

2025



TRAFFIC IMPACT ASSESSMENT REPORT

For **Universal Chrome Minerals (Pty) Ltd** within portion 50 of the farm Boschfontein 458 JQ under the Magisterial District of Bojanala Platinum, Northwest Province

Prepared By:



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Project Name	Traffic Impact Assessment Report for Universal Chrome Minerals (Pty) Ltd, located within portion 50 of the farm Boschfontein 458 JQ under Madibeng Local Municipality in Northwest Province	
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1. INTRODUCTION

1.1. Background Information

Segope Water and Environmental Services (Segope Consulting) has been appointed by Universal Chrome Minerals (Pty) Ltd (UCM) to undertake the Traffic Impact Assessment (TIA) study for the proposed chrome processing plant on the farm Boschfontein 458 JQ under Madibeng Local Municipality in Northwest Province.

This study is conducted in support of the Section 24G (S24G) rectification for the unlawful commencement of listed activities in accordance with NEMA Environmental Impact Assessment (EIA) regulations and National Environmental Management: Waste Act (NEMWA, Act 59 of 2008) for the proposed chrome processing plant. In addition to the above-mentioned applications, a Water Use Licence (WUL) with reference number WU41699 had been lodged with the Department of Water and Sanitation (DWS), Hartbeespoort Office.

The facility will process low-grade chrome minerals sourced from operating mines, utilizing a combination of mechanized processing equipment and manual hand-picking techniques to ensure efficiency and quality control. The planned operations will encompass several key activities, including stockpiling, screening, washing, and loading of chrome minerals for further use or distribution.

The purpose of this Traffic Impact Assessment (TIA) is to assess the projected peak-hour traffic volumes associated with the proposed chrome processing plant development. The study aims to quantify and evaluate the potential impacts of the development on the surrounding road network, including existing traffic conditions and road capacity.

This report documents the findings of the assessment and provides recommendations for road upgrades and infrastructure improvements, where necessary. Particular attention is given to key intersections and access points that may require enhancement to accommodate the additional traffic volumes generated by the development.

Although the proposed processing plant is expected to generate low to medium traffic volumes, effective traffic management remains essential to support operational productivity, minimize disruption to the existing network, and ensure the safety of workers and the surrounding community. To this end, this plan outlines the traffic management framework to be implemented by UCM, ensuring alignment with legal requirements and industry best practices. The provisions of this plan apply to all personnel and contractors, including any subcontracted service providers responsible for trucks, machinery, or transport logistics on the project.

1.2. Site Location

The proposed Universal Chrome Minerals (Pty) Ltd (UCM) project area can be accessed through a gravel road that connects to the regional road R104, which leads to the site (Southern part of the project). The project area covers about 11.7 Ha and is situated approximately 4.47 km east of Majakaneng town, about 113 m east of Edrange Luxury Lodge, refer to **Figure 1**.

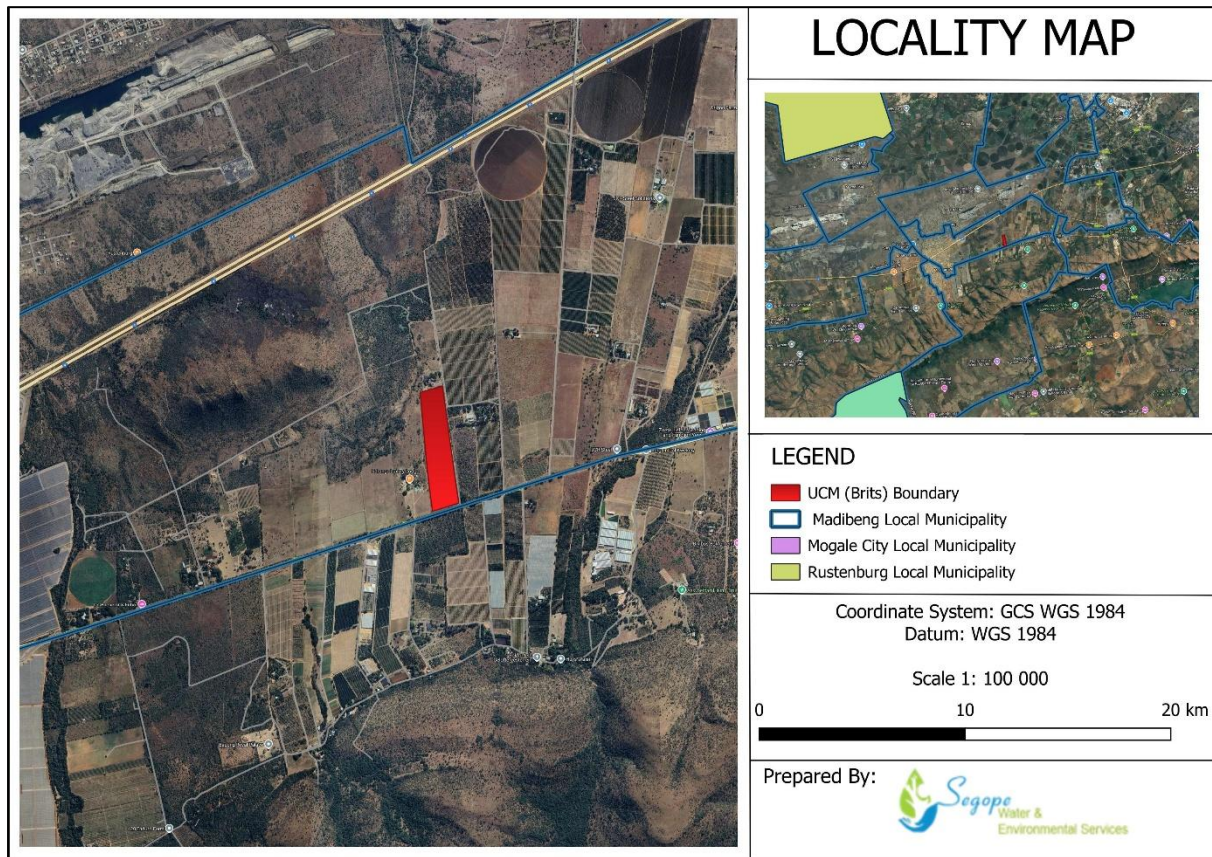


Figure 1: Locality Map for the proposed plant (Segope Consulting, 2025)

2. SURROUNDING ROAD NETWORK AND TRAFFIC FLOW

4.1. Surrounding Road Network

The following roads and streets are relevant to the study area, and they are categorized into different classes as shown on Table 1 below:

- **Regional Road (R104):** This road functions as a Collector Street (class 4). This road is a surfaced single carriageway road with no median and one (1) lane in each direction and has a T-junction stop with Lebidike Road.
- **R566 Road:** This road functions as a Local or Access Street (Class 5) as it connects R104 and N4. The road is a surfaced single carriageway road with no median and one (1) lane in each direction.
- **Unknown Tar Road:** This road functions as a Local or Access Street (Class 5). This road is a surfaced single carriageway road with no median and one (1) lane in each direction, and has a T-junction stop with R104 at Majakaneng Settlement.

Table 1: Rural Functional Road Classification ((COTO), 2012)

Function			Description		Mobility				
Basic Function	Alternate functional descriptions	Determining function	Class No (R_)	Class name	Origin / destination	Through traffic component	Reach of connectivity	% of built km	AADT (average annual daily traffic)
Mobility	Vehicle priority, vehicle only, long distance, through, high order, high speed, numbered, commercial, economic, strategic; route, arterial road or highway.	Movement is dominant, through traffic is dominant, the majority of traffic does not originate or terminate in the immediate vicinity, the function of the road is to carry high volumes of traffic between urban areas	1	Principal arterial*	Metro areas, large cities, large border posts, join national routes	Exclusively	> 50 km	2 - 4% Classes 1 and 2	1000 – 100 000+
			2	Major arterial*	Cities and large towns, transport nodes (harbours and international airports), smaller border posts, join major routes	Exclusively	>25 km		500 – 25 000+
			3	Minor arterial*	Towns, villages and rural settlements, tourist destinations, transport nodes (railway sidings, seaports, landing strips), small border posts, other routes	Predominant	> 10 km	6 - 12% Classes 1, 2 and 3	100 – 2 000+
Access / Activity	Access, mixed pedestrian and vehicle traffic, short distance, low order, lower speed, community / farm, road or street.	Access, turning and crossing movements are allowed, the majority of traffic has an origin or destination in the district, the function of the road is to provide a safe environment for vehicles and pedestrians using access points	4	Collector road	Connect farming districts, rural settlements, tourist areas, national and private parks and mines to mobility routes	Minimal	< 10 km	20 - 25%	< 1 000
			5	Local road	Farm or property access, connection to other routes	Nil Discontinuous	< 5 km		65 - 75%
			6	Walkway (path or track)	Settlements, farms, transport nodes, water points	n/a			

* In rural areas, the term distributor may be preferred to arterial

3. LAND USE AND INFRASTRUCTURE

5.1. Land-use and Land Cover

The majority of the project area is predominantly characterized by agricultural land use. The surrounding region is known for its extensive cultivation of citrus fruits, particularly oranges, along with other fruit-bearing crops. Large tracts of land are dedicated to commercial farming, indicating the area's significance in agricultural production. The presence of well-maintained orchards and expansive cultivated fields highlights the area's reliance on agriculture as a primary land use. Given this context, any development, including the proposed chrome processing plant, should consider the potential impacts on existing agricultural operations and ensure that land use compatibility and environmental sustainability are adequately addressed.

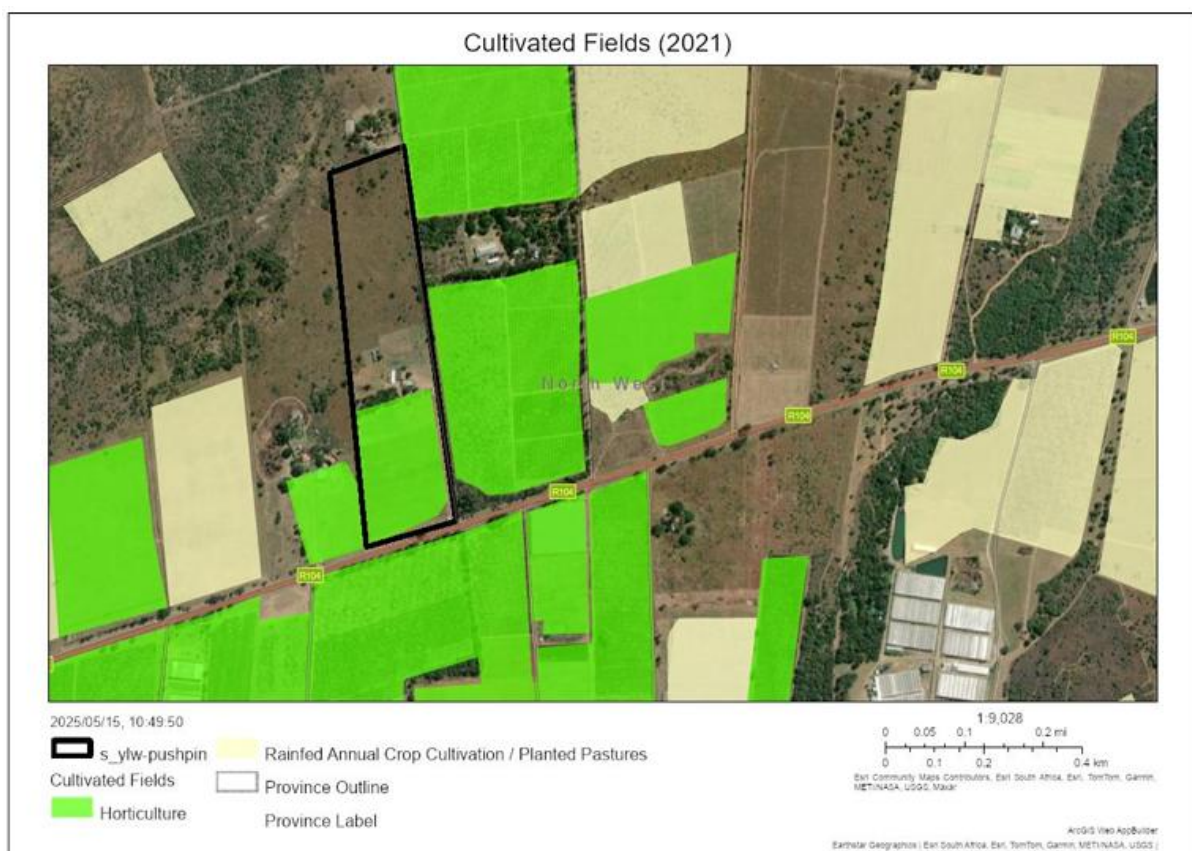


Figure 2: Land uses and cultivated areas around the study area (Enviro-Solum Consulting, 2025).

5.2. Processing Method

The proposed chrome processing plant will utilize a combination of mechanical and gravity-based separation methods to efficiently extract chromite from raw ore. The processing begins with a crushing phase, where raw chromite ore is reduced to an optimal size using jaw crushers. This is followed by a grinding stage, during which hammer mills are employed to further break down the crushed ore, enabling the liberation of chromite mineral particles from the surrounding gangue material. Once

adequately ground, the ore proceeds to the jigging separation stage, where jigging machines take advantage of density differences between the valuable chromite and the lighter waste materials. Using pulsating water, the denser chromite settles as concentrate, while the less dense gangue is separated as tailings. The chromite concentrate is then directed to the Concentrate Dam, while the tailings slurry is sent to the Tailings Dam for further processing and management.

In terms of water flow and recycling, the processing plant is designed to operate with a closed-loop system aimed at minimizing freshwater usage. Clean water from the Clean Water Dam is supplied to the processing equipment for ore beneficiation. After processing, the tailings slurry is channeled into the Tailings Dam where primary sedimentation occurs. From here, water from the sludge zone is directed through a series of four sedimentation ponds for multi-stage clarification. The clarified water is then recirculated back to the Clean Water Dam, ensuring sustainable water use and reducing environmental impact. This recycling system allows for efficient management of process water and limits dependency on external water sources.

The plant will utilize a range of equipment to support the various stages of ore processing. Crushers and hammer mills will work in coordination to prepare the ore for separation, while jigging machines will ensure efficient chromite recovery. The movement of materials throughout the plant will be facilitated by conveyors, pumps, and pipelines, which are strategically positioned to maintain a seamless operational flow. These components and their spatial arrangement are illustrated in the proposed layout plan shown in Figure 3, which outlines the positioning of the processing units, water management infrastructure, and supporting facilities within the chrome processing plant.

5.3. Plant Infrastructures

Infrastructure to be constructed or constructed onsite includes the following:

- Boreholes,
- Clean Water Dam,
- Tailings Dam,
- Tailings Sludge Sedimentation Zone,
- Tailings,
- Stockpile Zone,
- Sedimentation Dams (three units),
- Equipment Zone,
- ROM Stockpile Zone and
- Concentrate Stockpile Zone.

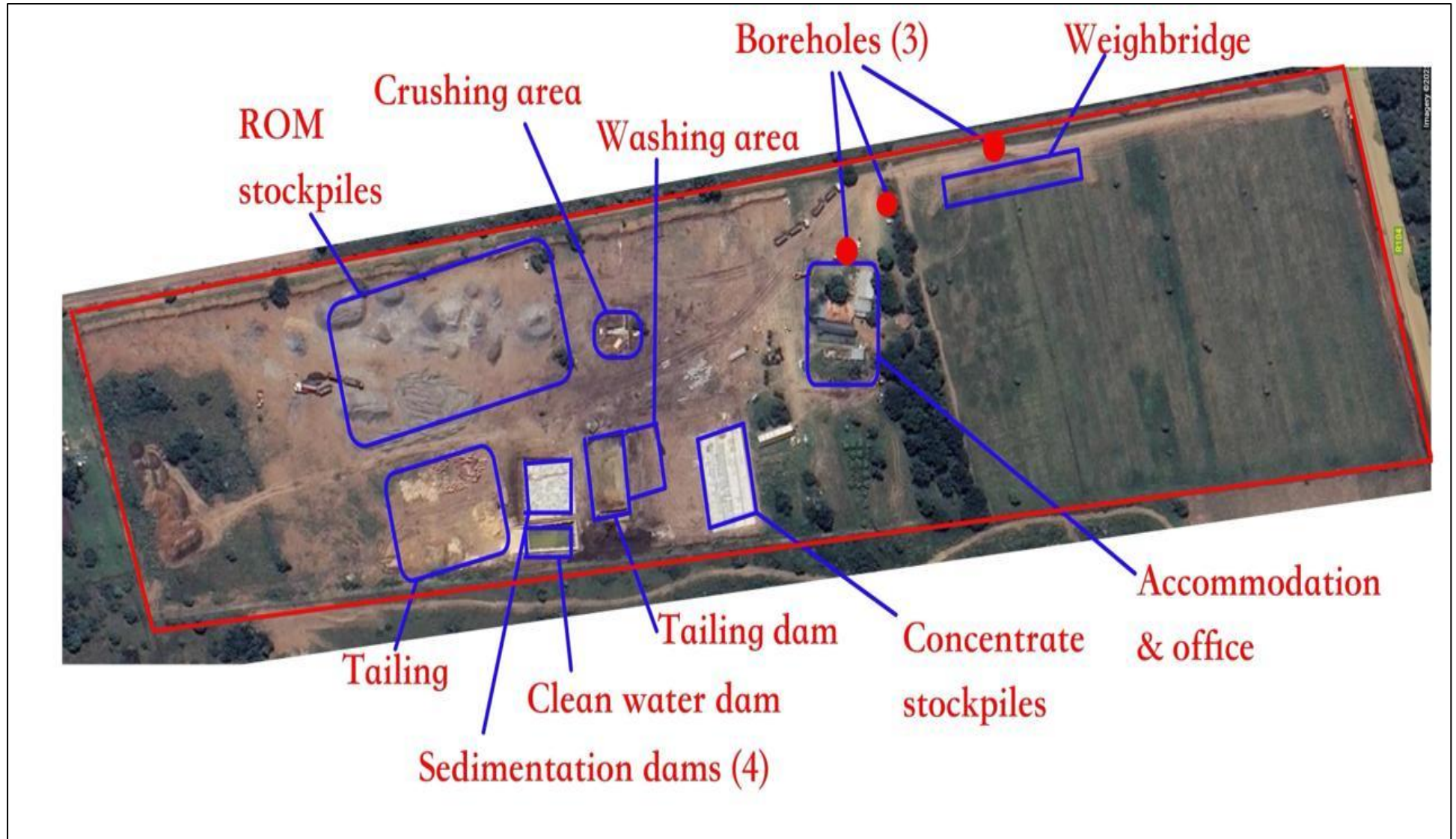


Figure 3: Plant layout plan for the proposed project (Segope Consulting, 2025)

5.4. Mine Equipment's

Table 2 summarizes all of the major and secondary equipment that was allowed, and the numbers shown are the steady-state needs. The quantities in the table may change over the course of the plants life, depending on typical hauling lengths and necessary tonnage throughput.

Table 2: Recommended fleet required ((Ukwazi Mining Studies (Pty) Ltd, 2019)

Equipment Type	Description	Quantity
Primary Equipment's	CAT 374D loader	1
	Screening Machine	1
	Crushing Machine	1
Secondary Equipment's	CAT 814H wheel dozer	1
	CAT 725 23 000L water tanker	2
	CAT 428E backhoe (TLB)	1
	Main M2000 crane truck	1
	CAT 725 23 000l diesel bowser	1
	340 KVA FGD generator	1
	Light plant	4
	Water pump	4
	LDV	6

4. METHODOLOGY

The study followed the guidelines outlined in TMH 16 (COTO, 2012)¹, the Department of Transport Manual for Traffic Impact Studies published by the South Africa National Roads Agency Limited (SANRAL), 2012.

- The extent of the study was determined by identifying the intersections in the vicinity of the development on which the traffic generated by the development may have a significant impact. The target years and peak scenarios to be analyzed were also determined, based on the land-use and extent of the development.
- Conducting vehicle count surveys, intersection performance analysis and road safety assessment applicable. Measures such as level of service, delay, and volume or capacity ratio were used to quantify the performance of an intersection or a roadway facility. Based on this assessment, mitigation measures were recommended for the proposed development to minimize the potential impacts on the existing road network.
- The existing traffic flow patterns were surveyed, where after the functioning of the intersections in the area was analyzed. Recommendations were made on the present need for road upgrading, without the development.
- As part of the study, the existing public transport infrastructure was also evaluated and where required upgrading to the existing infrastructure was recommended.
- The study also investigated the impact of future road network planned in the area, on the proposed development.

5. ASSUMPTIONS AND LIMITATIONS

- It was assumed that the period 06:00 – 09:00 am and 15:00 – 18:00 are the peak traffic hours
- The traffic count was conducted on the 13th and 14th of May 2025, when it was predicted that the site would have substantial traffic generation.
- The survey was conducted on two T-Junctions (that were assumed to produce the most impacts when it comes to traffic impacts)

6. TRIP GENERATION

6.1. Background

Trip generation is a critical step in the determination of traffic impact from proposed developments and therefore plays a key role in this study. The South African Trip Data Manual (Version 1, September 2012) by the Committee of Transport Officials, as well as the South African Trip Generation Manual (SATGM) (2nd Edition, 1995) by the Department of Transport, do not provide rates for any mining-related Operations. In this study, literature from past studies as well as operations data from the proposed Universal Chrome Minerals (Pty) Ltd have been used in estimating the expected trip generation of the proposed mine.

6.2. Mine operations traffic

6.2.1. Employee Traffic

It is estimated that once fully developed, the plant will employ about 50 workers, most of them will be from the surrounding settlements. Although the plant will operate in shifts, in order to model the worst-case scenario, **Table 3** models all the employees arriving in the AM peak hour and departing in the PM peak hour.

Table 3: models all the employees arriving in the AM peak hour and departing in the PM peak hour (Niara Environmental Consultants, 2019)

Description	Quantity
Annual production	180 tonnes*
Haul Days per Year	122
Tons per day	6 250t
Tons per Truck	32
Truckloads per day	22
Truckloads per hour (over 12-hour haul period)	2

From the above calculation, it is therefore expected that the hourly haul traffic shall be 8 trips per hour with a 50:50 directional split and thus will be evaluated in this report.

This amount of haulage trucks per hour is not anticipated to have that much impact from a traffic engineering point of view, however, a review of the existing road network capacity will be done to determine if new network trips can be accommodated

7. DATA COLLECTION AND DESCRIPTION OF TRAFFIC CONDITIONS

7.1. Traffic Survey

The traffic count was conducted for two days on the 13th and 14th of May 2025. Local Technicians were picked by the community leader to assist with the process, two (2) males and six (6) Females. The Traffic Impact assessment was conducted on two T-junctions, namely the Majakaneng Junction (Unknown Tar Road & R104 Road) and the Elegant Fuel Station Junction (R566 & R104 Roads) for both AM peak (06h00-09h00) and PM peak (15h00-18h00)

The survey was conducted to monitor the peak morning hours traffic of heavy and light vehicles and the afternoon peak hours of the light and heavy vehicles near the project area. Recordings were made on all three sides with the understanding that the vehicles may turn to any side (North, South, and East) at both T-junctions stops. The morning peak was recorded in 15-minute intervals from 6:00 am to 09:00 am, the afternoon peak was recorded in 15-minute intervals from 15:00 pm to 18:00 pm (**Table 7**), and **Figure 6** shows a schematic diagram of how the traffic count was conducted.

Table 4: Different Peaks.

Symbol	Meaning
Light vehicles	Private cars, taxis, and bakkies
Heavy vehicles	Trucks and buses
Morning peak	06:00am - 09:00am
Afternoon peak	15:00 pm -18:00 pm

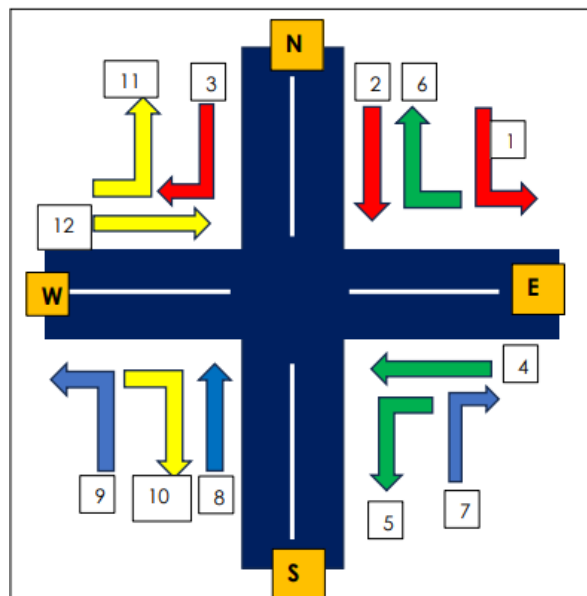


Figure 4: Illustration of the road along which the traffic count was conducted.

7.2. Observations on Elegant Fuel Station

7.2.1. Observations on the 13th of May 2025

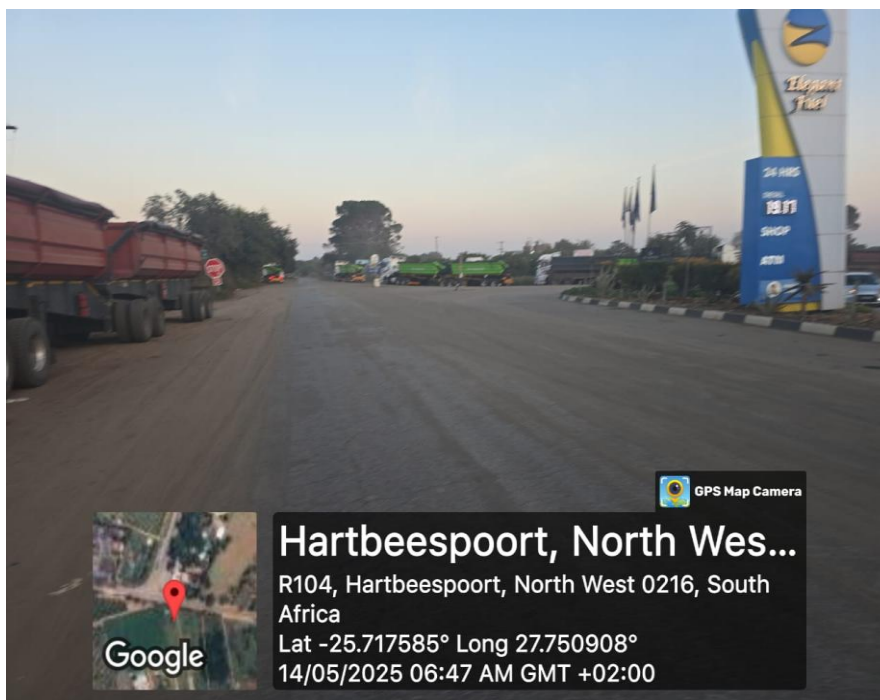
At the Elegant Fuel Station Junction, traffic during the AM peak period showed increased movement along the R104, particularly in the north and south directions. Between 06h15 and 07h30, around 30 to 45 light vehicles passed every 15 minutes, with additional traffic entering from the R566 heading westward or turning onto the R104.

In the PM peak (15h00–18h00), a noticeable number of heavy vehicles were observed, especially from the R566 turning onto the R104 (north or south directions). Traffic conditions remained orderly, though slightly heavier than the AM peak.

7.2.2. Observations on the 14th of May 2025

On the following day, traffic during the AM peak at the Elegant Fuel Station Junction followed a similar pattern. Light vehicle flow was again highest between 06h30 and 07h30, with approximately 35 to 50 vehicles moving through the junction every 15 minutes, primarily along the R104.

During the PM peak, there was a slight increase in traffic volume, particularly involving freight and delivery trucks turning from the R566 onto the R104. The overall flow of traffic remained consistent with no major disruptions reported.



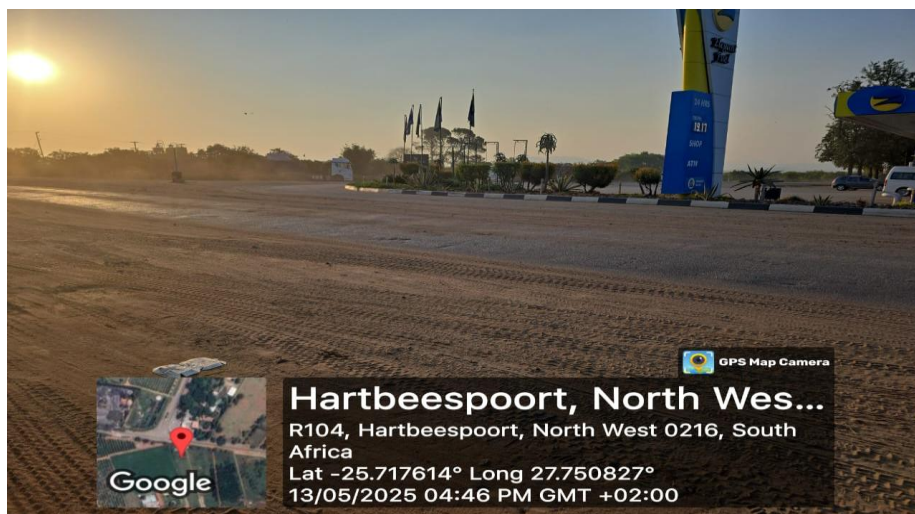


Figure 5: The Elegant T-Junction

7.3. Observations on Majakaneng Junction

7.3.1. Observations on the 13th of May 2025

During the AM peak period (06h00–09h00), traffic at the Majakaneng Junction was observed to be heavier between 06h30 and 07h30. Vehicle flow was most prominent along the R104 in both the north and south directions, where approximately 40 to 50 light vehicles passed through the intersection every 15 minutes. The increase in traffic is attributed to regular morning commutes and local school transport activity. The eastbound approach (Unknown Tar Road) experienced light but steady vehicle movement.

In the PM peak period (15h00–18h00), traffic volumes slightly increased again, with a noticeable presence of heavy vehicles moving north or south along the R104. However, traffic volumes remained moderate and did not result in significant congestion.

7.3.2. Observations on the 14th of May 2025

On the second day of observation, similar trends were recorded. The AM peak once again showed the highest traffic volume between 06h30 and 07h45, with around 35 to 50 light vehicles passing every 15 minutes along the R104. School drop-offs and worker commuting patterns contributed to the consistent north-south vehicle flow.

During the PM peak, the traffic volume was slightly more dispersed, with an increase in heavy vehicle movement particularly heading south along the R104. Despite this, the junction continued to operate within acceptable traffic flow levels.





Figure 6: Majakaneng -Junction

8. PUBLIC TRANSPORT ASSESSMENT

This study assumes that employees of the proposed chrome processing plant will make use of existing public transport services, as no private or company-provided transport will be arranged for staff. Employees will commute to and from the plant using taxis, buses, or other available public transport options in the area.

8.1. Background

In terms of the National Land Transport Act (NLTA) (Act No. 5 of 2009), Section 35, it is required that a public transport assessment be included as part of any Traffic Impact Assessment. The following information outlines the current state of public transport in relation to the proposed chrome processing plant (Niara Environmental Consultants, 2019).

8.2. Availability of Public Transport

Public transport will form a vital component of daily commuting for employees at the proposed chrome processing plant. Since no transport will be provided by the employer, workers are expected to rely on existing taxi and bus services in the area. The anticipated increase in passenger demand may have a positive economic impact on local public transport operators. Given the proximity of major roads such as the R104 and R566, which are already serviced by minibus taxis and buses, it is expected that employees will have reasonable access to public transport options without requiring significant changes or upgrades to current infrastructure.

9. IMPACT ASSESSMENT METHODOLOGY

The predicted impacts of the traffic generated by the proposed chrome plant 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 needed.

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance.

The impact significance rating system is presented in **Tables 5,6,7, and 8**, and involves four parts:

1.1. Impact Assessment Method

- **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.

10.1.1. Part A: Defining Consequence in Terms of Magnitude, Duration, and Spatial Scale:

Use these definitions to define the consequence in Part B

Table 5: Part A Consequence Rating Methodology

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 favorable publicity
	Site or local	Site specific or confined to the immediate project area

Spatial Scale or Population	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)

10.1.2. Part B: Determining Consequence Rating

Rate consequence based on the definition of magnitude, spatial extent, and duration.

Table 6: Part B Consequence Rating Methodology

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
		Short Term	Low	Medium	Medium
Major	Duration	Long term	High	High	High
		Medium	Medium	Medium	High
		Short term	Medium	Medium	High

10.1.3. Part C: Determining Significance Rating

Rate significance based on consequence and probability.

Figure 7: Part C Significance Rating Methodology

CONSEQUENCE				
Probability (of exposure to impacts)	Definite	Medium	Medium	High
	Possible	Low	Medium	High
	Unlikely	Low	Low	High

10.1.4. Part D: Determining Significance Rating

Table 7: Part C Significance Rating Methodology

CONFIDENCE LEVEL		
High	Medium	Low

11.2. Potential Environmental Impacts Related to Traffic

The assessment rating for the potential impacts identified relating to traffic is shown in **Table 16**.

Table 8: Environmental Impact Assessment related to Traffic

Affected Environment	Activity	Impact Description	BEFORE MITIGATION						Cumulative Impact	Mitigation measures / Recommendations	AFTER MITIGATION					
			Magnitude	Duration	Spatial Scale	Consequence	Probability	SIGNIFICANCE			Magnitude	Duration	Spatial Scale	Consequence	Probability	SIGNIFICANCE
Construction Phase																
Road network	Construction materials being transported to site	Added traffic on the road network	Minor -	Medium Term > 18 months < 5 years	Site or Local	Low	Definite	Medium	No	Road network able to support additional trucks.	Minor -	Medium Term > 18 months < 5 years	Site or Local	Low	Definite	Medium
Road network	Employees and labourers transported to/ from site	Added traffic on the road network	Minor -	Medium Term > 18 months < 5 years	Site or Local	Low	Definite	Medium	No	Road network able to support additional commuter trips	Minor -	Medium Term > 18 months < 5 years	Site or Local	Low	Definite	Medium
Air quality	Vehicles travelling on gravel roads	Dust will increase with increased traffic flow along gravel roads	Minor -	Short Term < 18 months	Site or Local	Low	Definite	Medium	No	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).	Minor -	Short Term < 18 months	Site or Local	Low	Possible	Low
Access road	Construction Of access roads	New Access roads	Minor - 18 months	Short Term <	Site or Local	Low	Definite	Medium	No	As per EMP	Minor - 18	Short Term <	Site or Local	Low	Definite	Medium

Operation Phase																
Road network	Haulage to/from site; and staff to/from site	Added traffic on the road network	Moderate	Long Term >5 years	Site or Local	Medium	Definite	Medium	No	Road network able to support additional trucks.	Minor -	Long Term > 5 years	Regional	Medium	Possible	Medium
Air quality	Vehicles travelling on gravel roads	Dust will increase with increased traffic flow along gravel roads	Minor -	Long Term >5 years	Site or Local	Medium	Possible	Medium	No	Ensure that gravel roads are kept watered to prevent dust (other dust suppression measures may also be used).	Minor -	Long Term > 5 years	Site or Local	Medium	Possible	Medium
Noise	Haulage to/from site; and staff to/from site	Noise levels affecting sensitive areas including residential areas	Major	Long Term >5 years	Site or Local	High	Possible	High	No	Speed limits to be kept low, and define routes away from residential areas.	Minor -	Long Term > 5 years	Site or Local	Medium	Possible	Medium
Decommissioning and Closure Phase																
Road Network	Rubble and other materials being removed from site	Added traffic on the road network	Minor -	Medium Term > 18 months < 5 years	Site or Local	Low	Definite	Medium	No	Road network able to support additional trucks.	Minor -	Medium Term > 18 months < 5 years	Regional	Low	Unlikely	Low

10. CONCLUSION AND RECOMMENDATIONS

The analyses of the existing plus development-generated traffic showed that the additional traffic generated by the proposed chrome processing plant development will not have a major impact on the surrounding road network. The 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 and will have minimal effect on public transport or pedestrian activities in the area.

Certain mitigation measures have been recommended to accommodate the traffic demand and any adverse effects on the environment. Based on the conclusions of this assessment, it is recommended that the proposed development should be favorably considered from a traffic engineering point of view by the relevant authorities.

It is therefore recommended that the proposed development is supported from a traffic engineering perspective, provided that the road upgrades and the access are implemented as proposed in this report (and on Drawing 20059/AL/01) and to the relevant standards of the Madibeng Local Municipality.

11. BIBLIOGRAPHY

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