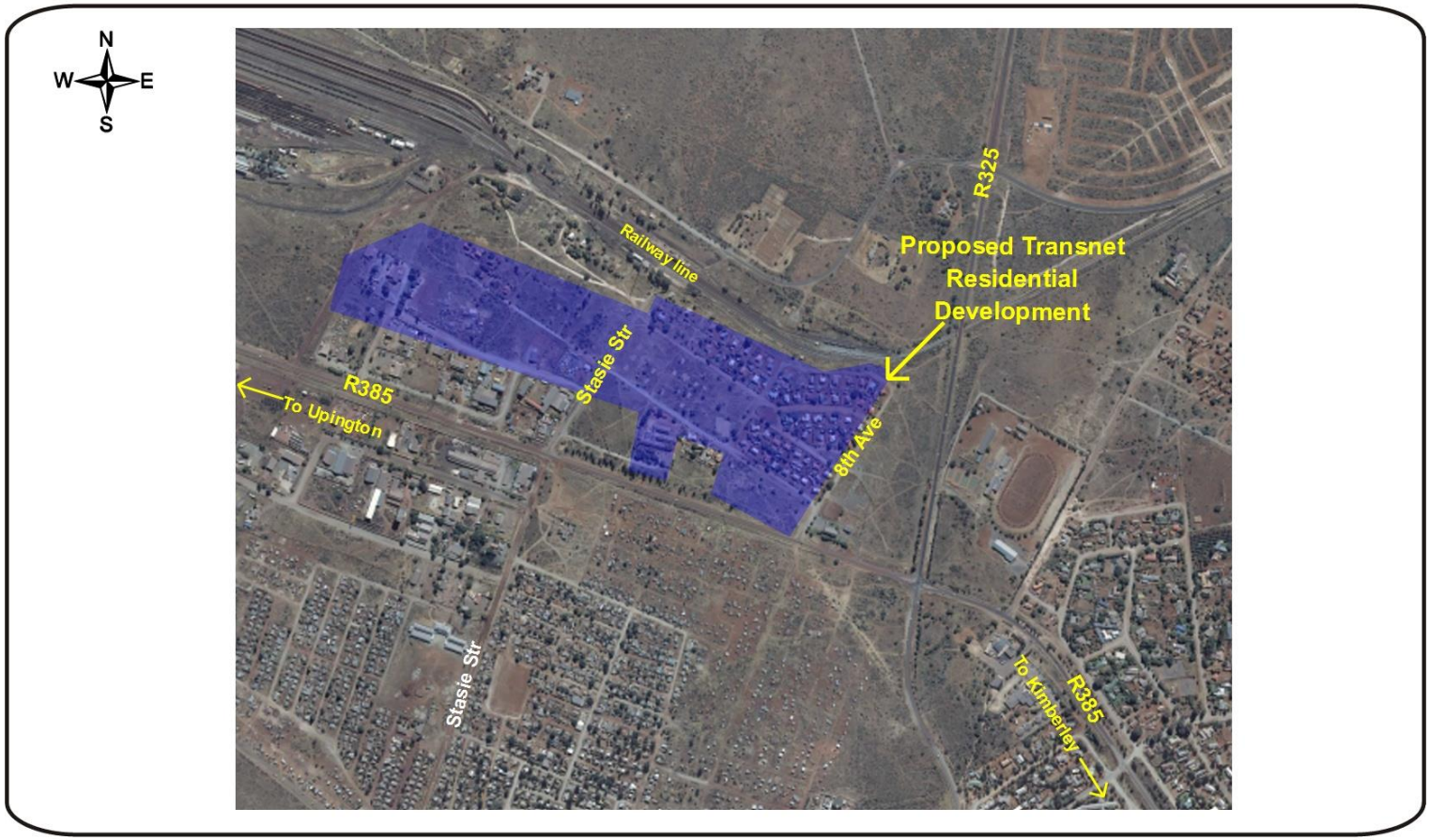
2.1 Project Location

The proposed residential development is located on the outskirts of the town of Postmasburg, just west of the town CBD. The proposed residential development is located off the main arterial, the R385. The R385 serves as the southern border of the proposed development. Stasie Street will serve as the access road into the proposed residential development. The railway station is located to the west of the proposed development with the railway line serving as the northern border. The R325, another main arterial, is located to the east of the development. The location of the proposed residential development in relation to the surrounding road network is shown on the Locality Plan, **Figure 1.** The Site Layout is attached as **Appendix C.**

2.2 Assumptions & Limitations

The distribution of the traffic generated by the construction and operations of the proposed housing development was based on the distribution of the existing traffic volumes. It can be reasonably assumed that the majority of the labour pool will originate from the Postmasburg area and the surrounding informal settlements.

The volume of traffic that will be generated by the construction of the proposed housing development is based on the estimated number of workers and volume of raw material required for the construction, as well as an assumption of the economic profile of these workers.



aurecon	LOCALITY SKETCH PROPOSED HOUSING DEVELOPMENT - POSTMASBURG, NORTHERN CAPE	PROJECT: 109473 FIGURE: 1
AUGUST 2013	AURECON (PTY) LTD	SCALE: Not to Scale

Figure 1: Locality Sketch

3 BASELINE ROADS & TRAFFIC DESCRIPTION

The following roads will be predominantly used to convey traffic volumes to and from the proposed residential development:

- R385
- R325
- Stasie Street
- 8th Avenue

A description of these roads follows hereafter.

3.1 R385

The R385 is a major arterial road that traverses through the town of Postmasburg. The R385 connects commuters travelling from Postmasburg to Uppington and it joins National Route 14 approximately 160km north east of Upington. The R385 can be described as a rural two lane highway with one lane in each direction. A speed limit of 60km/h is applicable in the built up area. The R385 traverses the site in an east west direction and is located to the south of the development. Commuters located in the proposed residential development will take access directly off the R385 via Stasie Street and Eighth Avenue.

3.2 R325

The R325 is also a major arterial road that traverses through the town of Postmasburg. The R325 connects commuters travelling from Kimberley to Postmasburg and vice versa. The R325 joins the National Route 8 approximately 70km south east of Postmasburg. The R325 can be described as a rural two lane highway with one lane in each direction. A speed limit of 60km/h is applicable in the built up area. The R325 traverses the site in a north south direction and is located to the east of the development.

Image 1: Main R325 / R385 Intersection

3.3 Stasie Street

Stasie Street serves as an access road. Stasie Street links the railway station to the major arterial, the R385. Stasie Street can be described as a two lane road with one lane in each direction. Stasie Street traverses the study area in a north south direction and will serve as the main access road of the proposed residential development.

3.4 8th Avenue

8th Avenue serves as an access road and it links the development to the major arterial, the R385. It is a narrow two lane road and it forms the eastern boundary of the site. 8th Avenue will be a minor access road to the eastern side of the development.

Image 2: Main R385 / R325 Intersection

4 EXISTING TRAFFIC CONDITIONS

4.1 Data Source

The peak traffic generation period of a residential development will occur during the morning commuter peak period when residents are leaving for work and school and during the afternoon commuter peak period when residents are returning home from work.

Traffic counts undertaken on Monday, 29 July 2013 and Tuesday, 30 July 2013 were used to assess the existing traffic conditions on the road network surrounding and serving the proposed residential development, on a typical weekday:

- R325 and R385 Intersection
- R385 and Stasie Street Intersection

The AM peak hour at both of these intersections was between 06:45 and 07:45 and the PM peak was between 16:00 and 17:00. The traffic counts can be found in **Appendix B**. These existing 2013 AM and PM peak hour traffic volumes on the road network surrounding the site are shown on Figure 2.

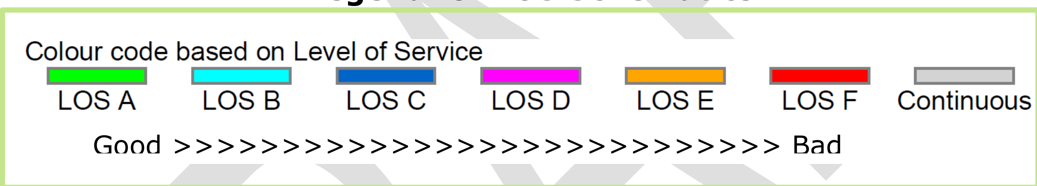
4.2 Existing Intersections

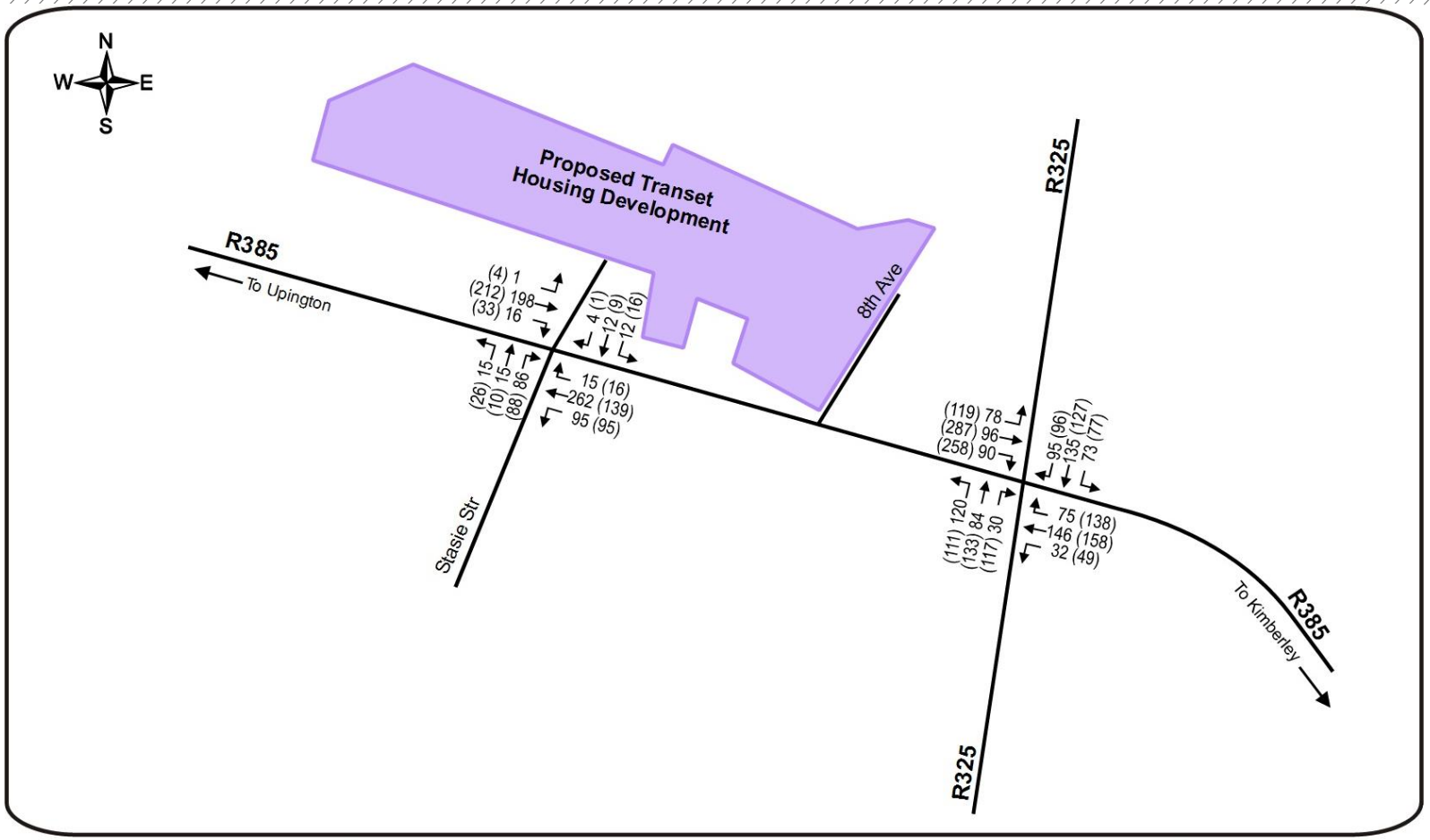
The 2 intersections identified in Section 4.1 are likely to be impacted the most by the traffic volumes generated by development of additional houses in the area. Both of these intersections were analysed using the SIDRA computerised analysis package for the 2013 AM and PM peak hour traffic volumes and for the existing intersection layouts at each intersection.

The SIDRA Intersection computer software program was used to analyse the existing traffic conditions at these signalised and priority controlled intersections. The underlying objective of intersection analysis is to quantify the performance of an intersection with regard to specified traffic volumes and environmental conditions. This traffic operational performance can be measured in terms of 'Level of Service' (LOS). Six levels of service exist, ranging from A to F. LOS A represents the best operating conditions (free-flow conditions and no delay or congestion) whereas LOS F represents the worst, (breakdown conditions with congestion and very high delays).

A summary of the results at each intersection is given below.

Legend for LOS Schematics



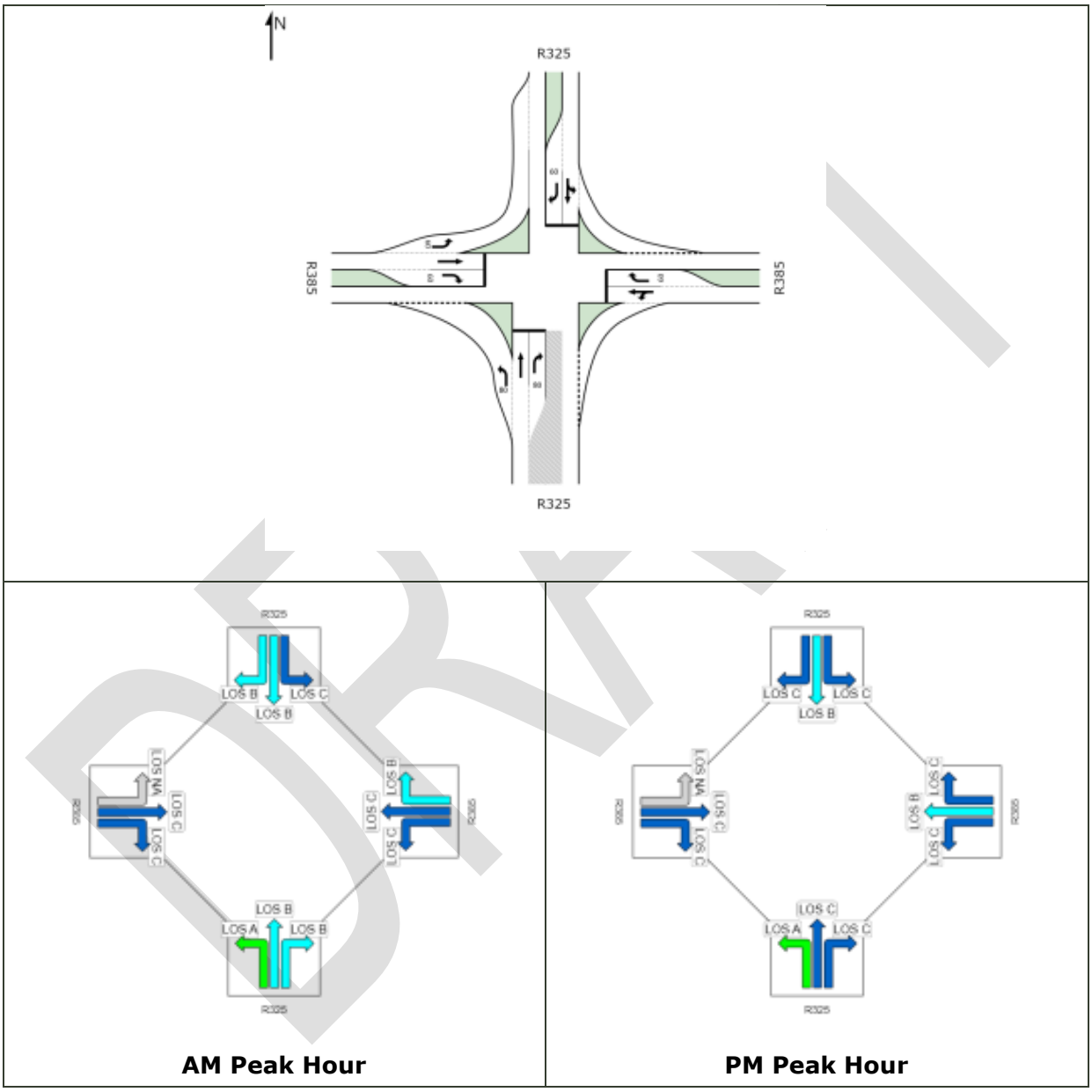


aurecon	EXISTING AM & PM PEAK HOUR TRAFFIC VOLUMES PROPOSED HOUSING DEVELOPMENT - POSTMASBURG, NORTHERN CAPE	PROJECT: 109473
		FIGURE: 2
AUGUST 2013	AURECON (PTY) LTD	SCALE: Not to Scale

Figure 2: Existing AM & PM Peak Hour Traffic Volumes

4.2.1 R325 & R385 Intersection

The R325 and R385 intersection is a four-legged signalised intersection. Both the R325 and the R385 are rural arterials with one basic lane in each direction. The R325 traverses in a north south direction and the R385 traverses in an east west direction. All approaches have left slip lanes and right turning lanes of varying lengths. Both the R325 and the R385 have lane widths of 3.5m. The following configuration and Levels of Service (LOS), as shown in Table 1, can be seen below:



AM Peak Hour **PM Peak Hour**

Table 1: Existing LOS - R325 / R385 Intersection

The SIDRA analysis revealed that this intersection currently operates at acceptable levels of service during both the AM and PM peaks. The average delays at this intersection are 17.7 seconds and 19.8 seconds in the AM and PM peak hours respectively. The

maximum queue lengths at this intersection are 37.4m and 67.9m in the AM and PM peak hours respectively, all of which is considered acceptable during peak hours.

4.2.2 R385 & Stasie Street Intersection

The R385 and Stasie Street intersection is a four-legged stop controlled intersection. Stasie Street can be described as a two way, two lane access road with one lane in each direction. Stasie Street traverses in a north south direction and the R385 traverses in an east west direction. The R385 is a rural arterial two lane, two way road with one lane in each direction. The R385 has priority at this intersection. Both Stasie Street and the R385 have lane widths of 3.5m. The following configuration and Levels of Service (LOS), as shown in Table 2, can be seen below:

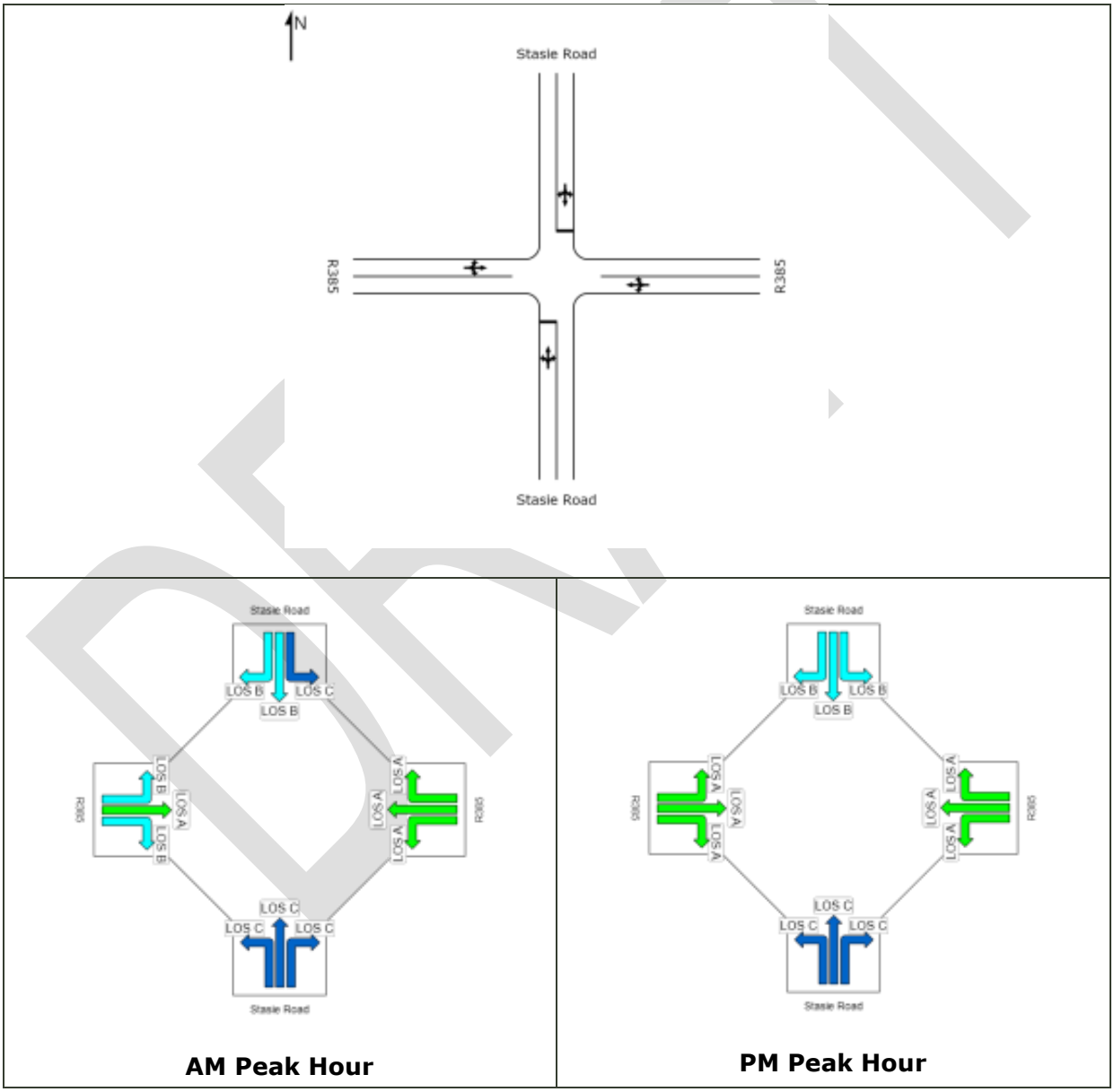


Table 2: Existing LOS - R385 / Stasie Road Intersection

The SIDRA analysis revealed that this intersection currently operates at acceptable levels of service during both the AM and PM peaks. The average delays at this intersection are 6.3 seconds and 6.5 seconds in the AM and PM peak hours respectively. The maximum queue lengths at this intersection are 13.4m and 10.1m in the AM and PM peak hours respectively, all of which is considered acceptable during peak hours.

5 THE PROPOSED RESIDENTIAL DEVELOPMENT

Savannah Environmental (Pty) Ltd has appointed Aurecon (Pty) Ltd on behalf of Transnet SOC to undertake a Traffic Impact Statement for the proposed residential development in Postmasburg, Northern Cape. The proposed development will comprise of 185 residential units.

The proposed residential development will generate additional traffic on the surrounding road network in two distinct phases, namely the construction phase and the operational phase. It must be noted that these two phases will generate traffic consecutively and not simultaneously therefore the traffic volumes generated by each phase will be considered separately from each other.

5.1 Access Proposals

The proposed residential development will have two accesses, both off the main arterial, the R385. As mentioned above, one access to the proposed development will be taken at Stasie Street. Another access will be taken at 8th Avenue. Due to the relatively flat gradients on the R385, the required shoulder sight distance of 175m is achievable on either side of both the access intersections.

5.2 Construction Phase

5.2.1 Construction Workforce

It has been estimated that the construction of the new proposed residential development will require a construction workforce of approximately 55 workers during the peak of the proposed construction. It is reasonable to assume that the workforce will reside in the neighbouring residential areas within a reasonable proximity to the development for the sake of convenience.

As a maximum impact scenario, it is assumed that the entire construction workforce is expected to travel to the site by private vehicle. Using an occupancy rate of 1.5 people per vehicle, the workers travelling by car are expected to generate a maximum of 37 trips in each direction during both the AM and PM peak hours as a maximum impact scenario.

The construction workforce for the proposed residential development is therefore expected to generate approximately 37 veh/h during the AM and PM peak periods, which is considered negligible in traffic capacity terms.

5.2.2 Construction Vehicles

Heavy delivery vehicles will be used to transport the construction equipment and materials to the proposed development during the construction phase. Most of the raw materials and equipment required for the construction of the residential development will be transported to the site via trucks. According to the developers of the project, approximately 10 construction vehicles/day carrying construction materials will arrive on site as a worst case scenario.

By virtue of the size and slow operating speed of a heavy vehicle, it is generally accepted that the road space and time required by a truck is equivalent to 3 passenger car units. Therefore, the volume of truck trips shown above is converted to an equivalent number of passenger car units (pcu) by multiplying the volume of truck trips by a factor of 3 (evu). Therefore, the equivalent number of pcu trips for the construction vehicles equates to 30 trips per day each way. Assuming an even spread of these trips over an 8 hour day, the total number of construction vehicle trips will equate to 4 pcu trips per hour which is negligible.

5.3 Operational Phase

The purpose of this section is to estimate the volume of additional traffic the proposed residential development will generate once it is completed and fully operational.

5.3.1 Trip Generation for the Operational Phase

From the publication – "South African Trip Generation Rates" published by the national DOT, RR92/228 (1995), the proposed development according to the Trip Generation Manual is categorised as cluster residential. Thus, the appropriate peak hour trip generation rate is 1,1 veh/dwelling unit. The weekday AM and PM peak hour traffic for the proposed development can be calculated and summarised as indicated in Table 3 below.

Land Use	Trip Generation Rate	Peak Total Two-way trips	Split	AM Peak Hour		PM Peak Hour	
				IN	OUT	IN	OUT
Cluster Residential	1.1 trips / unit	204 trips	75:25	51	153	153	51

Table 3: AM & PM Peak Hour Trip Generation Rates, Splits & Flows for the Proposed Residential Development

Based on this, the proposed development could generate 204 veh/h two-way trips (51 veh/h entering the development and 153 veh/h leaving the development during the AM peak hour and vice versa during the PM peak hour).

However, it should be noted that most of the workers (Transnet employees) will commute on foot to work due to the close proximity of the railway station to the proposed residential development and therefore, these numbers are considered overly

conservative. A more realistic approach would be to assume that 60% of the workers that will reside in the proposed Transnet residential development will commute to work on foot and that 40% of the workers will use private vehicles for external travel.

Based on this reasonable assumption, the proposed residential development will then be expected to generate a total of 82 two way trips in both the AM and PM peak hours (21 veh/h entering the development and 61 veh/h leaving the development during the AM peak hour and vice versa during the PM peak hour).

Based on the distribution pattern shown in Figure 3, the AM and PM peak hour traffic expected to be generated by this proposed mixed-use development has been assigned onto the surrounding road network as shown in Figure 4 below. The impact of these additional traffic volumes on the surrounding road network was analysed in the opening year of the proposed development are shown on Figure 5.

5.3.2 Trip Distribution

Of the 40% of commuters that will be using private vehicles, it can be reasonably assumed that 70% will use the R385 / Stasie Road intersection. The remaining 30% of workers will use the R385 / 8th Avenue intersection. The distribution of the traffic generated by the proposed mixed use development is expected to be in similar ratios to the distribution of the existing peak period traffic travelling along all the roads and through all of the intersections on the surrounding road network.

5.4 Analysis of the Generated Traffic Volumes

As discussed in the Sections 6.1 and 6.2, the construction and operation of the proposed residential development will generate traffic in two distinct phases i.e. the construction phase and operation phase. The total traffic generated by each phase, shown as an equivalent number of passenger car units in the peak hours is shown in Tables 4 and 5 below.

	AM Peak Hour	**PM Peak Hour**
	Equivalent Number of PCU Trips per hour INBOUND	**Equivalent Number of PCU Trips per Hour OUTBOUND**
Construction Staff	37	37
Construction Vehicles	4	4
Total Vehicles per Hour	**41**	**41**

Table 4: Total PCUs for the Construction Phase

Land Use	Peak Total Two-way trips	Split	AM Peak Hour		PM Peak Hour	
			IN	OUT	IN	OUT
Cluster Residential	82 trips	75:25	21	61	61	21

Table 5: Total PCUs for the Operational Phase

It is evident from Tables 4 and 5 that the proposed construction and operation of the new proposed residential development will generate negligible volumes of traffic on the surrounding road network.

5.5 Analysis of Future Horizons

Generally, the base year scenario and future horizon year scenario are analysed in a typical TIA. However, in accordance with the Department of Transport's Manual on Traffic Impact Studies (RR93/365), developments that generate over 150 vehicles per hour, in peak hours, require a full Traffic Impact Assessment (TIA), while those generating less than 150 vehicles per hour only require a Traffic Impact Statement (TIS). The difference between these two documents is that the TIA must contain recent traffic counts and the analysis of both existing and future traffic flows, whereas in a TIS, little or no analysis is required because of the low volumes, instead the Traffic Engineer's professional opinion is given more emphasis.

Since neither the construction or operational phases of the proposed residential development in Postmasburg will generate more than 150 vehicles per hour in the peak hour, a detailed traffic analysis is not required in this study. Therefore, the traffic analyses contained in this study is only limited to the base year and will not include the analysis of the future scenarios.

The Traffic Engineer will instead provide his professional opinion based a qualitative assessment of his observations and calculations. It was observed during the site visit that the road network within the study area is operating at an acceptable level of service as no congestion problems, excessive queue lengths and delays were evident on the surrounding road network. The surrounding road network has capacity to handle additional volumes of traffic without encountering undue stress.

Given the low volumes of traffic that the proposed development will generate, the traffic engineer is of the opinion that the residential development will have a negligible impact on the surrounding road network in the future.

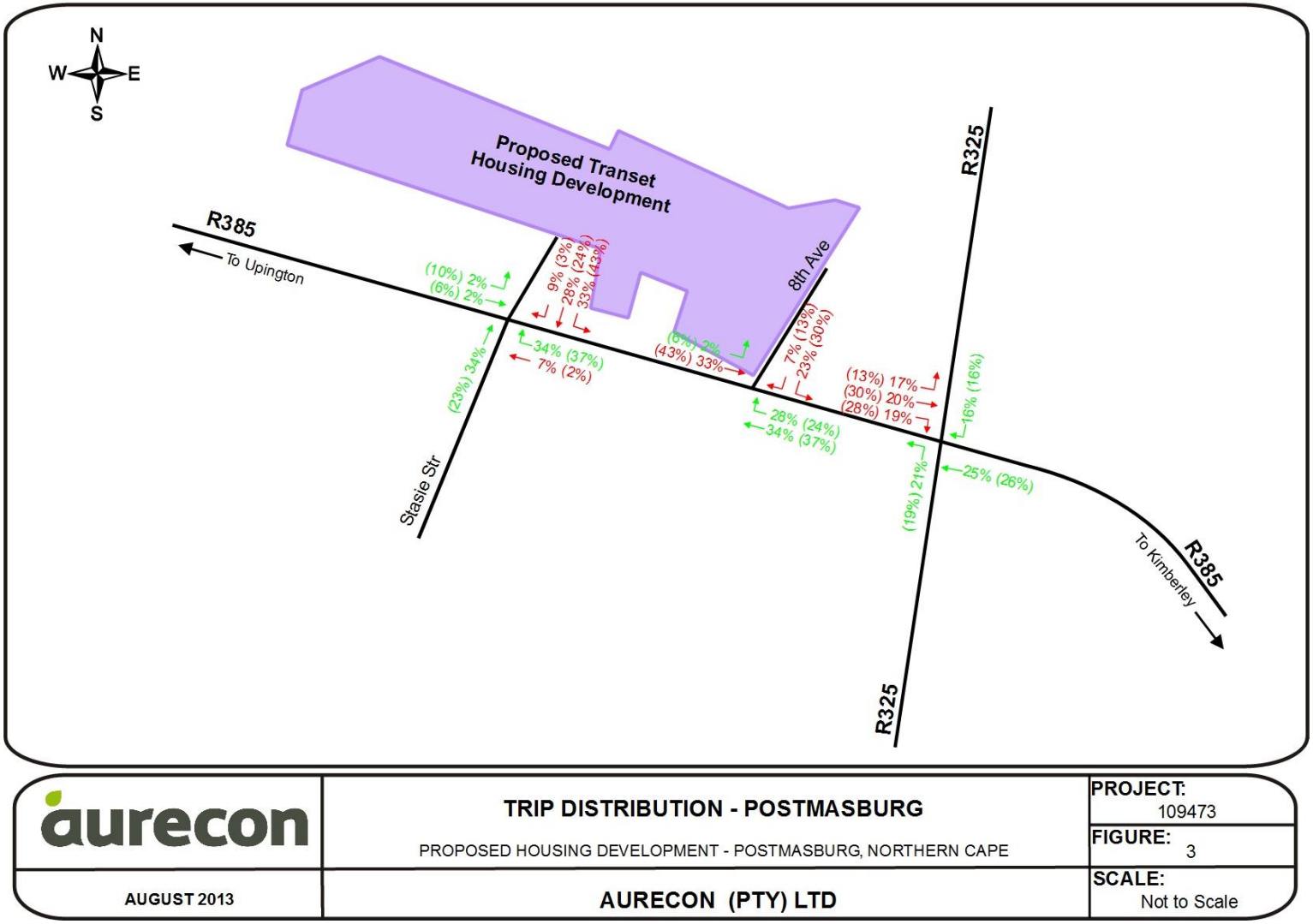
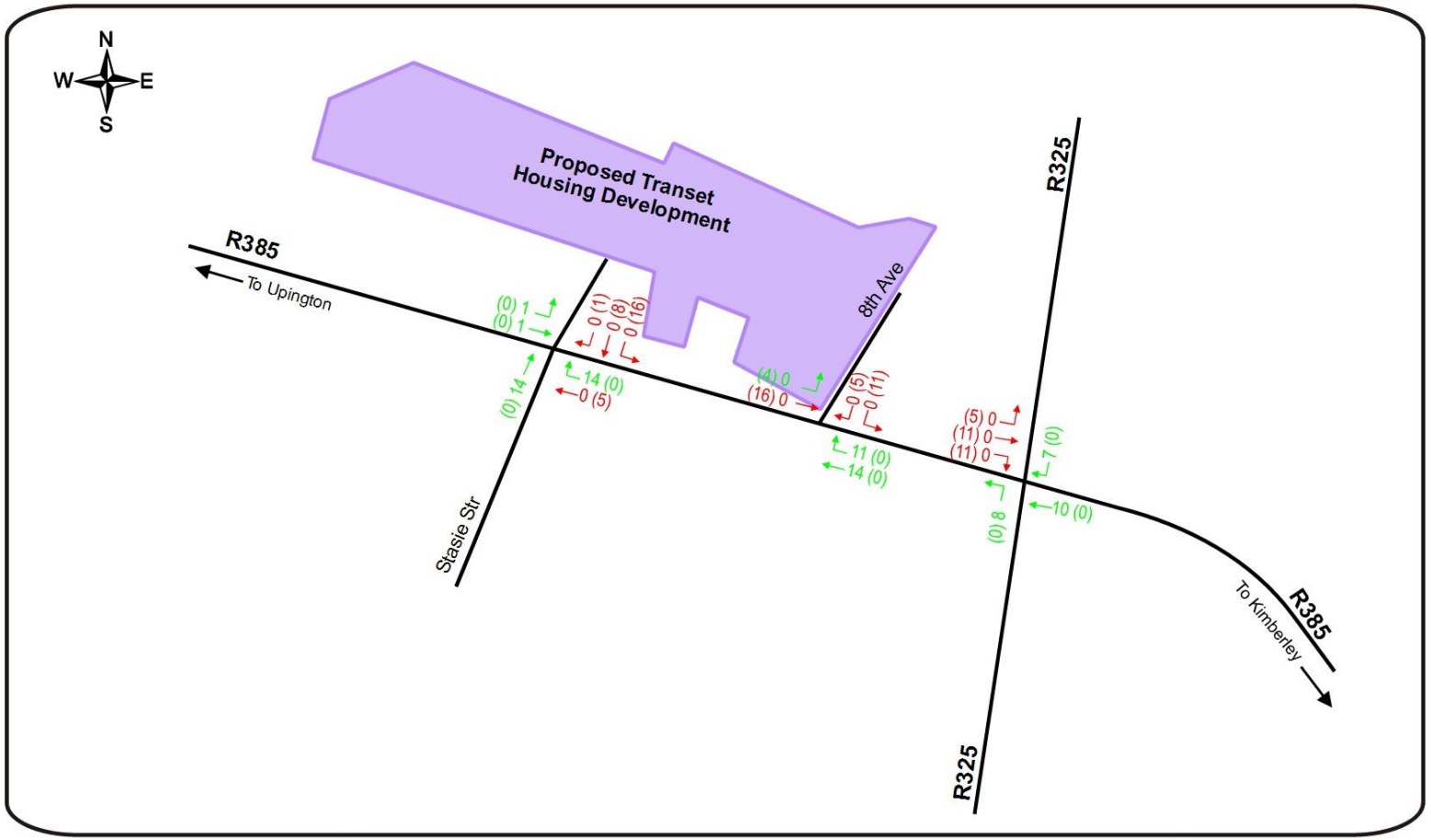
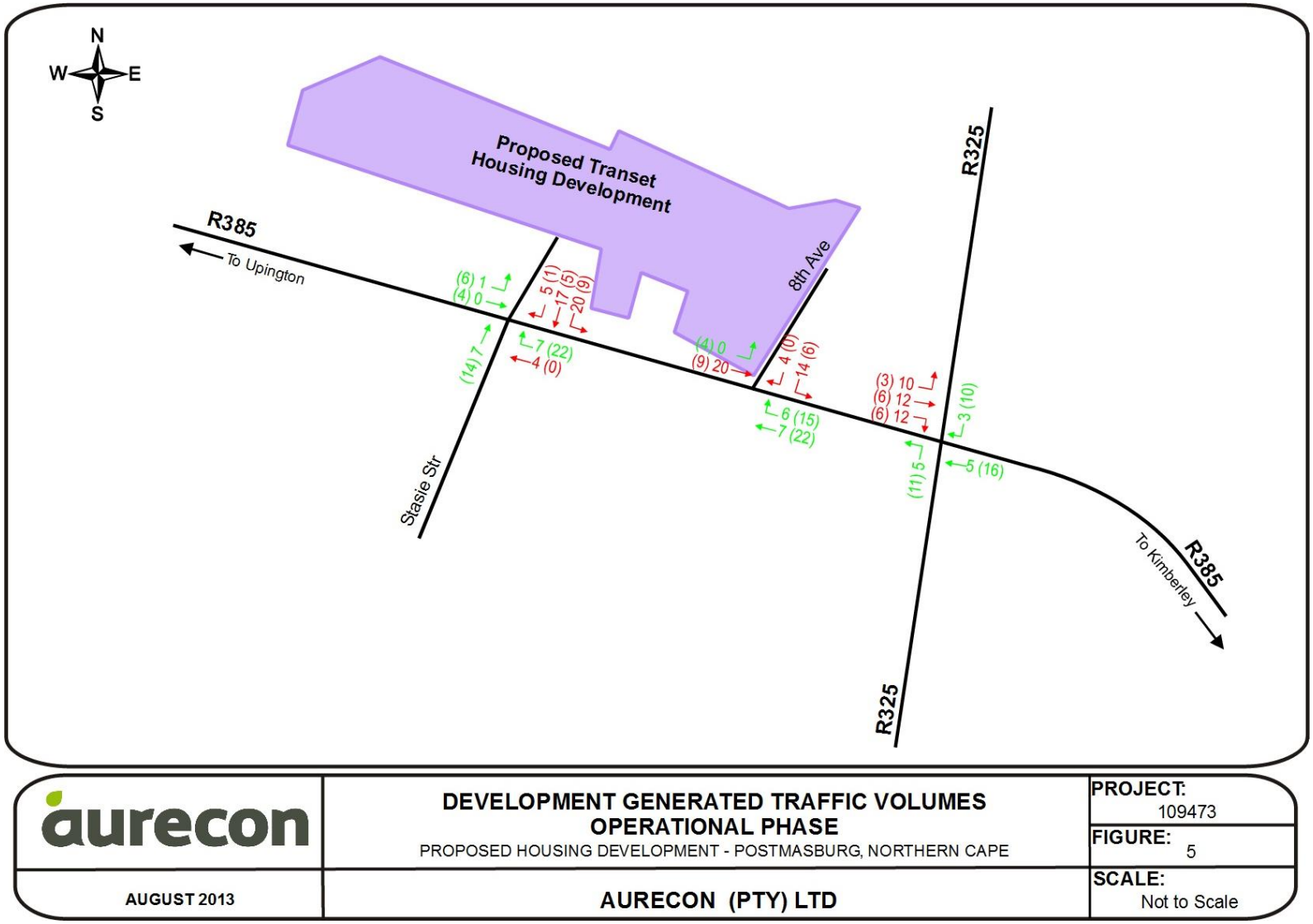


Figure 3: Trip Distribution - Postmasburg



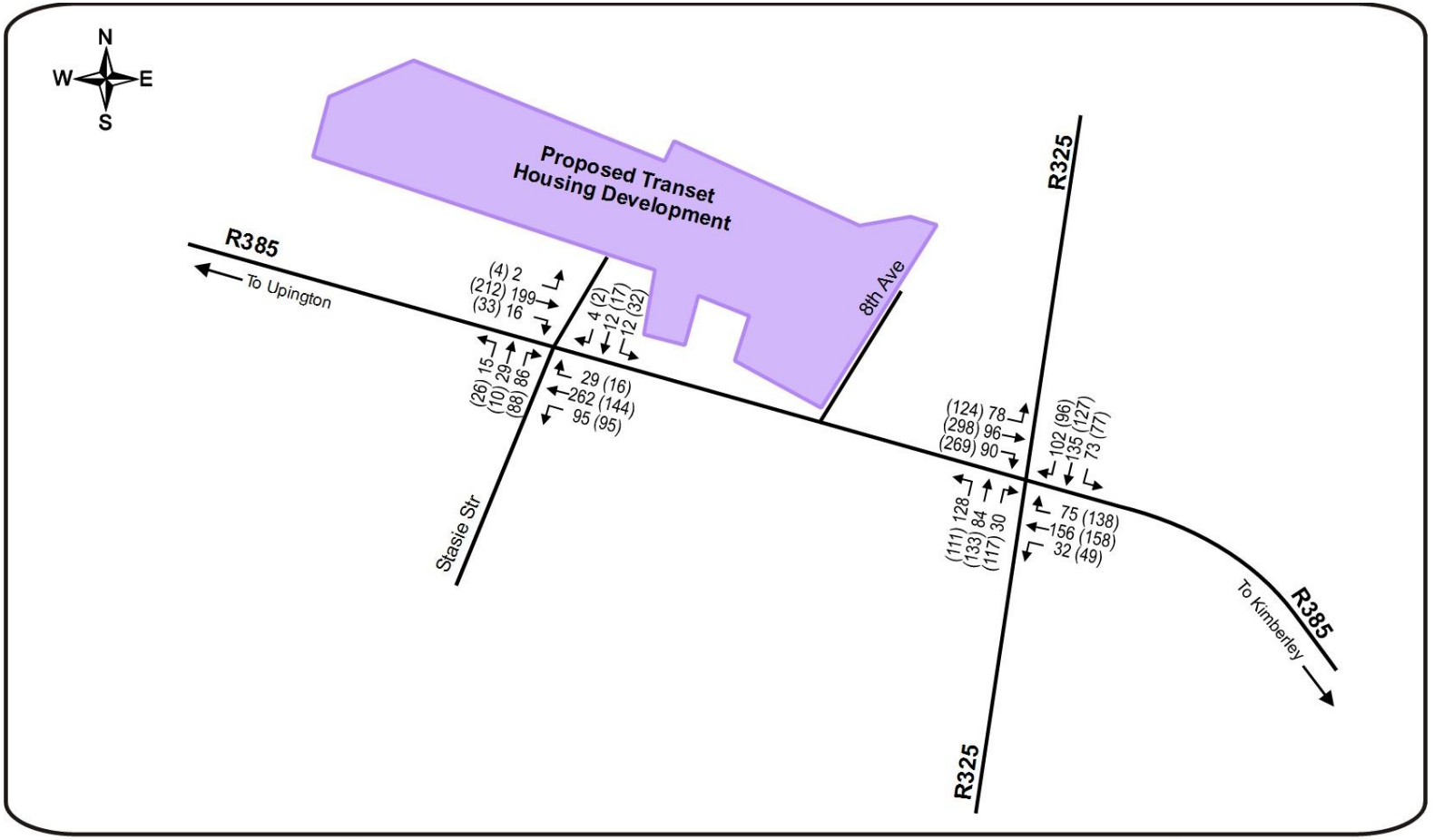
aurecon	DEVELOPMENT GENERATED TRAFFIC VOLUMES CONSTRUCION PHASE PROPOSED HOUSING DEVELOPMENT - POSTMASBURG, NORTHERN CAPE	PROJECT: 109473 FIGURE: 4
AUGUST 2013	AURECON (PTY) LTD	SCALE: Not to Scale

Figure 4: Development Generated Traffic Volumes – Construction Phase



aurecon	DEVELOPMENT GENERATED TRAFFIC VOLUMES OPERATIONAL PHASE PROPOSED HOUSING DEVELOPMENT - POSTMASBURG, NORTHERN CAPE	PROJECT: 109473
		FIGURE: 5
AUGUST 2013	AURECON (PTY) LTD	SCALE: Not to Scale

Figure 5: Development Generated Traffic Volumes – Operational Phase



aurecon	EXISTING PLUS CONSTRUCTIONAL DEVELOPMENT GENERATED AM & PM PEAK HOUR TRAFFIC VOLUMES PROPOSED HOUSING DEVELOPMENT - POSTMASBURG, NORTHERN CAPE	PROJECT: 109473 FIGURE: 6
AUGUST 2013	AURECON (PTY) LTD	SCALE: Not to Scale

Figure 6: Existing plus Development Generated Traffic Volumes – Construction Phase

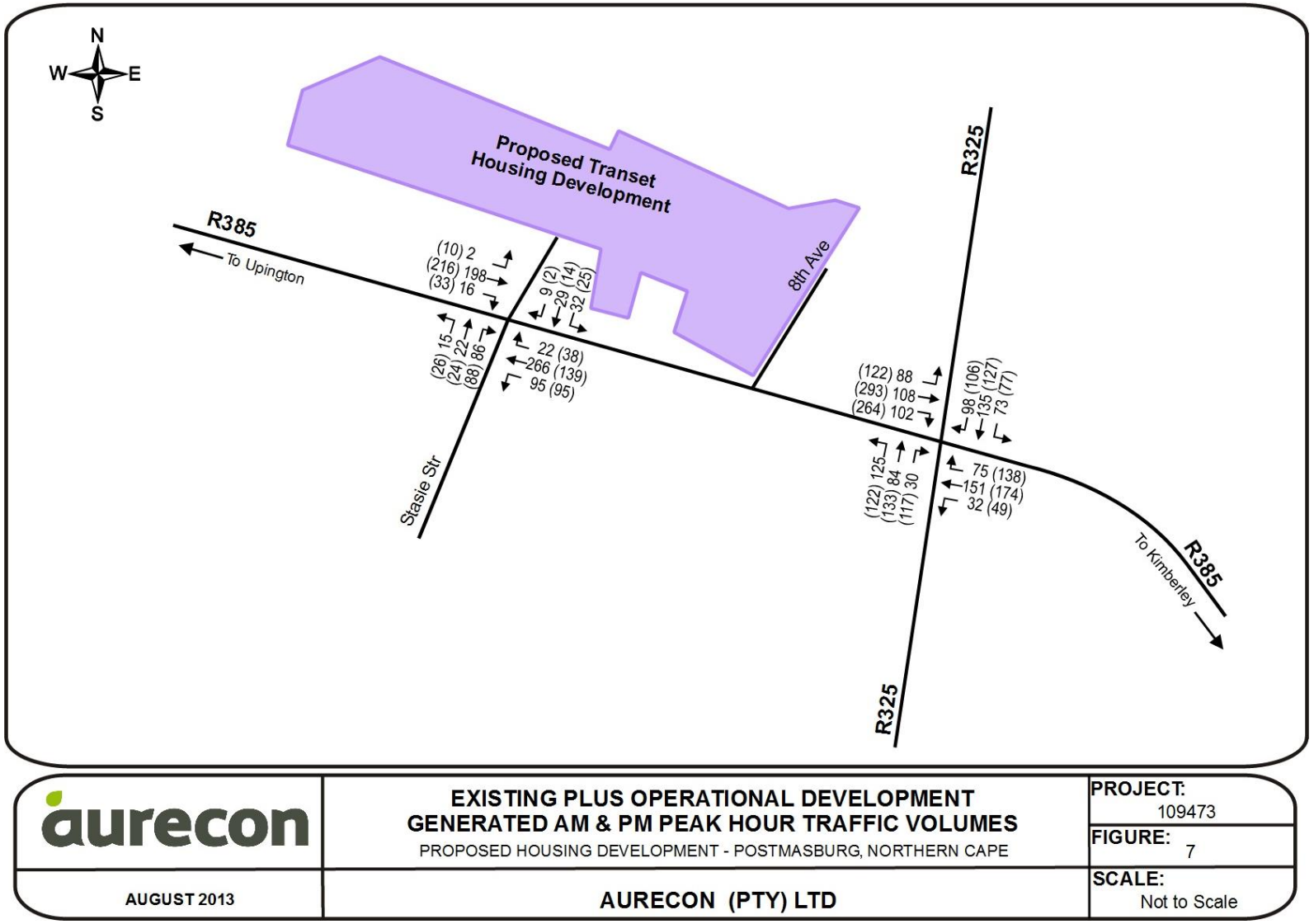


Figure 7: Existing plus Development Generated Traffic Volumes – Operational Phase

6 EXISTING PLUS DEVELOPMENT GENERATED TRAFFIC

The proposed residential development will generate relatively low volumes of additional vehicular traffic on the surrounding road network in the construction and operation phases as discussed in Chapter 5. The impact of these additional traffic volumes on the surrounding road network was analysed in the opening year of the proposed development i.e. the base year. The results yielded by this analysis are discussed below.

6.1 Construction Phase

6.1.1 R325 & R385 Intersection

As mentioned above, the traffic generated by the proposed residential development was distributed based on the existing traffic volumes. The following Levels of Service (LOS) for the construction phase can be seen in **Table 6** below:

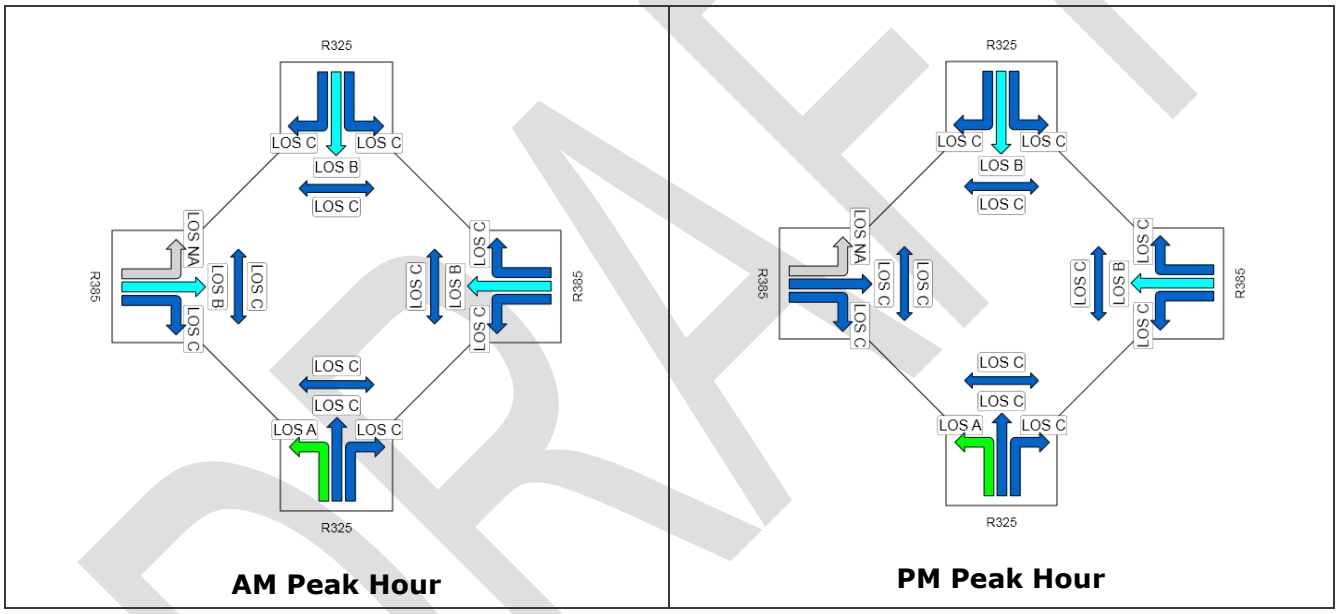


Table 6: Base Year LOS - R325 / R385 Intersection

The intersection was analysed using its current configuration. The SIDRA analysis revealed that this intersection will operate at acceptable levels of service during both the AM and PM peak hours despite the additional traffic volumes that will be generated by the proposed residential development during the construction phase. The average delays at this intersection are 18.5 seconds and 20.1 seconds in the AM and PM peak hours respectively. The maximum queue lengths at this intersection are 43.9m and 71.3m in the AM and PM peak hours respectively, all of which is considered acceptable during peak hours.

6.1.2 R385 & Stasie Road Intersection

The following Levels of Service (LOS) for the base year analysis of this intersection are shown in **Table 7** below:

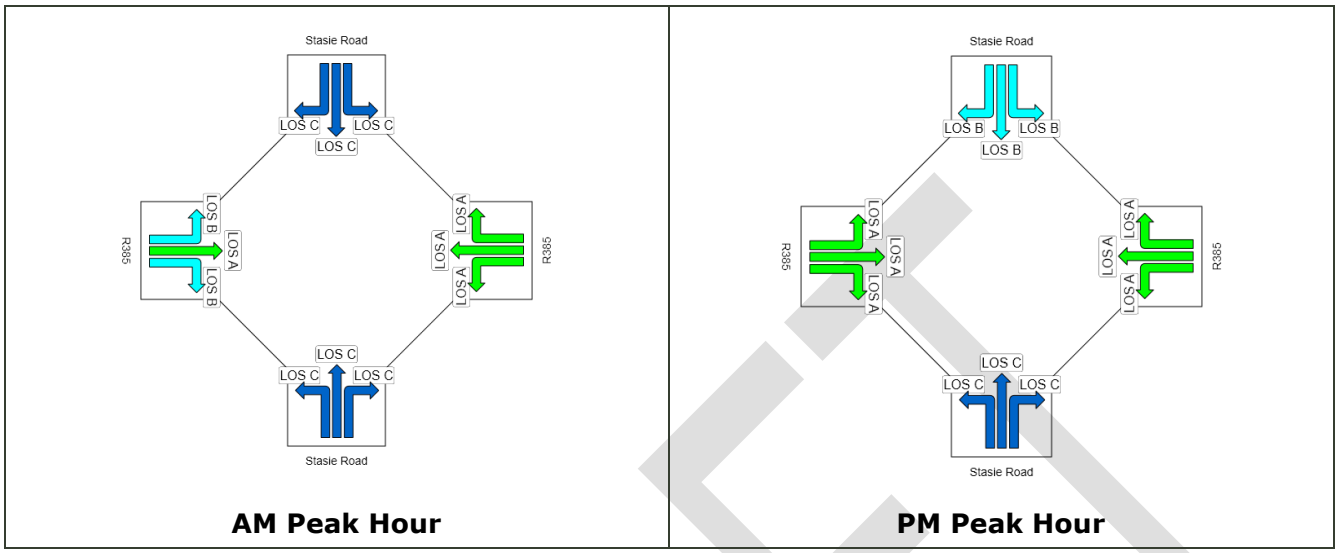


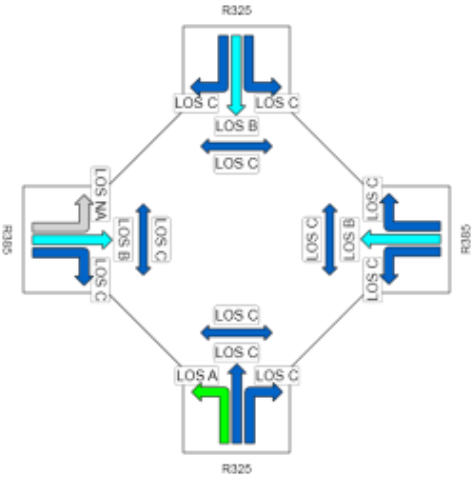
Table 7: Base Year LOS - R385 / Stasie Street Intersection

The intersection was analysed using its current configuration. The SIDRA analysis revealed that this intersection will operate at acceptable levels of service during both the AM and PM peak hours despite the additional traffic volumes that will be generated by the proposed residential development during the construction phase. The average delays at this intersection are 6.7 seconds and 6.8 seconds in the AM and PM peak hours respectively. The maximum queue lengths at this intersection are 14.7m and 10.8 in the AM and PM peak hours respectively, all of which is considered acceptable during peak hours.

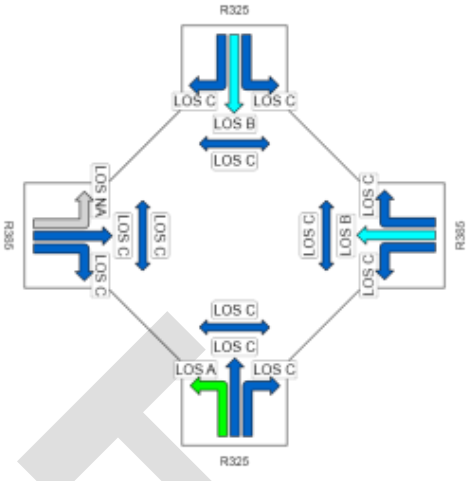
6.2 Operational Phase

6.2.1 R325 & R385 Intersection

As mentioned above, the traffic generated by the proposed residential development for the operational phase was distributed based on the existing traffic volumes. The following Levels of Service (LOS), as shown in **Table 8**, can be seen below:



AM Peak Hour



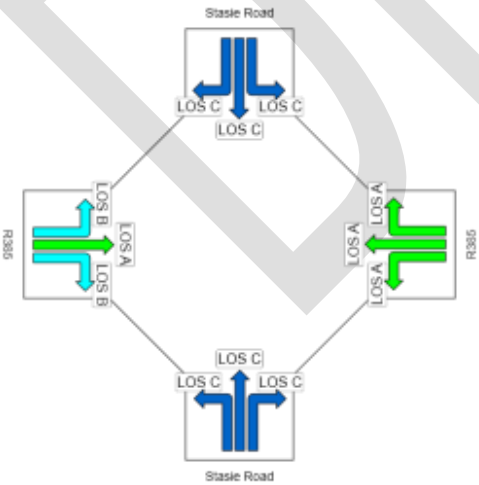
PM Peak Hour

Table 8: Base Year LOS - R325 / R385 Intersection

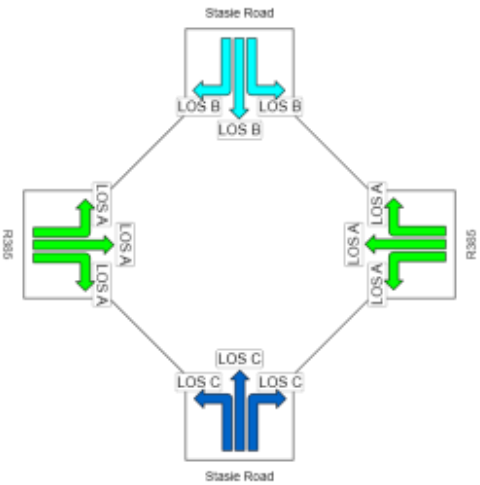
The intersection was analysed using its current configuration. The SIDRA analysis revealed that this intersection will operate at acceptable levels of service during both the AM and PM peak hours despite the additional traffic volumes that will be generated by the proposed residential development in the operational phase. The average delays at this intersection are 18.4 seconds and 20.2 seconds in the AM and PM peak hours respectively. The maximum queue lengths at this intersection are 43.9m and 70.1m in the AM and PM peak hours respectively, all of which is considered acceptable during peak hours.

6.2.2 R385 & Stasie Road Intersection

The following Levels of Service (LOS) for the base year analysis of this intersection are shown in **Table 9** below:



AM Peak Hour



PM Peak Hour

Table 9: Base Year LOS - R385 / Stasie Street Intersection

The intersection was analysed using its current configuration. The SIDRA analysis revealed that this intersection will operate at acceptable levels of service during both the AM and PM peak hours despite the additional traffic volumes that will be generated by the proposed residential development in the operational phase. The average delays at this intersection are 7.1 seconds and 7.2 seconds in the AM and PM peak hours respectively. The maximum queue lengths at this intersection are 14.4m and 13m in the AM and PM peak hours respectively, all of which is considered acceptable during peak hours.

7 ROAD SAFETY

7.1 Pedestrian Conditions

During the site visit it was observed that there is a high volume of pedestrians in the vicinity of the proposed development. Most of the pedestrians can be found around the main R385 / R325 intersection. This is most likely due to the shopping centre which is located just to the east and the school located to the west of this intersection. It was also observed there were no pedestrian crossings on the main R385 / R325 intersection to cater for the high volumes of pedestrians that the activity generators produce.

It is noted that this intersection is in the process of being upgraded by the local municipality and it is recommended that they cater for pedestrians when upgrading this intersection.

7.2 Public Transport

A small number of public transport vehicles was observed on the surrounding road network. Although additional public transport vehicles are expected to frequent the area during both peak periods, this number will be minor.

There will be little interaction between the generated traffic and the public transport vehicles. As long as all road users obey the rules, the additional traffic volumes will pose no threat to public transport vehicles.

8 RISK / IMPACT ASSESMENT

The envisaged impacts of the proposed construction and operation of the proposed residential development in Postmasburg in the Northern Cape on the surrounding road network are quantitatively evaluated in this chapter of the study, according to the methodology prescribed by NEMA. The purpose of this evaluation is to assign relative significance to the predicted impacts associated with the project and to determine the manner in which these impacts are to be avoided, mitigated or managed, if need be. A detailed description of each criterion used in this evaluation and its associated weighting is described in **Appendix A**.

8.1 Impact on Existing Traffic Flows - External

The construction and operation of the proposed development will generate additional traffic on the surrounding road network within the study area. The existing road network is operating at below its capacity during the AM and PM commuter peak periods. As such, the road network has sufficient capacity to handle the low volume of additional traffic that will be generated by the proposed operations of the new residential development.

Two access intersections are proposed off the R385, at Stasie Street and 8th Avenue that will provide direct access to the new residential development. As shown in the traffic analysis carried out in Chapter 7, these new access intersections will not impinge on the efficiency of the intersecting road.

In essence, the construction and operation of the proposed residential development will have a low impact on the surrounding road network. **Table 9.1 and 9.2** shows the significance of the impact of the additional traffic generated by the proposed constructional and operational activities on the existing traffic conditions (road capacity and congestion) respectively during the critical AM and PM peak periods.

CONSTRUCTION PHASE

Table 9.1: Impact of the Generated Traffic on the Existing Traffic Conditions – Construction Phase

Likelihood		Consequence			
Frequency of Activity	**Frequency of Impact**	**Severity of Impact**	**Spatial / Population Scope**	**Duration**	**Rating**
5 Daily	1 Almost Never	1 Insignificant	2 Area Specific	3 One year to 10 years	**Low**
SCORE	6	6			**36**

OPERATIONS PHASE

Table 9.2: Impact of the Generated Traffic on the Existing Traffic Conditions

Likelihood		Consequence			
Frequency of Activity	**Frequency of Impact**	**Severity of Impact**	**Spatial / Population Scope**	**Duration**	**Rating**
5 Daily	1 Almost Never	1 Insignificant	2 Area Specific	4 Life of Operation	**Low**
SCORE	6	7			**42**

Given the low overall rating of this impact for the constructional and operational phases, no mitigation measures are required as the project during both phases generates very low volumes of traffic, which will not adversely impact on the existing levels of service on the surrounding road network.

8.2 Impact on Existing Traffic Flows – Internal

The internal streets within the housing development are presently somewhat informal with both tar and gravel surfacing and a lack of road signs and controls.

The proposed housing development will need a network of surfaced roads with sidewalks and stop and yield controls throughout, together with road markings, all in accordance with the SA Road Traffic Signs Manual.

Existing traffic flows are low and the low traffic generated by the development can be accommodated comfortably without compromising access to existing facilities such as the hostel and maintenance depot. Indeed, once the roads have been formalised and controls have been introduced, conditions will improve.

8.3 Impact on Existing Pedestrians and Cyclists

The additional traffic that will be generated by the construction and operational activities of the proposed residential development will have a minimal impact on the existing space available for pedestrians and cyclists.

It is envisaged that many of the Transnet workers will reside in the new residential development. The new residential development is in close proximity to the train station and therefore all Transnet workers commuting to work on foot will be internal. Therefore the new residential development will have no impact on the existing space available for pedestrians.

The impact of the additional traffic and additional pedestrians generated by the proposed residential development, during the construction and operational phases, on the space available for pedestrians and cyclists is illustrated in **Table 9.3 and 9.4.**

CONSTRUCTION PHASE

Table 9.3: Impact of Generated Traffic & Pedestrians on Existing Pedestrians & Cyclists – Construction Phase

Likelihood		Consequence			
Frequency of Activity	**Frequency of Impact**	**Severity of Impact**	**Spatial / Population Scope**	**Duration**	**Rating**
5 Daily	1 Almost Never	1 Insignificant	2 Area Specific	3 One year to 10 years	**Low**
SCORE	6	6			**36**

OPERATIONS PHASE

Table 9.4: Impact of Generated Traffic & Pedestrians on Existing Pedestrians & Cyclists – Operational Phase

Likelihood		Consequence			
Frequency of Activity	**Frequency of Impact**	**Severity of Impact**	**Spatial / Population Scope**	**Duration**	**Rating**
5 Daily	1 Almost Never	1 Insignificant	2 Area Specific	4 Life of Operation	**Low**
SCORE	6	7			**42**

8.4 Impact on Road Safety

The existing road safety conditions on the surrounding road network are not acceptable. It was observed that there is a high volume of pedestrians in the vicinity of the proposed development. It was also observed there were no pedestrian crossings on the main R385 / R325 intersection to cater for the high volumes of pedestrians that the activity generators produce. This is a pre-existing condition that is not caused by the residential development

Mitigation measures will have to be taken to alleviate the existing pedestrian problem. The R385 / R325 intersection currently does not have pedestrian facilities. The R385 / R325 intersection will be upgraded in the near future and it is recommended that pedestrian crossings be installed at the main R385 / R325 intersection to alleviate this dilemma.

Mitigation measures are required during the construction phase of the proposed residential development to provide adequate road safety in the vicinity of the proposed residential development during the construction phase. It is recommended that a systematic plan such as a Traffic Management Plan be implemented to ensure the safety of all commuters during the construction phase. The Traffic Management Plan will ensure that adequate signage is posted and barriers between the road and the site are specified if necessary. Traffic calming measures will also be adopted, possibly with respect to speed humps etc. The impact of the additional traffic on the road safety conditions of the proposed project is quantified in **Table 9.5**.

Sight distance conditions at the proposed access intersections are good. The new development will generate low volumes of traffic therefore the additional traffic will have a negligible impact on the prevailing road safety conditions. Below is an impact table summarising the significance of the impact of Generated Traffic on Safety with and without mitigation.

Table 9.5: Impact of Generated Traffic on Road Safety

Nature: Road Safety **There are no facilities for pedestrians at the main R385 / R325 Intersection**		
	Without Mitigation	**With Mitigation**
Extent	High (3)	Medium (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Moderate (6)	Very Low (1)
Probability	Probable (3)	Probable (3)
Significance	39 Medium	21 Low
Reversibility	Low	Low
Irreplaceable loss of Resources	Yes	Yes
Can impacts be mitigated	Yes	
Mitigation: It is recommended that facilities for pedestrians be installed at the R385 / R325 Intersection when the intersection is upgraded. It is also recommended that a Traffic Management Plan be implemented to ensure adequate safety and precautionary measures be adhered to during the construction phase.		

8.5 Impact on the Condition of the Surrounding Road Network

The condition of the existing road network is fair. The road network within the study area has been constructed to a fair structural standard to transport large volumes of truck traffic to and from Kimberley and Upington via Postmasburg. From a structural perspective, these roads will confidently convey the additional minimal volumes of traffic that will be generated by the proposed project. Hence, the impact of the additional truck traffic on the existing condition of the road network is expected to be negligible as shown in Table 9.6 and Table 9.7.

Table 9.6: Impact of the Generated Traffic on the Condition of the Road Surface – Construction Phase

Likelihood		**Consequence**			
Frequency of Activity	**Frequency of Impact**	**Severity of Impact**	**Spatial / Population Scope**	**Duration**	**Rating**
1 Annually or Less	1 Almost Never	1 Insignificant	2 Area Specific	3 One year to 10 years	**Very Low**
SCORE	2	6			**12**

Table 9.7: Impact of the Generated Traffic on the Condition of the Road Surface – Operational Phase

Likelihood		Consequence			
Frequency of Activity	**Frequency of Impact**	**Severity of Impact**	**Spatial / Population Scope**	**Duration**	**Rating**
1 Annually or Less	1 Almost Never	1 Insignificant	2 Area Specific	4 Life of Operation	**Very Low**
SCORE	2	7			**14**

9 CONCLUSIONS

Based on the above analyses, the following conclusions can be drawn with regard to the traffic impact of the proposed residential development located in Postmasburg, Northern Cape:

- Savannah Environmental (Pty) Ltd has appointed Aurecon to undertake a traffic study for the establishment of a new residential development in Postmasburg in the Northern Cape.
- Since the proposed development will generate less than 150 vehicles per hour during the peak hours, only a Traffic Impact Statement (TIS) is required.
- Analyses of existing traffic conditions on the external road network and intersections surrounding the proposed residential development showed that generally the traffic conditions during typical weekday AM and PM peak hours are good with very little congestion during peak hours.
- The proposed development will comprise of a maximum of 185 houses / units in total. Due to the fact that most workers will commute to work on foot, the proposed development will generate approximately 82 veh/h, two-way in the AM and PM peak hours.
- The distribution of the traffic generated by the proposed development in Postmasburg is expected to be in similar ratios to the distribution of the existing peak period traffic travelling along all the roads and through all of the intersections on the surrounding road network.

- The analyses of the existing plus development generated traffic showed that the additional traffic generated by the proposed residential development will not have an impact on the surrounding road network. The surrounding road network is currently operating well below its capacity. Therefore, the generated traffic volumes will easily be accommodated by the existing road network without reducing the levels of service on the surrounding road network.

- These additional trips will have little or no effect on public transport or pedestrian activities in the area.

- The streets within the housing development will need to be surface with sidewalks and formalised controls and road markings will be required. This will i8mprove internal traffic conditions.

- During the site visit it was observed that there is a high volume of pedestrians in the vicinity of the proposed development. It was also observed there were no pedestrian crossings on the main R385 / R325 intersection to cater for the high volumes of pedestrians that the activity generators produce. It is recommended, from a safety standpoint, that pedestrian crossings be installed at the main R385 / R325 intersection when this intersection is upgraded to alleviate this dilemma.

- No additional public transport infrastructure will be required to accommodate the additional public transport passengers likely to be generated by the proposed residential development. It is highly possible that there will be little interaction between the generated traffic and the public transport vehicles. As long as all road users obey the rules, the additional traffic volumes will pose no threat to public transport vehicles.

10 RECOMMENDATIONS

The volume of traffic generated by the proposed residential development is not expected to have a detrimental effect on the surrounding internal and external road network, especially during peak hours.

An existing pedestrian safety problem exists at the P385/P325 intersection and this should be brought to the local authority's attention with a view to them remedying this problem when they improve this intersection in the near future.

It is therefore recommended that, from a traffic perspective, the proposed construction of the housing development in Postmasburg be approved.

Appendix A
Risk / Impact Assessment Methodology

Assessing the Significance of Impacts

The purpose of impact evaluation is to assign relative significance to predicted impacts associated with the project, and to determine the manner in which impacts are to be avoided, mitigated or managed. The accumulated knowledge and findings of the specialist studies inform the process of assessing the significance of the impacts identified according to the following criteria:

1.1 Description of aspects and impacts

1.1.1 Spatial scope

The geographical coverage (spatial scope) description will take account of the following factors:

The physical extent / distribution of the aspect and proposed impact; and

The nature of the baseline environment within the area of impact.

For example, the impacts of noise are likely to be confined to a smaller geographical area than the impacts of atmospheric emissions, which may be experienced at some distance. The significance of impacts also varies spatially. Many will be significant only within the immediate vicinity of the site or within the surrounding community, whilst others may be significant at a regional or national level.

The spatial scope of the impact will be rated on the following scale:

Activity specific	1
Area specific	2
Whole site	3
Regional / neighbouring areas	4
National	5

1.1.2 Duration

Duration refers to the length of time that the aspect may cause a change either positively or negatively on the environment[1]. The environmental assessment distinguishes between different time periods by assigning a rating to duration based on the following scale:

[1] This may take place without a receptor being impacted.

One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure	5

1.1.3 Severity

The severity of an environmental aspect is determined by the degree of change to the baseline environment and includes consideration of the following factors:

The reversibility of the impact;

The sensitivity of the receptor to the stressor;

The impact duration, its permanency and whether it increases or decreases with time;

Whether the aspect is controversial or would set a precedent; and

The threat to environmental and health standards and objectives.

The severity of each of the impacts will be rated on the following scale:

Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful	5

1.1.4 Frequency of the activity

The frequency of the activity occurring will be rated on the following scale:

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

1.1.5 Frequency of the impact

The frequency of the impact occurring refers to how often the aspect impacts or may impact either positively or negatively on the environment. After describing the probability, the findings will be described using the following scale:

Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

1.2 Significance determination

The environmental significance rating is an attempt to evaluate the importance of a particular impact, the consequence and likelihood of which has already been assessed by the relevant specialist. The description and assessment of the aspects and impacts undertaken as outlined in Section 4.2.1 above is presented in a consolidated table (Table 1) with the significance of the impact assigned using the process and matrix detailed below. The sum of the first three criteria (spatial scope, duration and severity) provides a collective score for the CONSEQUENCE of each impact. The sum of the last two criteria (frequency of activity and frequency of impact) determines the LIKELIHOOD of the impact occurring. The product of CONSEQUENCE and LIKELIHOOD leads to the assessment of the SIGNIFICANCE of the impact, shown in the significance matrix below. The model outcome is then assessed in terms of impact certainty and consideration of available information. Where a particular variable rationally requires weighting or an additional variable requires consideration the model outcome is adjusted accordingly. Arguments for such adjustments are presented in the text and associated table.

Table A: Framework for assessing environmental impacts

SPATIAL SCOPE	RATING	DURATION	RATING	SEVERITY	RATING
Activity specific	1	One day to one month	1	Insignificant / non-harmful	1
Area specific	2	One month to one year	2	Small / potentially harmful	2
Whole site / plant	3	One year to ten years	3	Significant / slightly harmful	3
Regional (neighbouring areas)	4	Life of operation	4	Great / harmful	4
National	5	Permanent	5	Disastrous / extremely harmful	5

FREQUENCY OF ACTIVITY	RATING	FREQUENCY OF IMPACT	RATING
Annually or less	1	Almost never / almost impossible	1
6 monthly	2	Very seldom / highly unlikely	2
Monthly	3	Infrequent / unlikely / seldom	3
Weekly	4	Often / regularly / likely / possible	4
Daily	5	Daily / highly likely / definitely	5

SIGNIFICANCE RATING OF IMPACT	TIMING
Very Low (1-25) **Low** (26-50) **Medium -Low** (51-75) **Medium-High** (76-100) **High** (101-125) **Very High** (126-150)	Pre-construction Construction Operation
ADJUSTED SIGNIFICANCE RATING	

1.3 Mitigation

In assessing the significance of the impact, natural and existing mitigation will be taken into account. Natural and existing mitigation measures are defined as natural conditions, conditions inherent in the project design and existing management measures that alleviate (control, moderate or curb) impacts.

In addition, where necessary measures to avoid, reduce or manage impacts consistent with best practice will be proposed and the effectiveness of such measures assessed in terms of their ability to avoid an impact, remove an impact entirely, render it insignificant or reduce its magnitude. The significance of impacts will therefore be determined both before and after mitigation.

An EMP will be prepared as part of the EIR prepared during the assessment phase. This plan will specify the methods and procedures for managing the environmental aspects of the proposed development. Monitoring requirements will also be detailed within the plan, particularly for those environmental aspects that give rise to potentially significant impacts.

Appendix B
Traffic Counts

R325 / R385 Intersection

TRAFFIC SURVEY ANALYSIS

CLIENT: AURECON

SITE: INTERSECTION OF R325&385

DATE: AM PEAK COUNT ON TUESDAY 30 JULY
UNITS: CLASSIFIED

APPROACH FROM	NORTH																		TOTAL
NAME	R325																		
MOVEMENT	LEFT TURN						STRAIGHT						RIGHT TURN						ALL
TIME	C	T	Tr	H	B	TOTAL	C	T	Tr	H	B	TOTAL	C	T	Tr	H	B	TOTAL	MOVEMENTS
07:00-07:15	15	0	0	0	0	15	40	6	2	0	0	48	24	1	2	0	3	30	93
07:15-07:30	21	2	0	0	0	23	36	1	0	0	1	38	18	1	1	0	1	21	82
07:30-07:45	17	2	0	0	0	19	30	5	0	0	0	35	11	3	0	2	4	20	74
07:45-08:00	10	3	1	2	0	16	11	2	1	0	0	14	20	3	0	1	0	24	54
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
16:00-16:15	22	0	1	0	0	23	20	2	2	0	1	25	13	1	2	0	0	16	64
16:15-16:30	18	3	3	1	2	27	43	7	3	0	0	53	22	1	6	1	2	32	112
16:30-16:45	10	1	0	0	0	11	21	2	3	0	0	26	19	3	4	0	2	28	65
16:45-17:00	16	0	0	0	0	16	19	2	2	0	0	23	15	3	2	0	0	20	59
TOTAL	**129**	**11**	**5**	**3**	**2**	**150**	**220**	**27**	**13**	**0**	**2**	**262**	**142**	**16**	**17**	**4**	**12**	**191**	**603**

TRAFFIC SURVEY ANALYSIS

CLIENT: AURECON

SITE: INTERSECTION OF R325&R385

DATE: AM PEAK TUESDAY JULY 30
UNITS: CLASSIFIED

APPROACH FROM	SOUTH																		TOTAL
NAME	R325																		
MOVEMENT	LEFT TURN						STRAIGHT						RIGHT TURN						ALL
TIME	C	T	Tr	H	B	TOTAL	C	T	Tr	H	B	TOTAL	C	T	Tr	H	B	TOTAL	MOVEMENTS
07:00-07:15	27	1	0	0	1	29	22	1	1	0	0	24	6	0	0	0	0	6	59
07:15-07:30	35	1	2	0	1	39	18	1	0	0	0	19	3	0	0	0	0	3	61
07:30-07:45	28	0	0	0	0	28	12	3	2	0	0	17	8	2	1	0	0	11	56
07:45-08:00	20	2	2	0	0	24	15	8	1	0	0	24	9	0	1	0	0	10	58
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
16:00-16:15	18	1	2	0	0	21	35	4	1	0	0	40	21	1	1	1	0	24	85
16:15-16:30	38	0	2	0	0	40	27	5	0	0	1	33	35	2	1	0	1	39	112
16:30-16:45	24	1	3	1	0	29	29	5	1	1	0	36	24	1	1	0	0	26	91
16:45-17:00	20	0	1	0	0	21	20	2	2	0	0	24	24	3	1	0	0	28	73
TOTAL	**210**	**6**	**12**	**1**	**2**	**231**	**178**	**29**	**8**	**1**	**1**	**217**	**130**	**9**	**6**	**1**	**1**	**147**	**595**

TRAFFIC SURVEY ANALYSIS

CLIENT: AURECON

SITE: INTERSECTION OF R32! 5 & 385

DATE: AM PEAK ON TUESDAY JULY 30

UNITS: CLASSIFIED

APPROACH FROM	EAST																		TOTAL
NAME	R385																		
MOVEMENT	LEFT TURN						STRAIGHT						RIGHT TURN						ALL
TIME	C	T	Tr	H	B	TOTAL	C	T	Tr	H	B	TOTAL	C	T	Tr	H	B	TOTAL	MOVEMENTS
07:00-07:15	6	0	0	1	0	7	45	2	0	1	0	48	17	2	1	2	0	22	77
07:15-07:30	5	0	1	0	0	6	29	5	4	0	0	38	17	2	1	2	0	22	66
07:30-07:45	6	0	1	0	0	7	26	2	2	0	0	30	12	2	3	0	0	17	54
07:45-08:00	11	1	0	0	0	12	24	5	1	0	0	30	14	0	0	0	0	14	56
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
16:00-16:15	16	0	0	0	0	16	28	1	1	0	1	31	39	0	1	0	0	40	87
16:15-16:30	9	0	0	0	0	9	39	2	6	0	0	47	31	0	1	0	0	32	88
16:30-16:45	8	1	0	0	0	9	37	2	2	1	2	44	26	2	0	0	0	28	81
16:45-17:00	14	1	0	0	0	15	31	1	0	4	0	36	35	2	0	1	0	38	89
TOTAL	**75**	**3**	**2**	**1**	**0**	**81**	**259**	**20**	**16**	**6**	**3**	**304**	**191**	**10**	**7**	**5**	**0**	**213**	**598**

TRAFFIC SURVEY ANALYSIS

CLIENT: AURECON

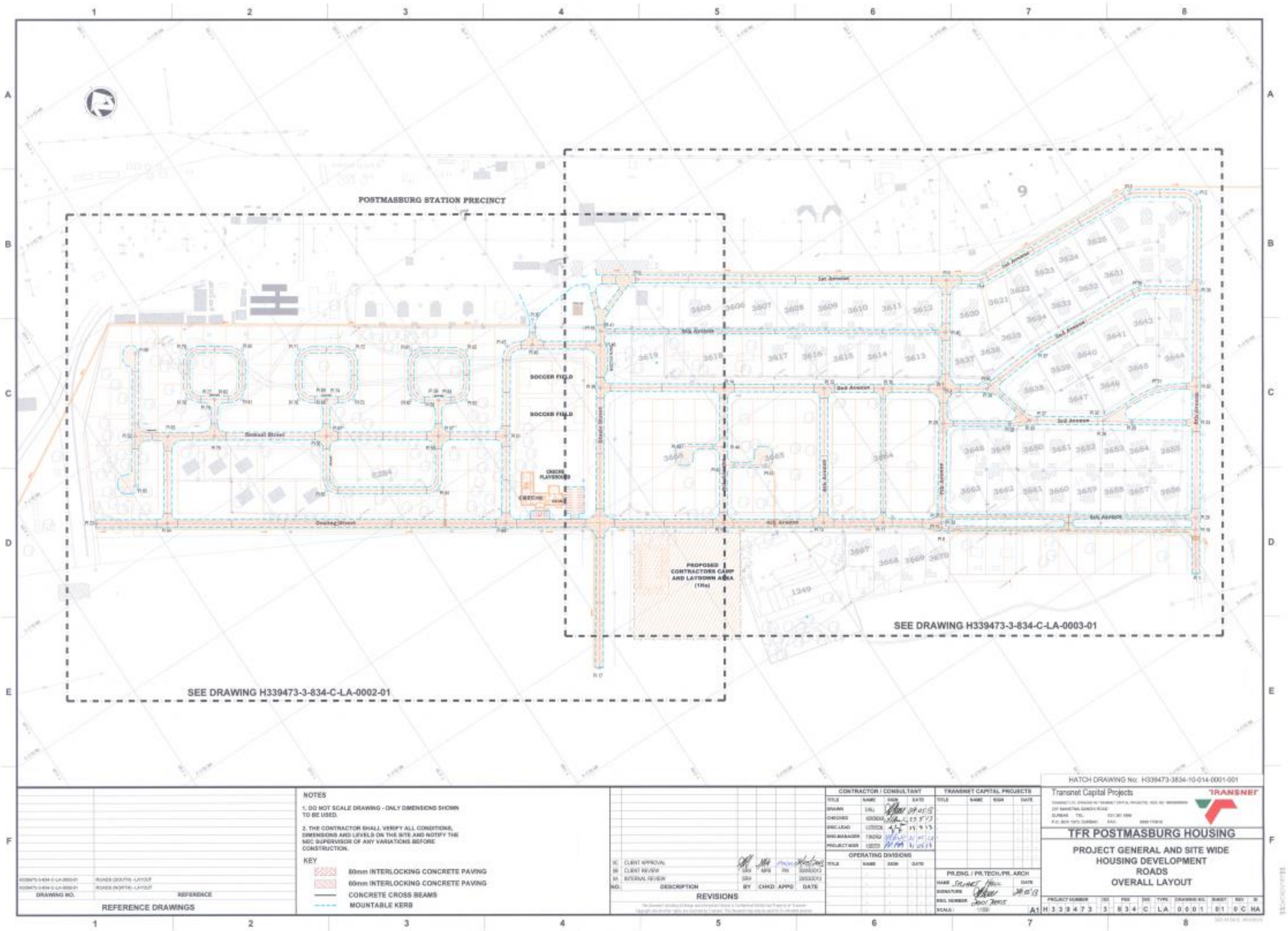
SITE: INTERSECTION OF R325&385

DATE: AM PEAK ON TUESDAY 30 JULY

UNITS: CLASSIFIED

APPROACH FROM	WEST																		TOTAL
NAME	R385																		
MOVEMENT	LEFT TURN						STRAIGHT						RIGHT TURN						ALL
TIME	C	T	Tr	H	B	TOTAL	C	T	Tr	H	B	TOTAL	C	T	Tr	H	B	TOTAL	MOVEMENTS
07:00-07:15	14	2	5	1	3	25	17	3	0	0	0	20	23	1	0	0	0	24	69
07:15-07:30	8	6	0	2	1	17	22	3	1	0	0	26	20	0	0	0	0	20	63
07:30-07:45	13	0	6	0	3	22	31	0	0	2	0	33	22	0	1	0	0	23	78
07:45-08:00	9	1	0	1	3	14	14	0	2	1	0	17	21	2	0	0	0	23	54
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
						0						0						0	0
16:00-16:15	26	4	1	1	2	34	61	0	3	3	0	67	74	1	1	1	0	77	178
16:15-16:30	24	5	1	0	0	30	75	3	2	0	0	80	82	1	1	0	0	84	194
16:30-16:45	29	2	1	0	2	34	69	5	5	4	0	83	59	3	1	0	0	63	180
16:45-17:00	17	1	2	0	1	21	51	3	2	1	0	57	34	0	0	0	0	34	112
TOTAL	**140**	**21**	**16**	**5**	**15**	**197**	**340**	**17**	**15**	**11**	**0**	**383**	**335**	**8**	**4**	**1**	**0**	**348**	**928**

Appendix C
Site Layout



POSTMASBURG STATION PRECINCT
SOCCER FIELD
SOCCER FIELD
PROPOSED CONTRACTORS CAMP AND LAYDOWN AREA (1Ha)
SEE DRAWING H339473-3-834-C-LA-0003-01
SEE DRAWING H339473-3-834-C-LA-0002-01
NOTES
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
KEY
80mm INTERLOCKING CONCRETE PAVING
60mm INTERLOCKING CONCRETE PAVING
CONCRETE CROSS BEAMS
MOUNTABLE KERB
REFERENCE DRAWINGS
REVISIONS
TFR POSTMASBURG HOUSING
PROJECT GENERAL AND SITE WIDE HOUSING DEVELOPMENT ROADS OVERALL LAYOUT
Transnet Capital Projects
TRANSNET

Postmasburg – Northern Cape

Date 2 September 2013
Reference 109473
Revision 02 - Final

Aurecon South Africa (Pty) Ltd

1977/003711/07

PO Box 932
Pinetown
3600
South Africa

T +27 31 714 2500
F +27 31 702 0287
E eThekwini@aurecongroup.com
W aurecongroup.com