

**TRAFFIC IMPACT ASSESSMENT FOR THE PROPOSED COAL MINING IN
FARM TENBOSCH 162 JU EXCLUDING PORTION 46, 74 AND 90; FARM
VYEBOOM 414 JU EXCLUDING PORTION 01; FARM TECKLENBURG'S
RANCH 548 JU AND TURFBULT 593 JU WITHIN THE JURISDICTION OF
NKOMAZI LOCAL MUNICIPALITY OF THE EHLANZENI DISTRICT
MUNICIPALITY IN MPUMALANGA PROVINCE**

Prepared for:



On Behalf of:



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INDEMNITY AND CONDITIONS RELATING TO THIS REPORT

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EXECUTIVE SUMMARY

This traffic impact assessment was done as part of the Environmental Impact Assessment for the mining right application by Manzolwandle Investments (Pty) Ltd. The basis of this report was done in accordance with the Guidelines for Traffic Impact Studies. The study identified possible traffic impacts resulting from the proposed mining operation and, where necessary, propose remedial action.

The proposed site is approximately 17975 hectares in extent and located at approximately 4 km west of Komatipoort, 10 km west of Lebombo border control, approximately 31 km from Malelane, using the N4 road to Mozambique, and approximately 93 km east of Nelspruit, Ehlanzeni District Municipality, Mpumalanga Province.

There are four access roads that are usable by the proposed mine, the N4, Olifant Drive, Coopersal, and R571. Traffic count was conducted in three intersections, the Olifant drive – N4, the Coopersal – N4 and the Olifant Drive – R571. The traffic count was relatively the same except for the Olifant Drive – R571 intersection which recorded the fewest vehicles on the road. However, the main road to be used by the mine will be the Coopersal Road from the N4 as it provides access to the remainder portion of Farm Tecklenburg's Ranch 548 JU where the surface mining activities will take place and where the surface infrastructures are located.

For the purposes of this study we assumed that operations will take place 5 days a week, 8 hours a day, with one shift. To derive an expected trip generation for the project a number of assumptions had to be made at this stage.

From a traffic flow point of view, the worst case scenario in terms of the number of expected trips generated by the project will be evaluated. The expected morning peak hour trip generation and afternoon peak hour trip generation that will be used in this report are depicted further in the report.

It is expected that the majority of the shift workers will use Mine transport and the proposed development of the project can be supported from a traffic flow point of view with provision be made on site to accommodate the safe loading and off-loading of staff using Mine transport as well as an in house traffic management plan.

The mining operations will generate additional traffic on the existing roads within the study area, however the input of the mine vehicles including heavy vehicles

will be less than 150 veh/hr and will therefore not require Full Traffic Impact Assessment but a traffic impact statement will suffice.

The assessment established that the proposed mining will have minimal impact on the existing traffic conditions on all of the assessed roads. The impacts will be manageable; it is however recommended that monitoring of traffic impact be conducted on a 3-year cycle.

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LIST OF ACRONYMS

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

Manzolwandle Investments (Pty) Ltd has appointed Singo Consulting appointed Mielelani Consultancy, an independent consulting company, to conduct a Traffic Impact Assessment to assess the mine impacts of development on the transport network and identify reasonable solutions, applicable and to address these impacts of the proposed Coal mining project is located approximately 4 km west of Komatipoort, Mpumalanga Province, 10 km west of Lebombo border control, approximately 31 km from Malelane, using the N4 road to Mozambique, and approximately 93 km east of Nelspruit. The proposed site is located on the south of the Kruger National Park, and is enclosed by the Crocodile River on the north and Komati River on the South. The Ehlanzeni district area consists of four local municipalities, namely, Bushbuckridge, City of Mbombela, Thaba Chweu and Nkomazi municipalities. The mining operations will generate additional traffic on the existing roads within the study area. The public roads to be affected by the proposed mining are the following:

- ❖ The N4 from the Lembobo Border to Nelspruit;
- ❖ Olifant Drive from the N4 to Marloth Park;
- ❖ Coopersal Road from the proposed farms to the N4; and
- ❖ R571 which connects Olifant Drive to the Komatipoort Town

The purpose of this specialist traffic and transportation study is therefore to estimate the daily traffic that the proposed construction and operations is likely to generate. Furthermore, this study will endeavour to assess the impact of this additional traffic on the surrounding road network and make recommendations for mitigation or improvements.

1.1 Study terms of Reference

The objectives for this specialist traffic and transportation study are thus as follows:

- To undertake a review of all relevant literature and a field study to describe the baseline traffic conditions.
- To determine the potential environmental and social (including labour, health and safety) indirect, direct and cumulative risks / impacts to receptors for each activity.
- To propose mitigation measures for the identified significant risks / impacts and enhance positive risks / impacts of the project.
- To identify monitoring and capacity requirements and costs for implementing the suggested mitigation measures.

1.2 Study Location

Manzolwandle Investments (Pty) Ltd proposes to undertake coal mining in Farm Tenbosch 162 JU excluding portion 46, 74 and 90; Farm Vyeboom 414 JU excluding portion 01; Farm Tecklenburg's Ranch 548 JU and Turfbult 593 JU within the Jurisdiction of Nkomazi Local Municipality of the Ehlanzeni District Municipality in Mpumalanga Province. The proposed site is approximately 17975 hectares in extent and located at approximately 4 km west of Komatipoort, 10 km west of Lebombo border control, approximately 31 km from Malelane, using the N4 road to Mozambique, and approximately 93 km east of Nelspruit. The proposed site is located on the south of the Kruger National Park, and is enclosed by the Crocodile River on the north and Komati River on the South.

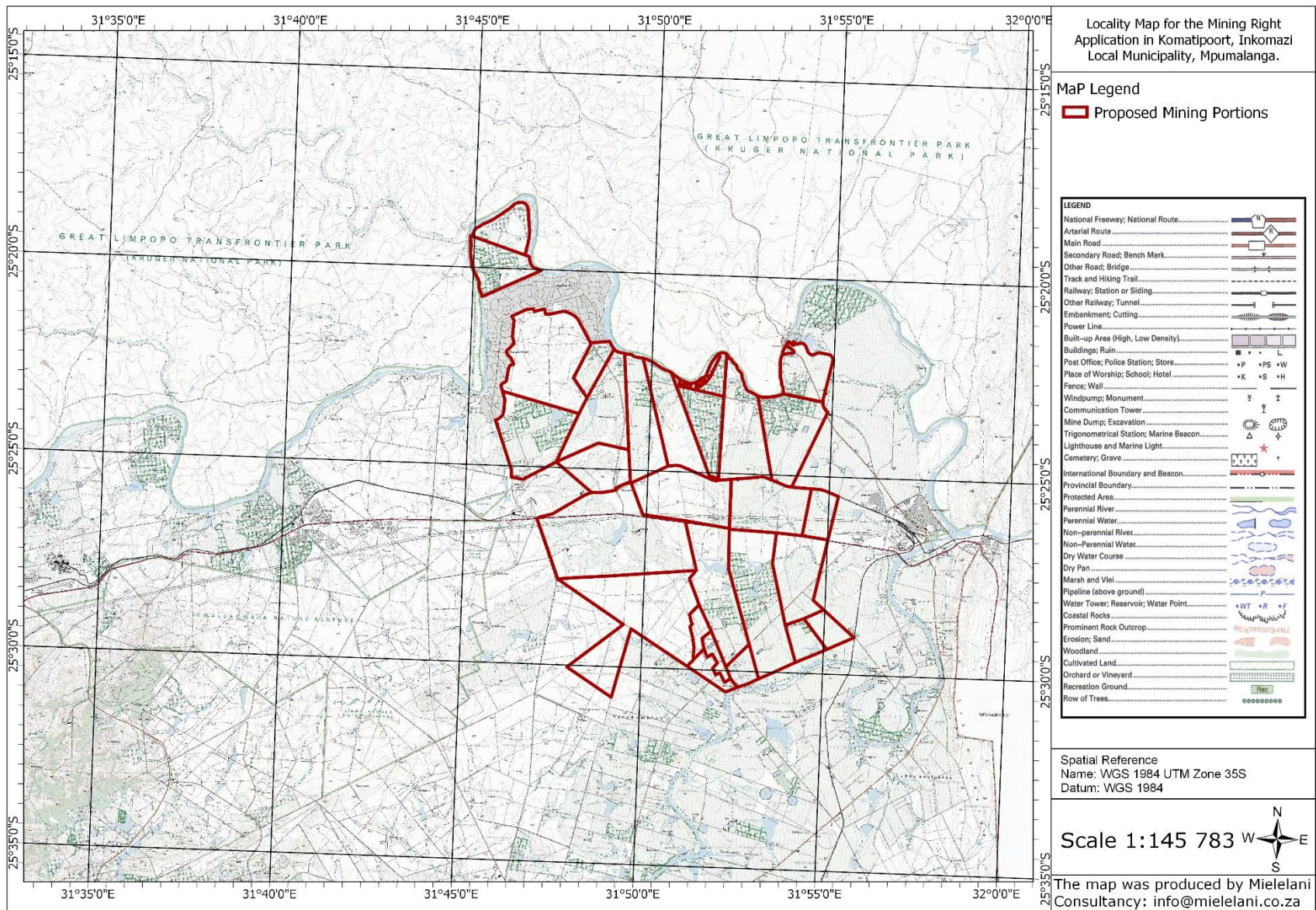


Figure 1-1: Locality Map

1.3 Project Description

Mineral Applied for: Coal, Pusedocoal and Torbonite/Oilshale resources

Mining Methods: Open Cast Mining and Underground Mining

Life of Mine: 30 years' lifespan

Potential Market: International markets, Eskom, other domestic (i.e. coal stove & power generation) and (i.e. for steel production, liquid fuel and for cement manufacturing).

The extent of the mining right entails a life of mine of more than 30 years and covers the above-mentioned farm portions. The proposed project relates to the opencast mining extracting the No. 2, 3, 4U and 4L coal seams of approximately 20 million tons per annum (Mtpa) of high-grade coal over a period of approximately thirty years. When coal seams are near the surface, it is economical to extract the coal using open cast (also referred to as open cut, open pit, or strip) mining method. Open cast coal mining recovers a greater proportion of the coal deposit than underground methods, as more of the coal seams in the strata may be exploited.

In 2012 ZYL mining undertook an aeromagnetic survey of the PR area by the drilling of some geophysically logged percussion holes. From the company's survey it was evident that numerous dolerite dykes and sills transgress the strata. These are the source of heat and pressure needed for the rank increase of the coal and the anthracite development. All of these maps were made available and the 2014 exploration was planned on the basis that only areas with less dolerite intrusions would be targeted. Access was also taken into consideration and it was decided to drill the holes on the farm Techlenburg's Ranch. On the 16th of June 2014 boreholes were all cored and the intersected coal seams were analyzed by an accredited laboratory. All the 2014 holes were drilled using HQ-wireline methods.).

Very thick dolerite sills were intersected: 75 m thick in borehole 1/53 and 100 m thick in borehole 3/54. All the historical data was captured but seam correlations is not possible due to the wide spread of the boreholes and the displacement caused by the dolerites. Boreholes PO2 and PO7 have good coal intersections and coal seams were analyzed. Several dolerite dykes and sills were intersected. The

combined thickens of these intrusive adds to 130 m in some boreholes like P03. In P04 the coal was totally destroyed and assimilated by a 61 m thick dolerite sill.

Diamond and reverse circulation boreholes were drilled for the south of the prospecting area (south of the N4 National Highway). The Zyl mining company's encounters gave confidence to Manzolwandle Investment (Pty) Ltd Company, thus the necessity of the proposed project. The underground will be accessed via a boxcut audit. It is proposed that the boxcut, plant and associated mine infrastructure be located on the farm Tecklenburg's Ranch 548 JU Portion.

Infrastructures that will be used:

- ❖ Access & Haul roads (with necessary security) including the upgrading of the access point to the gravel road;
- ❖ Contractor's Yard with septic/chemical ablution facilities;
- ❖ Offices;
- ❖ Weighbridge, workshop and stores (with septic/chemical ablution facilities);
- ❖ Rail Siding;
- ❖ Diesel facilities and a hardstand;
- ❖ Power and Water;
- ❖ Boxcut;
- ❖ Stockpiles (topsoil, overburden, subsoil/softs, ROM);
- ❖ Surface water management measures (storm water diversion berms and trenches, pollution control dams, tailings dam etc.);
- ❖ Crushing, screening & wash facility; and
- ❖ Disposal dump.

Coal will be transferred from the underground to surface by means of a conveyor belt. Whereby, it will be sent to the plant area for processing (crushing, screening and washing). Mine residue from the plant will be disposed of onto an integrated disposal dump. Product coal will be sized and stockpiled in designated areas for pre-qualification prior to being transported to the market. It is currently anticipated that the plant will run 24/7.

1.4 Summary of infrastructure such as roads, rail, electricity and water

1.4.1 Access roads

The proposed Manzolwandle Investments coal mine is located within 4 km west of Komatipoort, 10 km west of Lebombo border control, approximately 31 km from Malelane, using the N4 road to Mozambique, from the N4 will provide as the main access to the application area. There are secondary tarred roads that will provide access into the proposed mining area and connect the site with the N4 Road. From the secondary roads the site will be accessed using existing farm roads. The available access roads to be used during the mining operations are the:

- ❖ The N4 from the Lebombo Border to Nelspruit;
- ❖ Olifant Drive from the N4 to Marloth Park;
- ❖ Coopersal Road from the proposed farms to the N4; and
- ❖ R571 which connects Olifant Drive to the Komatipoort Town

The site infrastructures and surface mining activities are located within the remainder portion of farm Tecklenburg's Ranch 548 JU and as such the Coopersal Road will be the primary access road from the N4 to the proposed mining site.

1.4.2 Rail Infrastructure

There is an existing railway line traversing the site from Komatipoort to Nelspruit. Should the applicant prefer to use the railway as an alternative to roads transport, an agreement can be made with the Transnet Soc Ltd.

1.4.3 Site Offices

To minimize the establishment cost and due to the relatively short life of mine plan for the envisaged mine operation, pre-fabricated buildings will be erected to function as workshops and mine offices, change houses, laboratories, first aid rooms, and warehousing. An existing building on the property has been identified for renovation and use as main winder room.

2 ASSUMPTIONS AND LIMITATIONS

- ❖ The distribution of the traffic generated by the proposed activities at Manzolwandle Investments (Pty) Ltd project, when fully operational, was assumed based on the distribution of existing site generated traffic that travels on the road network as well as the location of the towns and residential areas that will provide the accommodation for the additional labour. In addition, the location of potential suppliers, were also taken into consideration;
- ❖ It was assumed that the period 07:00 – 09:00 am and 15:00 – 17:30 are the peak traffic hours; and
- ❖ The traffic count and assessment were done only on intersections where the mining vehicle will be travelling i.e. from the farm roads into the local roads intersections and the intersections between the local roads and the N4.

3 RELEVANT LEGISLATION AND STANDARDS

The specialist traffic and transportation study has been undertaken in accordance with the following legislation and standards where applicable:

- The National Road Traffic Act 93 of 1996
- Minerals and Petroleum Resources Development Act (MPRDA, Act 28 of 2002)
- National Environmental Management Act (NEMA, Act 107 of 1998) and amendments December 2014
- National Water Act (NWA, Act 36 of 1998)
- Conservation of Agricultural Resources Act 43 of 1983
- Environment Conservation Act 73 of 1989
- National Environmental Management: Air Quality Act 39 of 2004
- National Environmental Management: Waste Act 59 of 2008
- Mine Health and Safety Act 29 of 1996
- National Heritage Resources Act 25 of 1999

In addition, this specialist traffic and transportation study has also referred to the following guideline documents:

- ❖ Guidelines for Traffic Impact Studies (BKS Incorporated 1995 an update of the National Department of Transport's document Guidelines for Traffic Impact Studies 1990) which provides guidelines to determine the extent of the study area for such a project, the type of impact assessment required, the type of traffic analysis that needs to be undertaken, the time periods that need to be analysed and the methodology to be used;
- ❖ Southern African Road Safety Manual (National Department of Transport 1999) which gives guidelines and the methodology to undertake a road safety assessment of existing roads;
- ❖ Southern African Development Community Road Traffic Signs Manual (South African Department of Transport);
- ❖ National Guidelines for Traffic Calming (South African Department of Transport) COD Report CR96/036.

4 SITE LOCATION AND ACCESS

The road network that is likely to be used by Manzolwandle Investments project workers, for the transportation of materials and equipment and for the transportation of the bulk coal is expected to be mainly towards the Komatipoort, Marloth Park and Malelane town and the surrounding areas, using the major access roads like Cooperal RD, Marloth RD and N4.

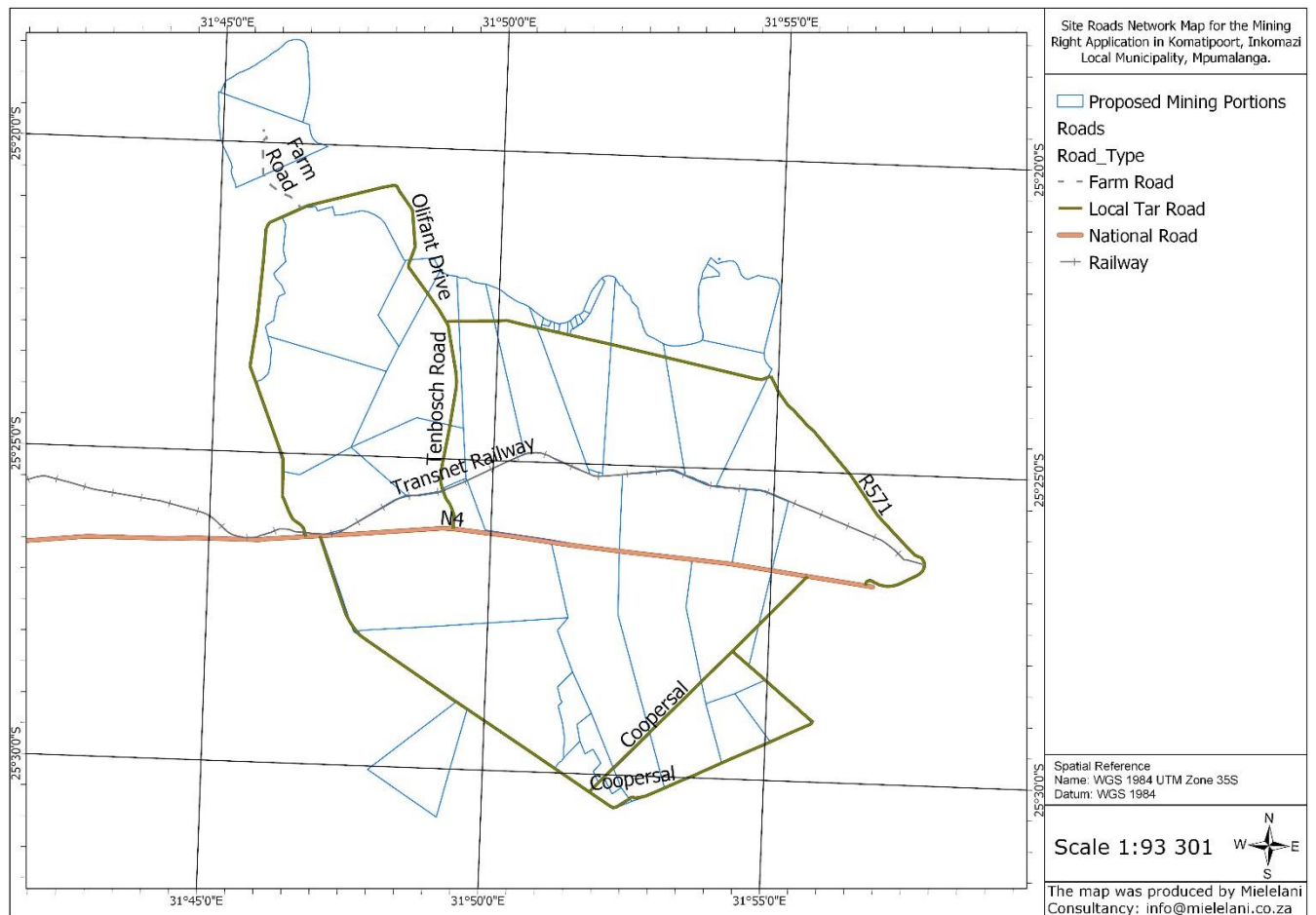


Figure 4-1: Existing Road Network

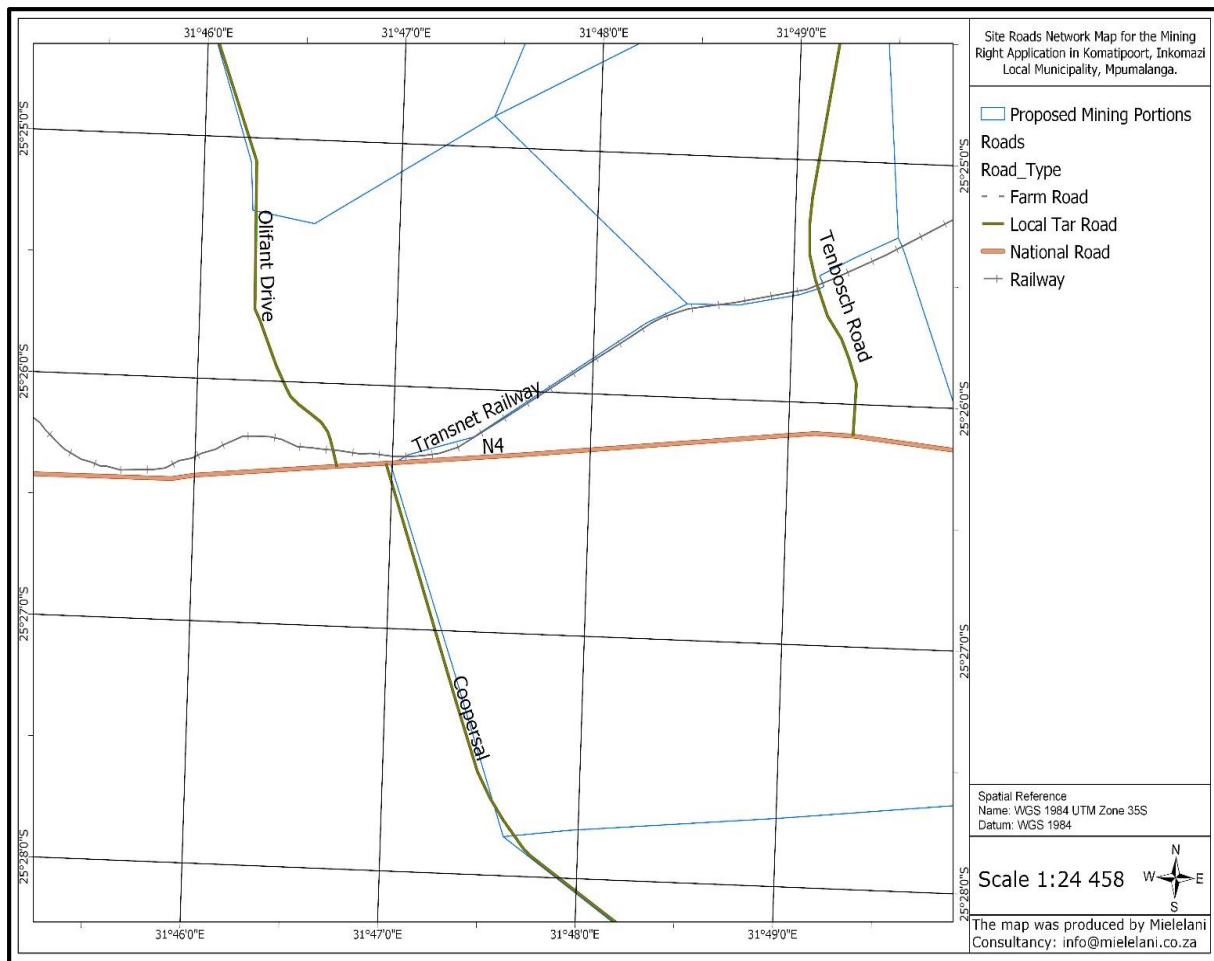


Figure 4-2: Major Roads Intersection

In order to assess existing traffic conditions, classified (by vehicle type) traffic counts were undertaken at the following locations on the surrounding road network which are deemed to be the four locations that will be impacted the most by the additional site generated traffic by the project:

- The N4 from the Lembobo Border to Nelspruit;
- Olifant Drive from N4 to Marloth Park;
- Coopersal connected from N4; and
- The R571 from Komatipoort to the Crocodile Bridge Gate of the Kruger National Park.

4.1 Existing Road Network and Traffic Conditions

Refer to Appendix 1 for the traffic counts and road network conditions

5 TRAFFIC GENERATION

The proposed new mining activity at Manzolwandle Investments (Pty) Ltd project will generate additional traffic on the surrounding road network during the operational phase. The estimated employment figures for the construction and operational phases of the Manzolwandle Investments (Pty) Ltd project were projected from the scale of the operation.

5.1 Construction Phase (Mine Establishment)

5.1.1 Construction Workforce Traffic

The volume of traffic entering and exiting the Manzolwandle Investments (Pty) Ltd project will increase during the construction phase as a result of the construction workforce. The construction of the infrastructure will require a construction workforce of approximately 122 workers. Some of the workforce will be sourced from the local communities in the vicinity of Komatipoort and Malelane. The remainder of the workforce will arrive from other towns and will seek accommodation in close proximity to the project for the sake of convenience.

The distribution of this construction traffic is expected to be approximately similar to the existing distribution of traffic using the surrounding road network. Given the estimated low volume of construction traffic daily and during the peak periods, it is not expected that this additional traffic will have any detrimental impact on the level of service (LOS) on the surrounding road network.

5.1.2 Construction Transport Vehicles

The operational activities at the proposed Manzolwandle Investments (Pty) Ltd project will generate additional heavy vehicle traffic on the surrounding road network as a result of the vehicles travelling to and from the site transporting materials. It is envisaged that the delivery vehicles will be deployed from their origins in the morning. The expected arrival times of these vehicles will fall outside of the traditional AM peak hour in. Similarly, these vehicles will leave for their origins before the PM peak hour in order to be back in time. Therefore, the impact of the heavy construction vehicles on the external road network is also expected to be negligible during the peak hours. In addition, heavy vehicles will be used to transport raw materials and equipment within the construction site, in which case,

these construction vehicles will remain within the site overnight for lengthy periods of time and will also have no impact on the surrounding road network.

The construction phase will thus generate a total of +20 veh/h two-way during the AM and PM peak hours, which is considered to be very low in traffic analysis terms.

5.2 Operational Phase

5.2.1 New Employees

Permanent employees will be employed to operate the new activities at the proposed Manzolwandle Investments (Pty) Ltd project. The operational phase will see an increase in the number of workers (400) and hence trips as the construction phase described above.

As with most industries in SA, it is safe to assume that all management, skilled and semi-skilled labour will travel to work in private cars while the unskilled employees will use public transport or be transported by site transport.

Based on vehicle occupancy rates of 1.5 for passenger cars and 15 for mini bus taxis (maximum impact scenario), the additional workforce that will be employed at the site will generate 40 passenger cars, 20 minibuses to sustain the new operations per day.

5.2.2 Heavy Delivery Vehicles

The carrying capacities of the trucks is 30 tonnes, and this will then generate 20-30 trucks per day two-way, from a traffic capacity perspective the volume is considered to be low.

By virtue of this low additional volume of daily traffic required for the delivery of the ore, the impact of these delivery vehicles will be negligible on the level of service on the surrounding road network.

The operations phase will thus generate a total of 40 light and heavy vehicles during the AM and PM peak hour due to traffic spread from the shifts. This volume of traffic is considered to be very low in traffic analysis terms.

5.2.3 Analysis Requirements for the Additional Site Generated Traffic Volumes

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 assessments 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, instead the Traffic Engineer's professional opinion is given more emphasis based on his or her observations and experience.

Since the operational phase of the proposed new activities at the proposed Manzolwandle Investments (Pty) Ltd project will generate significantly less than 150 vehicles per hour in the peak hour, a detailed analysis of these traffic volumes on the surrounding road network is not required for this study. The Traffic Engineer will instead provide his or her professional opinion based a qualitative assessment of his or her observations and calculations.

Traffic counts were none the less undertaken at the intersection of Olifant Drive and the N4, R571 and Olifant Drive, and the Cooperal roads and the N4. The three intersections will be used as the primary access points for the proposed mine. The main road to be used will be the Cooperal from the N4 as the surface mining activities and infrastructures are located on the remainder portion of Farm Tecklenburg's Ranch 548 JU which can be accessed from the N4 through the Cooperal Road.

6 RISK / IMPACT ASSESSMENT

The predicted impacts of the traffic generated by the proposed Manzolwandle Investments (Pty) Ltd project area on the surrounding road network are quantitatively evaluated in this chapter of the study. The purpose of this impact 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.

6.1 IMPACT ASSESSMENT METHOD

The impact significance rating system is presented in Table 2 and involves three parts:

- Part A: Define impact consequence using the three primary impact characteristics of magnitude, spatial scale/population and duration;
- Part B: Use the matrix to determine a rating for impact consequence based on the definitions identified in Part A; and
- Part C: Use the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from Part B) and the probability of occurrence.
- Part D: Define the Confidence level.

Table 6-1: Method for rating the significance of impacts

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE <i>Use these definitions to define the consequence in Part B</i>		
Impact characteristics	Definition	Criteria
MAGNITUDE	Major	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded
	Moderate	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded
	Minor	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded
	Minor+	Minor improvement; change not measurable; or threshold never exceeded
	Moderate+	Moderate improvement; within or better than the threshold; or no observed reaction
	Major+	Substantial improvement; within or better than the threshold; or favourable publicity
SPATIAL SCALE OR POPULATION	Site or local	Site specific or confined to the immediate project area
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic
	National/ International	Nationally or beyond
DURATION	Short term	Quickly reversible. Less than two years.
	Medium term	Reversible over time. Life of the project (2 – 15 years)
	Long term	Permanent. Beyond closure (15 years and beyond)
PART B: DETERMINING CONSEQUENCE RATING		
Rate consequence based on definition of magnitude, spatial extent and duration		
		SPATIAL SCALE/ POPULATION

			Site or Local	Regional	National/ international
	MAGNITUDE				
Minor	DURATION	Long Term	Medium	Medium	High
		Medium Term	Low	Low	Medium
		Short Term	Low	Low	Medium
Moderate	Duration	Long Term	Medium	High	High
		Medium	Medium	Medium	High
		Term Short Term	Low	Medium	Medium
Major	DURATION	Long term	High	High	High
		Medium	Medium	Medium	High
		term Short term	Medium	Medium	High
PART C: DETERMINING SIGNIFICANCE RATING : <i>Rate significance based on consequence and probability</i>					
				CONSEQUENCE	
PROBABILITY (of exposure to impacts)		Definite	Medium	Medium	High
		Possible	Low	Medium	High
		Unlikely	Low	Low	High
PART D: CONFIDENCE LEVEL					
High		Medium		Low	

Using the matrix, the significance of each described impact is initially rated. This rating assumes the management measures related to the project are accounted for.

6.2 Impact on the Existing Traffic Conditions on the External Road Network

The proposed construction and operations phases at the site will generate additional traffic along all mine access roads with the main being Coopersal road, Olifant Drive, R571 and N4 as well as some other roads within the study area. The Coopersal road will be the primary access into the mine from the N4 as it connects with the remainder portion of farm Tecklenburg's Ranch 548 JU where the surface infrastructures and surface mining activities will take place. Whilst, there will be an increase in traffic flows along these roads, in traffic capacity analysis terms, the increases are very low and the road network capacity can easily accommodate the increased traffic flows due to the relatively low existing traffic flows on these roads compared to their capacity. The intersections that the site generated traffic are expected to use are currently operating at good levels of service and the low additional volumes generated by the proposed project during all phases of the mining operations is not expected to have any impact on these levels of service during the peak periods.

The impact of the additional traffic generated by the proposed construction on the existing traffic conditions (road capacity and congestion) during the construction phase and the operational phase are illustrated in Table 3 below. The closure / post closure phase impact is expected to be similar or less than the construction phase.

Table 6-2: Impact of Project Generated Traffic on Existing Traffic Conditions

Operations								
	Magnitude	Duration	Scale	Consequence	Probability	Significance	+-	Confidence
Before Management	Minor	Long-term (<5yrs)	Regional	Medium	Possible	Medium	-	High
Management Measures Traffic conditions to be monitored annually, should traffic congestion increase, appropriate mitigation measures will need to be explored and implemented.								
After Management	Minor	Long-term (<5yrs)	Site/Local	Medium	Unlikely	Low	-	High
Construction								
	Magnitude	Duration	Scale	Consequence	Probability	Significance	+-	Confidence
Before Management	Minor	Short-term (<18mnts)	Regional	Low	Possible	Low	-	High
Management Measures Traffic conditions to be monitored annually, should traffic congestion increase, appropriate mitigation measures will need to be explored and implemented.								
After Management	Minor	Short-term (18mnts)	Regional	Low	Unlikely	Low	-	Medium

Even though the predicted impact is expected to be negligible and no mitigation or improvement measures are required on the surrounding road network to accommodate the additional traffic generated by the mining activity, it is nevertheless recommended

that the traffic conditions on the road network that the site generated traffic uses is monitored by means of sample traffic counts and assessed by a traffic engineer on a 3-year cycle. Should congestion levels at key locations start deteriorating as a result of the natural growth in the background traffic volumes, then appropriate mitigation measures should be identified and implemented.

6.2.1 Impact on Pedestrians and Cyclists

The increase in light and heavy vehicles generated by the proposed mining activity at Manzolwandle Investments (Pty) Ltd will have a minimal impact on the existing road space available for pedestrians and cyclists. There is minimal pedestrian activity along the access roads leading to the mine area and minimal increase in new pedestrian activity is expected.

General workers are not highly paid and are generally in the bottom half of the low income group. As such, the majority of the construction workers are likely to reside within a reasonable distance of the site and will commute to and from work using public transport (or site transport) from the surrounding residential areas, and be dropped off at the proposed Manzolwandle Investments (Pty) Ltd project access gate. Therefore, the volume of pedestrian activity along the external road is not expected to increase. The impact of the additional traffic generated by the proposed Manzolwandle Investments (Pty) Ltd project activity, during the operational phase on the road space available for the pedestrians and cyclists is illustrated in Table 4.

Table 6-3: Impact of Project Generated Traffic on Pedestrians and Cyclists

Construction								
	Magnitude	Duration	Scale	Consequence	Probability	Significance	+ -	Confidence
Before Management	Minor	Short-term (<18mnths)	Regional	Low	Possible	Low	-	Medium
Management Measures None Required.								
After Management	Minor	Short-term (18mnths)	Regional	Low	Unlikely	Low	-	Medium
Operations								
	Magnitude	Duration	Scale	Consequence	Probability	Significance	+ -	Confidence
Before Management	Minor	Long-term (<5Yrs)	Regional	Medium	Unlikely	Low	-	Medium
Management Measures None Required.								
After Management	Minor	Long-term (5yrs)	Site/Local	Medium	Unlikely	Low	-	Medium

The closure / post closure phase impact is expected to be similar or less than the construction phase.

6.2.2 Impact on Road Safety Conditions

The increase in traffic generated by the proposed Manzolwandle Investments (Pty) Ltd project activities is not expected to have a major impact on the prevailing road safety conditions on the surrounding road network. There will however be an increase in heavy vehicle traffic flows on the surrounding road network and heavy vehicles have been identified as one of the major causes of accidents and incidents including fatalities on road networks. Whilst the responsibility for road safety on public roads is not that of the private mining companies, the project can implement measures to reduce the frustration experienced by the motoring public on these roads. It is therefore recommended that the drivers of all heavy vehicles be required to attend a specialised road safety and driving course that sensitises them to the impact that they have on driving conditions for other vehicles on these roads.

The impact of the increase in generated traffic by the proposed expansion of the Manzolwandle Investments (Pty) Ltd project on the road safety conditions on the surrounding road network is quantified in Table 5.

Table 6-4: Impact of Project Generated Traffic on Road Safety Conditions

Operations								
	Magnitude	Duration	Scale	Consequence	Probability	Significance	+ -	Confidence
Before Management	Minor	Long-term (<5yrs)	Regional	Medium	Unlikely	Low	-	Medium
Management Measures Drivers of heavy mine vehicles attend a road safety and driving course to sensitise them to the impact they have on driving conditions for others on these roads								
After Management	Minor	Long-term (<5yrs)	Site/Local	Medium	Unlikely	Low	-	Medium
Construction								
	Magnitude	Duration	Scale	Consequence	Probability	Significance	+ -	Confidence
Before Management	Minor	Short-term (<18mnts)	Regional	Low	Possible	Low	-	Medium
Management Measures Drivers of heavy mine vehicles attend a road safety and driving course to sensitise them to the impact they have on driving conditions for others on these roads								
After Management	Minor	Short-term (18mnts)	Regional	Medium	Unlikely	Low	-	Medium

6.2.3 Impact on the Condition of the Road Network

The increase in traffic generated by the proposed Manzolwandle Investments (Pty) Ltd project activities will increase the percentage of heavy vehicles using this road network. Some sections of the road network have a very high percentage of heavy vehicles and others have a very low percentage.

The increase in heavy vehicles will accelerate the deterioration of these roads although only slightly and certainly not noticeably. With the exception of the Site Access Road all other roads that the generated traffic is likely to use is under the jurisdiction of the Mpumalanga Department of Transport. It is this department's responsibility to repair and rehabilitate these roads and not the mining houses. It is therefore recommended that a standard operating procedure be developed by the Manzolwandle Investments (Pty) Ltd management responsible for operations, for all site drivers to identify and report potholes and edge breaks on these provincial roads to the operations manager who in turn will report it to the Mpumalanga Department of Transport. In this way the proposed project will have completed its obligations in bringing to the attention, the deterioration of the road to the relevant department.

The construction and operations of these proposed project activities will generate additional traffic on the existing road network within the study area, during construction, operations and closure.

Traffic counts were undertaken at three locations to establish base line traffic conditions on which the impact of the traffic generated by the proposed mining activity can be assessed. The traffic counts and analysis thereof, have indicated that the existing road network within the study area is operating at well below its capacity and at a good Level of Service with all movements operating at a Level of Service B or better. Calculations of traffic generation showed that the operational phase of the proposed project will generate low volumes of traffic during the morning and afternoon peak hours, that is, less than 40 light veh/hr. The guidelines for traffic impact assessments states that detailed traffic impact assessments are only required for developments that generate more than 150 veh/hr during any peak hour. Based on this, plus the baseline assessment, the impact of the generated traffic of each phase is expected to be negligible on the surrounding road network. The existing road

network can therefore easily accommodate the estimated increase in generated traffic of the proposed phases.

Similarly, there is currently very little pedestrian and cyclist activity on the road network that the project generated traffic is expected to use. There is a concentration of pedestrians at the major roads which is mainly workers waiting to be picked up by passing minibus taxis or private cars. The additional traffic generated by the Manzolwandle Investments (Pty) Ltd project is not expected to have any impact on this minimal pedestrian activity.

There will, however, be an increase in heavy vehicle traffic flows on the surrounding road network and heavy vehicles have been identified as one of the major causes of accidents and incidents including fatalities on this road network. Whilst the responsibility for road safety on public roads is not that of the private companies, the proposed project can implement measures to reduce the frustration experienced by the motoring public on these roads. It is therefore recommended that the drivers of all heavy vehicles be required to attend a specialised driving course that sensitises them to the impact that they have on driving conditions on these roads.

The increase in heavy vehicles will accelerate the deterioration of these roads although only slightly and certainly not noticeably. With the exception of the site access roads to the four shafts, all other roads that the project generated traffic is likely to use, is under the jurisdiction of the Mpumalanga Department of Transport.

6.2.4 Public Transport

Public transport will be an integral part of the operations, but provisions for safe drop of and pick up's must be incorporated into the mine access plan.

7 RECOMMENDATION

It is expected that the majority of the shift workers will use public transport and the proposed development of the project can be supported from a traffic flow point of view with provision be made on site to accommodate the safe loading and off-loading of staff using public transport as well as an in-house traffic management plan.

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 analyses of the existing plus development generated traffic showed that the additional traffic generated by the proposed mining development will not have a major 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 minimal effect on public transport or pedestrian activities in the area.

REFERENCES

- ❖ BKS Inc., South African Trip Generation Rates PR 92/228, Department of Transport, Pretoria, June 1995.
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- ❖ *Committee of. Transportation Officials (COTO), 2002.* National Guidelines for Road Access Management in South Africa.
- ❖ National Department of Transport (NDoT), 1995. Manual for Traffic Impact Studies.
- ❖ *National Department of Transport (NDoT), 1996.* National Guidelines for Traffic Calming.
- ❖ *National Department of Transport (NDoT), 1994.* South African Trip Generation Rates, 2nd Edition.
- ❖ *National Department of Transport (NDoT), 1996.* Technical Recommendations for Highways (TRH).

Appendix 1: Traffic count and Site Pictures

Traffic count and Site Pictures

Traffic count was conducted on the 23rd and 24th of May 2019.

Traffic count and assessment was done at 3 intersections namely:

- ❖ N4 and Olifant Drive (Int 01);
- ❖ N4 and Coopersal (Int 02); and
- ❖ Olifant Drive and R571(Int 03).

Traffic Count Results (07:00 – 09:00)				
Intersection	Traffic count			
	Heavy Vehicles	Light Vehicles	Public Transport	
			Buses	Taxis
Int 01	36	119	4	8
Int 02	7	23	1	2
Int 03	6	12	3	1

Traffic Count Results (15:00 – 17:30)				
Intersection	Traffic count			
	Heavy Vehicles	Light Vehicles	Public Transport	
			Buses	Taxis
Int 01	33	124	4	8
Int 02	4	28	2	3
Int 03	5	20	1	12

