PROPOSED ARNOT SOUTH COAL MINING PROJECT, SITUATED NEAR HENDRINA, MPUMALANGA PROVINCE

TRAFFIC IMPACT ASSESSMENT REPORT

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1 Introduction

EDL Engineers (Pty) Ltd was appointed to conduct a Traffic Impact Assessment for the proposed Arnot South Colliery between Hendrina and Carolina, with its main mining-related infrastructure on the farms Weltevreden 174-IS, Mooiplaats 165-IS, Vlakfontein 166-IS and Schoonoord 164-IS, within the Steve Tshwete Local Municipality jurisdiction boundaries, in Mpumalanga.

The purpose of this traffic impact assessment report is to investigate the expected peak hour traffic generated by the proposed colliery and to quantify and evaluate its impact on the existing road network near and surrounding the study area.

As part of the study, we have also evaluated the NMT (Non-Motorised Transport) and Public Transport facilities for the proposed colliery.

As can be seen in the chapters that follow, we have undertaken peak period traffic counts at the key intersections, identified according to the TMH16, and analysed these key intersections by using SIDRA™ Intersection Analyses, which we have performed in the critical peak hours for various traffic scenarios, including the future 5-year horizon, using a compound annual growth rate, to check for overall possible capacity restraints. We have also checked for required upgrades at these relevant key intersections before any mining operations can commence.

Based on site inspection observations, as well as the Sidra™ analyses results, intersection and road upgrades are proposed, for certain road conditions (potholes, edge brake etc.), or congested Levels of Service (L.O.S.) and Average Delays are found at the relevant key intersections.

Trip generation for the mining development is calculated from the trip rates and vehicle splits as set out in TMH17 Table 3.3, based on coal outputs as well as peak hour traffic generated.

Printouts of the Sidra™ analyses results of the key intersections are included in **Annexure A** at the back of the report, with a summary of the analyses output in **Tables 5-7**.

1.1 Abbreviations

MDPWRT	Mpumalanga Department of Public Works, Roads and Transport
COTO	South Africa Committee of Transport Officials
T.I.A.	Traffic Impact Assessment
HV	Heavy Vehicles
LV	Light Vehicles
N.M.T.	Non-motorised Transport
P.T.	Public Transport
vph	Vehicles per hour
q	Lane Utilisation Factor
Qm	Access Utilisation Factor
L.O.S.	Level of Service
B.S.D.	Barrier Sight Distance
SSD	Stopping Sight Distance

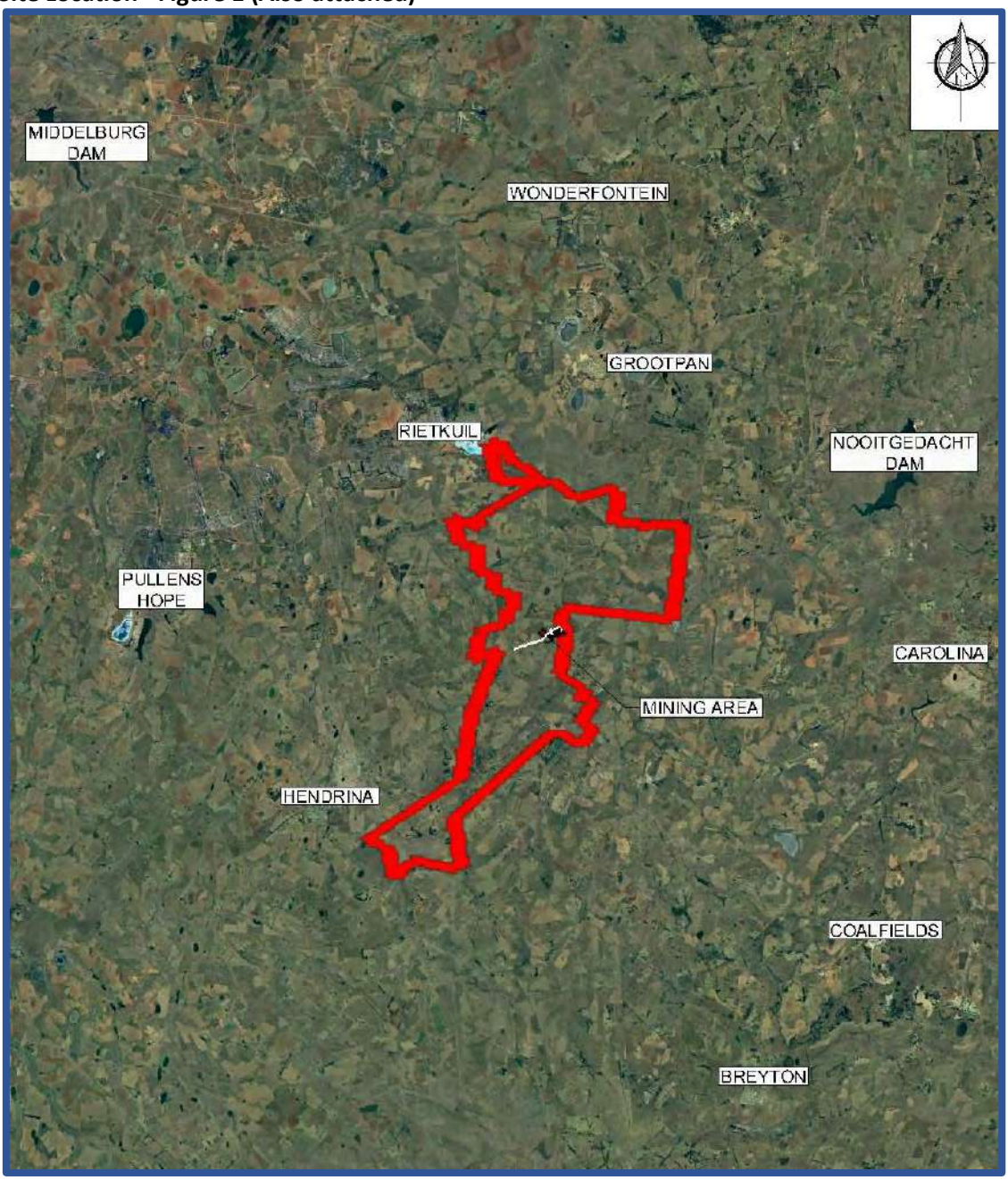
2 Site Location

2.1 Site Location

As shown in **Figure 1,** the proposed target area for mining and mining-related infrastructure of the colliery (such as the Pollution Control Dam, workshops, and offices) is situated across portions of the farms Weltevreden 174-IS, Mooiplaats 165-IS, Vlakfontein 166-IS and Schoonoord 164-IS, about 8km north of the R38 and about 17.5km north-east of Hendrina.

Access is proposed from District Road D383, about 7.7km north of its intersection with the R38 at coordinates 26° 4'19.66"S and 29°49'52.37"E.

Site Location - Figure 1 (Also attached)



3 Surrounding Road Network and Traffic Flow

3.1 Surrounding Road Network

The following roads are relevant to the study area:

R38: This road functions as a Rural Major Arterial (Class R2) and falls under the jurisdiction of The South African National Roads Agency Limited (SANRAL). As it runs across the southern portion of the planned mining area, in an east / west direction between Hendrina and Carolina with an observed speed limit of 120km/h, this road is a single carriageway road with no median and one lane in each direction. Manually undertaken traffic counts indicate that this road carries traffic volumes of between 45vph and 130vph per direction during the weekday morning (AM) and afternoon (PM) peak hours.

D383: This road is classified as a District Collector (Class 4) and falls under the jurisdiction of the Mpumalanga Department of Public Works, Roads and Transport (MDPWRT). This is a gravel road which is in a relatively good condition with ample space for one vehicle travelling per direction, for most of its length (upgrades are proposed in Chapter 8). This road runs in a north / south direction and intersects the R38 by means of a four (4) legged, 2-way stop intersection, with the R38 having the right-of-way. This gravel road measures 9.5m to 10m wide in the vicinity of where the access to the development is proposed. Manually undertaken traffic counts indicate that this road carries traffic volumes of less than 15vph per direction during the weekday morning (AM) and afternoon (PM) peak hours past the study site's access road.

D1555: This road is classified as a District Collector (Class 4) and falls under the jurisdiction of the Mpumalanga Department of Public Works, Roads and Transport (MDPWRT). This is a surfaced, single carriageway road with one lane per direction, running in an east / west direction between the D383 and Rietkuil. This road intersects the D383 by means of a T-junction intersection, which is in a poor condition (upgrades proposed in Chapter 8). Manually undertaken traffic counts indicate that this road carries traffic volumes of between 20vph and 60vph per direction during the weekday morning (AM) and afternoon (PM) peak hours.

D2225: This road is classified as a District Collector (Class 4) and falls under the jurisdiction of the Mpumalanga Department of Public Works, Roads and Transport (MDPWRT). This road runs in a southerly direction, into Rietkuil and Arnot, past the Arnot power station, as a surfaced single carriageway road with no median and one lane per direction. Manually undertaken traffic counts indicate that this road carries traffic volumes of between 25vph and 60vph per direction during the weekday morning (AM) and afternoon (PM) peak hours.

3.2 Future Road Network

According to the information available to EDL Engineers (Pty) Ltd, there are no new roads / streets planned within the immediate vicinity of the proposed colliery which might impact the proposed colliery, nor its operations. For any other upgrades, as proposed by EDL Engineers (Pty) Ltd, please refer to Chapter 5, Chapter 8, or the attached drawing.

3.3 Existing Traffic Flows

As a result of the existing surrounding roads, and proposed coal mine, as well as the number of vehicle trips it is expected to generate per hour, during weekdays, the study area was defined to include three (3) key intersections, which were analysed using SIDRA 9™.

Weekday Morning and Weekday Afternoon Traffic Counts were therefore carried out during the Weekday Morning (AM) and Weekday Afternoon (PM) commuter peak periods, after 26 July of 2021, during the adjusted level 3 lockdown rules, after all the schools were opened at the following identified intersections:

Key Intersections: R38 & D383
D383 & D1555
D1555 & D2225

The existing Weekday Morning (AM) and Weekday Afternoon (PM) peak hour traffic volumes at the above-mentioned key intersections are summarised in **Figure 2**.

Note on COVID-19: Please note that the traffic counts were done, during normal peak hour traffic conditions on a weekday, in the adjusted level 3 of lockdown, when all the schools were open, and therefore no adjustments to the traffic volumes were deemed necessary.

4 Proposed Development & Trip Generation

With reference to **Drawing No. 21046/AL/01**, the following sub-chapters are relevant with respect to the proposed coal mining development.

4.1 Proposed Development

The mining right boundaries includes the following farms:

- Groblersrecht 175-IS
- Mooiplaats 165-IS
- Tweefontein 203-IS
- Vaalwater 173-IS
- Weltevreden 174-IS
- Nooitgedacht 493-JS
- Leeuwpan 494-JS
- Schoonoord 164-IS
- Vlakfontein 166-IS
- Vryplaats 163-LQ
- Helpmekaar 168-IS
- Op Goeden Hoop 205-IS
- Klipfontein 495-JS

The proposed colliery is planned to have a lifespan of seventeen (17) years, with an estimated production rate / output of 2.4 Mtpa (Million tons per annum). This calculates to a total of 200,000 tons of coal product per month. With an average of 30 working days per month, this calculates to about 6,667 tons of coal product per day.

Table 1 below summarises the extent of the proposed mining development.

Table 1: Extent of the Proposed Development

Proposed Use	Estimated Output	Traffic / Hr (one-way)
Mining	200 000 tons / month	17 trucks / Hr (32t payload)
Total	**200 000 tons / month**	34 trucks / Hr both directions 17 trucks / Hr (one-way)

4.2 Trip Generation

The expected trip generation for the proposed development is discussed below:

Coal Output (Heavy Vehicles): The breakdown for the Heavy Vehicles is calculated in accordance with the planned coal output of 200,000 tons / month using a 30-day working month and 32-ton payload capacity as per **Table 2** on the next page.

Personnel (Light Vehicles): For the employees, whom is a combination of office bound engineering and admin staff as well as site and operational staff, a trip rate of 0.5vph was deemed appropriate per employee. The max. no of employees, including site staff and contractor staff is estimated at about 168 people, as per information provided to EDL Engineers (Pty) Ltd. Using a trip rate of 0.5vph, a total of 84vph was calculated during the AM and PM peak hours. This is a worst case that allow for the vehicles travelling only within the weekday peak hours and not before and after the relevant peak hours. The details are provided in **Table 3** on the next page.

Table 2: Heavy vehicle trip generation estimation

Coal Output	Trips/day	Adj. Factor	Split %	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Coal Output of 200,000 t/month	208 trucks / day	-	50/50 50/50	17	17	34	17	17	34
Total Trips				**17**	**17**	**34**	**17**	**17**	**34**

Table 3: Light vehicle trip generation estimation

Employees	Trip rate/hr	Adj. Factor	Split %	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
168	0,5vph / employee	-	75/25 25/75	63	21	84	21	63	84
Total Trips				**63**	**21**	**84**	**21**	**63**	**84**

The total peak hour trips are therefore **118vph** in the weekday peak hours.

Figure 4 shows the estimated trip generation and distribution for the proposed development.

4.3 Latent Rights

A fairly small coal mine, on Portion 4 of the Farm Opgoedenhoop 205-IS, will be sharing one of the key intersections with the proposed Arnot South colliery (R38 & D383 – see encircled in red on Figure 5). This proposed colliery is planned to have an output of 30,000 to 50,000 tons coal product per month. It is therefore expected that this planned colliery on Opgoedenhoop 205-IS, will generate a total of 85 vehicle trips, with coal transporting trucks forming about 12% of its estimated trip generation (5 trucks IN and 5 trucks OUT).

Furthermore, we have also allowed for background traffic growth over a 5-year horizon period. Please refer to **Figure 6 and 7** for the total impact on the key intersections, which also considers the future colliery on Opgoedenhoop 205-IS, showing both existing and future scenarios.

5 Queueing Analysis & Proposed Site Access

5.1 Queueing Analysis

The formula used for an exceedance of 95% is as follows:

$$\frac{\ln(0.05) - \ln(Qm)}{\ln(q)} - 1$$

Where:

Utilization factor (q):

$$\frac{\text{Arrival rate}}{(\text{Number of lanes}) * (\text{Service rate per lane})}$$

And by means of interpolation, Qm is determined by using **Table 4** below:

Table 4: Tabled values of the relationship between queue length, number of lanes and utilization factor (Qm)*

Table of Qm Values							
LANES	**1**	**2**	**3**	**4**	**6**	**8**	**10**
0,0	0,0000	0,0000	0,0000	0,0000			
0,1	0,1000	0,0182	0,0037	0,0008	0,0000	0,0000	0,0000
0,2	0,2000	0,0666	0,0247	0,0096	0,0015	0,0002	0,0000
0,3	0,3000	0,1385	0,0700	0,0370	0,0111	0,0036	0,0011
0,4	0,4000	0,2286	0,1411	0,0907	0,0400	0,0185	0,0088
0,5	0,5000	0,3333	0,2368	0,1739	0,0991	0,0591	0,0360
0,6	0,6000	0,4501	0,3548	0,2870	0,1965	0,1395	0,1013
0,7	0,7000	0,5766	0,4923	0,4286	0,3359	0,2706	0,2218
0,8	0,8000	0,7111	0,6472	0,5964	0,5178	0,4576	0,4093
0,9	0,9000	0,8526	0,8172	0,7878	0,7401	0,7014	0,6687
1	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000

*Source: Transportation and Land Development (Vergil G Stover / Frank J Koepke)

Calculations on the expected queue length were based on a maximum arrival rate ("IN" only) of 63vph (light vehicles) and 17vph (heavy vehicles), in the worst peak hour for entering vehicles (Weekday AM) at the access.

In a worst-case scenario with a 150vph service rate for light vehicles and a 30vph service rate for haulage trucks (heavy vehicles) at a security gate or a security boom for the Colliery, with two (2) entrance lanes (one for light vehicles and one for heavy vehicles), the utilization factor (q) equates to 0.420 and 0.567 for light and heavy vehicles, respectively. By then using **Table 4** above, Qm can be determined as 0.420 and 0.567 for each case. By solving for the exceedance of 95%, the queue length equates to two (2) light and four (4) heavy vehicles, respectively, plus two (2) vehicles at each category to account for random arrivals. This means the space required for vehicles queuing from the road edge of District Road D383 towards the entrance gate is the longer distance of the two above calculated stacking spaces, being 150m of stacking space (25m x 6 heavy vehicles). Considering that the access road is more than 3km long, more than enough space is available on this road to accommodate the estimated queue length in front of any access gate to the proposed Arnot South Colliery.

5.2 Proposed Site Access

The proposed development is planned to be accessed by means of one (1) access point.

D383 Site Access:

A 'Full' access extending from an access road which intersects the D383, about 3.0km to the west of where the main infrastructure is proposed, will be the proposed access for the mine development.

The access is proposed with 2 lanes 'IN' and 1 lane 'OUT', as described within the Queueing analysis done in the previous sub-chapter. This access must allow enough queueing distance in front of any security boom or gate with a minimum of 150m from the security boom to the edge of any intersecting road (as also mentioned in the Queueing analysis), for six (6) heavy vehicles (of 25m in length each) to queue.

All access lanes must be 5.0m wide and have an unobstructed height of at least 5.0m to allow for the safe manoeuvring of heavy vehicles when entering the proposed coal mining development. A dust suppression layer is proposed to be sprayed onto the access road (for 150m) and the existing gravel road D383, extending for a minimum of 100m past its intersection with the access road toward the north and south, respectively. Furthermore, the access road must be widened to a minimum width of 15m (3x 5m lanes). Please refer to **Drawing No. 21046/AL/01** for the proposed access layout.

The turning circles of a WB-20 Double Bottom Interlink Truck was tracked through the access road and relevant intersection with District Road D383, as shown on **Drawing No. 21046/AL/01**, to ensure that trucks will be able to manoeuvre onto and from the access intersection to the site.

5.3 Sight Distance at the Access (SSD)

SSD (Stopping Sight Distance) is calculated as follows:

$$SSD = \frac{v^2}{254(f \pm G)} + 0.694v$$

As can be seen on **Drawing No. 21046/AL/01** the access road is situated on a relatively flat section of the D383, with an average slope of less than -3% northbound, and a slight (large radius) left hand bend in its alignment. By using the equation above, with a speed limit (*v*) of 60km/h, a break force coefficient (*f*) of 0.4 (gravel road) and an average gradient of ±3%, the stopping sight distance calculates to 75m to 80m, which is available to either side of where the access is proposed on District Road D383.

5.4 Shoulder Sight Distance

For a road with a speed limit of 60km/h, a total of 170m of barrier sight distance must be available to either side of where an access is proposed, according to the Guidelines for Human Settlement Planning and Design, Chapter 7 (Roads: Geometric design and layout planning) Table 7.7. During a site visit, in July of 2021, it was observed that more than the required shoulder sight distance is available on site, to the north and south of where the access is planned on District Road D383.

5.5 Access Safety

- A Speed limit of 60km/h must be enforced, and the proposed speed limit signs are to be erected on both sides of the access road intersection with the D383 within 200m of the intersection. Refer to **Drawing No. 21046/AL/01**. A "Slow-Heavy vehicles turning" sign is also proposed on each side of the access road intersection.
- The proposed 'Heavy Vehicles' Turning Signs are to be erected on both sides of the access road position on the D383 at least 100m from the proposed access road position. Refer to **Drawing No. 21046/AL/01.**
- U-turn space (at least 30m x 60m) will need to be provided on the site to avoid dangerous vehicle manoeuvres on the access road.
- Flag men are to be used in severe circumstances for abnormal load vehicles, travelling and or turning onto the access road, towards the study site, at dangerously low speeds.

6 Traffic Flows and Distribution

It is required to determine the Future 5-year Horizon traffic by applying a compound annual growth rate (CAGR) to the existing traffic. As the greater area around the site has potential for new mines and subsequently more housing developments, the background traffic growth is expected to be positive. With information available to EDL Engineers, it can be concluded that the greater area, extending to Carolina to the east, and Hendrina to the west, have seen an above average population growth of about 4.3%. Therefore, a traffic growth rate of **3.0% per annum** was adopted and applied to the existing 2021 peak hour traffic counts for this study.

Figure 6 shows the existing 2021 peak hour traffic plus estimated development traffic, which is the summation of **Figures 2**, **4 and 5.**

Figure 7 shows the future 2026 peak hour traffic plus estimated development traffic which is the summation of **Figures 3**, **4 and 5.**

6.1 Trip Distribution

Assumptions on the expected trip distribution were based on the location of the proposed site's access in relation to the surrounding road network, as well as possible trip attractions within the greater area such as existing power stations and residential areas for employees. The traffic was therefore distributed as per the approximate percentages set out below:

From the exit road onto the D383 (100% of traffic to be distributed):

- 100% of trucks, and 30% of light vehicles, is estimated to turn right, heading north towards the intersection of the D383 and D1555.
- 70% of light vehicles is estimated to turn left, heading south towards the intersection of the D383 and the R38.

R38 & D383 (70% of light vehicle traffic to be distributed):

- 25% of total generated traffic will be turning left, heading eastbound towards Carolina.
- 32% of total generated traffic will be turning right, heading westbound towards Hendrina.
- 13% of total generated traffic is estimated to continue heading southbound.

D383 & D1555 (30% of light vehicles and 100% heavy vehicles to be distributed):

- 27% of light vehicles and 90% of heavy vehicles is estimated to turn right, heading towards the intersection of the D1555 and the D2225.
- 3% of light vehicles and 10% of heavy vehicles is estimated to continue northbound with the D383.

D1555 & D2225 (27% of light vehicles and 90% of heavy vehicles to be distributed):

- 16% of light vehicles and 54% of heavy vehicles is estimated to turn left, heading southbound towards Rietkuil / Arnot Power Station.
- 11% of light vehicles and 36% of heavy vehicles is estimated to continue heading south-west, towards the intersection of the D1555 and the D1398, as an alternative to enter Rietkuil / Arnot Power Station from the south.

7 Traffic Impact & Capacity Analyses

To determine the expected traffic impact of the proposed development at the key intersections, capacity analyses were carried out by using SIDRA 9™, a well-known traffic engineering software package. The following intersections were analysed:

Key Intersections: R38 & D383
D383 & D1555
D1555 & D2225

The following scenarios were analysed at the above-mentioned key intersections, namely:

- Existing 2021 Weekday Morning (AM) and Weekday Afternoon (PM) peak hour without the development traffic (as per **Figure 2**).
- Existing 2021 Weekday Morning (AM) and Weekday Afternoon (PM) peak hour with development and Latent Rights development traffic (as per **Figure 6**).
- Future 2026 Background Weekday Morning (AM) and Weekday Afternoon (PM) peak hour without development traffic (as per **Figure 3**).
- Future 2026 Background Weekday Morning (AM) and Weekday Afternoon (PM) peak hour with development and Latent Rights development traffic (as per **Figure 7**).

The next subsections illustrate the SIDRA 9™ results in three tables and briefly discusses the results and key conclusion at the analysed intersections, with the details of SIDRA 9™ Intersection Capacity Analyses appended in **Annexure A**.

7.1 R38 & D383

Also see **Annexures A1.1 to A1.8** as they have reference:

Table 5 – Results of Sidra Analyses (R38 & D383)

Intersection		1. R38 & D383			
Scenario		Existing 2021	Exist 2021 + Dev + Lat Rights	Future 2026	Future 2026 + Dev + Lat Rights
Level of Service	Weekday Morning AM Peak Hour	B	B	B	B
	Weekday Afternoon PM Peak Hour	B	B	B	B
Average Delays	Weekday Morning AM Peak Hour	10.5	10.8	10.9	11.2
	Weekday Afternoon PM Peak Hour	11.1	11.8	11.4	12.4
Remarks	The Intersection currently operates acceptably, with the development traffic added – no capacity upgrades are required.				

7.2 D383 & D1555

Also see **Annexures A2.1 to A2.8** as they have reference:

Table 6 – Results of Sidra Analyses (D383 & D1555)

Intersection		2. D383 & D1555			
Scenario		Existing 2021	Exist 2021 + Dev + Lat Rights	Future 2026	Future 2026 + Dev + Lat Rights
Level of Service	Weekday Morning AM Peak Hour	B	B	B	B
	Weekday Afternoon PM Peak Hour	B	B	B	B
Average Delays	Weekday Morning AM Peak Hour	10.1	10.1	10.1	10.1
	Weekday Afternoon PM Peak Hour	10.1	10.1	10.1	10.2
Remarks	The Intersection currently operates acceptably, with the development traffic added – no upgrades are required for capacity purposes. However, this intersection is in a poor condition and therefore upgrades are proposed for this intersection, as per Chapter 8 and **Drawing No. 21046/ID/01**.				

7.3 D1555 & D2225

Also see **Annexures A3.1 to A3.8** as they have reference:

Table 7 – Results of Sidra Analyses (D1555 & D2225)

Intersection		3. D1555 & D2225			
Scenario		Existing 2021	Exist 2021 + Dev + Lat Rights	Future 2026	Future 2026 + Dev + Lat Rights
Level of Service	Weekday Morning AM Peak Hour	B	B	B	B
	Weekday Afternoon PM Peak Hour	B	B	B	B
Average Delays	Weekday Morning AM Peak Hour	10.2	10.3	10.2	10.3
	Weekday Afternoon PM Peak Hour	10.2	10.4	10.3	10.5
Remarks	The Intersection currently operates acceptably, with the development traffic added – no capacity upgrades are required.				

Note: A SIDRA check (worst case 2026) was also done at the D383 / access intersection and the levels of service and average delays were found to be acceptable (LOS A / B).

8 Road and / or Intersection Upgrades

8.1 Proposed Road Upgrades

As per **Tables 5** to **7** in Chapter 7, all the key intersections perform within acceptable levels of service and average delays, even with the increased number of heavy vehicles (coal haulage trucks) and light vehicles expected to travel on them, within the 5-year horizon period. As a result, no upgrades are required, for capacity purposes, nor proposed for any of the key intersections in this study.

However, concluding a site visit in July of 2021, the intersection of District Road D383 and D1555 was found to be in a poor condition, with several large potholes, extending to more than 200m on all approaching legs of this intersection, resulting in unsafe manoeuvres from all types of vehicles at this intersection. Along with the southern leg (D383) of the intersection of the D383 and the D1555 to be rehabilitated (old tar to be demolished and resurfaced), extending southbound for 100m past the bell mouth, the entire intersection is proposed to be resurfaced / potholes to be repaired before the mine activities commence. Please refer to **Drawing No. 21046/ID/01**.

Furthermore, it was found that the D383 decreases in width, about 12km north of where the access road to the proposed development is situated, to just under 5m wide. This section (about 2km northbound) will have to be widened to a width of 10m minimum to allow for the safe passage of coal haulage trucks to and from the study site, when transporting the product on a daily basis.

A dust suppression layer (Dust-A-Side or similar product) is proposed to be sprayed periodically onto the gravel road surface of the access road (150m distance) as well as the D383, for at least 100m in each direction (on the D383), to minimise dust as a result of heavy vehicles traveling past the site. This will increase visibility and ultimately, road user safety in the vicinity of the proposed access road intersection. Refer to enclosed **Drawing No. 21046/AL/01**.

Road signs are proposed as per Chapter 5.4 and as shown on enclosed **Drawing No. 21046/AL/01 and 21046/ID/01** which must be according to the most relevant standards of the South African Road Traffic Signs Manual and the relevant standards of the Steve Tshwete Local Municipality / Mpumalanga Department of Public Works, Roads and Transport.

9 Public Transport Assessment

9.1 Pedestrian Walkways & Crossings

There are no existing pedestrian walkways along the D383. With no residential or retail area in the immediate vicinity, the addition of pedestrian walkways is not required, nor proposed.

9.2 Public Transport Facilities

In terms of the National Land Transport Transition Act (NLTTA) 22 of 2000, Section 29, it is a requirement that an assessment of the public transport issues be included in the traffic impact assessments. The Act also requires that there be public transport facilities within 1km walking distance from a development in a built-up area.

Given the location of the proposed colliery site and its distance from any major intersection and or settlement, no public transport facilities are present near the site. However, it is proposed that the development provide a taxi / bus facility (large enough to allow for the turning circles of PT Vehicles and a minimum of 30m x 60m in size) within the proposed colliery parking grounds to cater for the workers using public transport to travel to-and-from work.

A formalised internal public transport drop-off and pick-up zone is therefore proposed for the coal mine development as stated above.

10 Conclusions & Recommendations

Based on the content of this traffic impact report, the following key conclusions and recommendations are relevant:

- The proposed development is for coal mining operations which will be situated on several existing farms, but with its main mining-related infrastructure on the farms Weltevreden 174-IS, Mooiplaats 165-IS, Vlakfontein 166-IS and Schoonoord 164-IS, within the Steve Tshwete Local Municipality jurisdiction boundaries, in Mpumalanga.
- As shown in **Figure 1**, the proposed site is located between Hendrina and Carolina, with main mining-related infrastructure about 8km north of the R38.
- It is estimated that the proposed colliery will generate (as a worst case) a total of 118vph trips (total 'In' plus 'Out') during the Weekday Morning (AM) and 118vph trips (total 'In' plus 'Out') during the Weekday Afternoon (PM) peak hours.
- The latent rights mining development of Opgoedenhoop was considered within this study. This mine will share a key intersection with the Arnot South Mine and its total impact was therefore considered at the intersection of the R38 and the D383.
- SIDRA 9™ Intersection Capacity Analyses were carried out for the Weekday Morning and Weekday Afternoon peak periods at the key intersections and no upgrades for capacity purposed were found to be required for the development. However, other intersection upgrades and road widenings are necessary as set out within Chapter 8.
- The intersection of the D383 and D1555 is to be resurfaced, and the southern approach leg of the intersection of the D383 and the D1555 is proposed to be rehabilitated / resurfaced, for 100m to the south. Please refer to **Drawing No. 21046/ID/01**.
- Access will be obtained via a gravel access road which intersects the D383. At the site's access gates, two (2) lanes of 5m wide are proposed to enter the site, and one (1) lane of 5m wide to exit the site.
- The access road must have an unobstructed minimum stacking (queueing) space for six (6) heavy vehicles, i.e., 150m as measured from any access gate / security boom to the intersection with District Road D383.
- The D383 and the access road must have a dust suppression layer which is proposed to be sprayed periodically onto the access road and the D383, for a minimum of 100m to both sides where the access road intersects the D383, and for 150m on the access road, to minimise dust on this road which may impair sight distance.
- For road user safety, several road signs are proposed on each approach at the access road intersection with the D383, as also shown on **Drawing No. 21046/AL/01**.
- Regarding non-motorised and public transport, no pedestrian walkways, nor public transport lay-bys are proposed along the D383, nor the access road. An internal public transport drop-off and pick-up zone is proposed for the development, with a minimum of 30m x 60m in size, as described in Chapter 9.

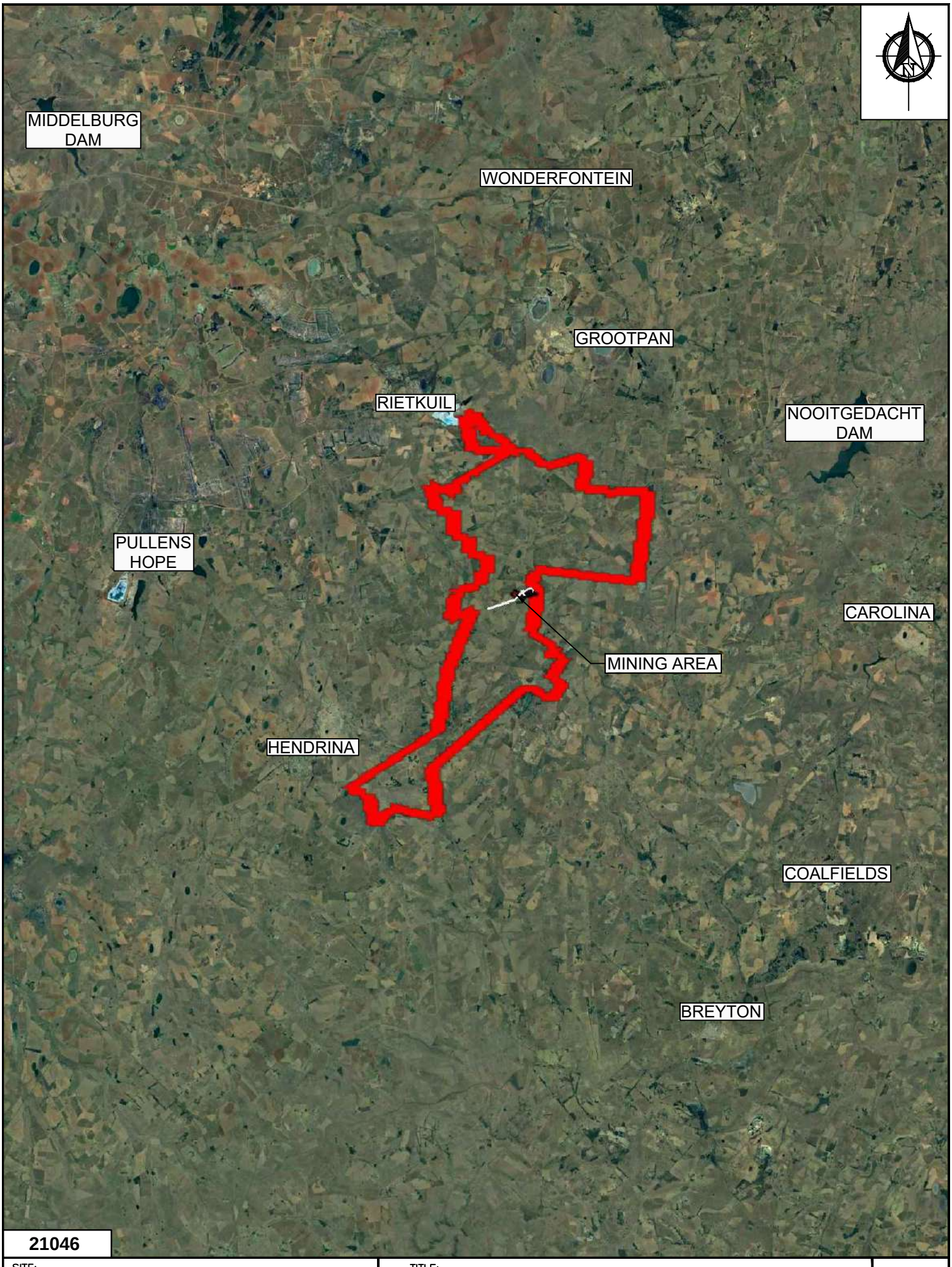
It is therefore recommended that the proposed Arnot South Mine, between Hendrina and Carolina, in Mpumalanga, is supported from a traffic engineering perspective, provided that any upgrades be completed before the colliery commences with its operations, as set out / proposed in this report (and on **Drawings 21046/AL/01 & 21046/ID/01**) and to the relevant standards of the Mpumalanga Department of Public Works, Roads and Transport.

11 Bibliography

- TMH 17 - South African Trip Data Manual. (2013). South African Committee of Transport Officials.
- SIDRA Intersection 9. (2021). Australia: Department of Planning Transport and Infrastructure.
- TRH 26 - South African Road Classification and Access Management Manual. (2012). 1st ed. South African Committee of Transport Officials.
- TMH 16 - Traffic Impact and Site Traffic Assessment Manual. (2012). 1st ed. South African Committee of Transport Officials.
- South African Road Traffic Signs Manual (SARTSM) – Volume 2

Figures

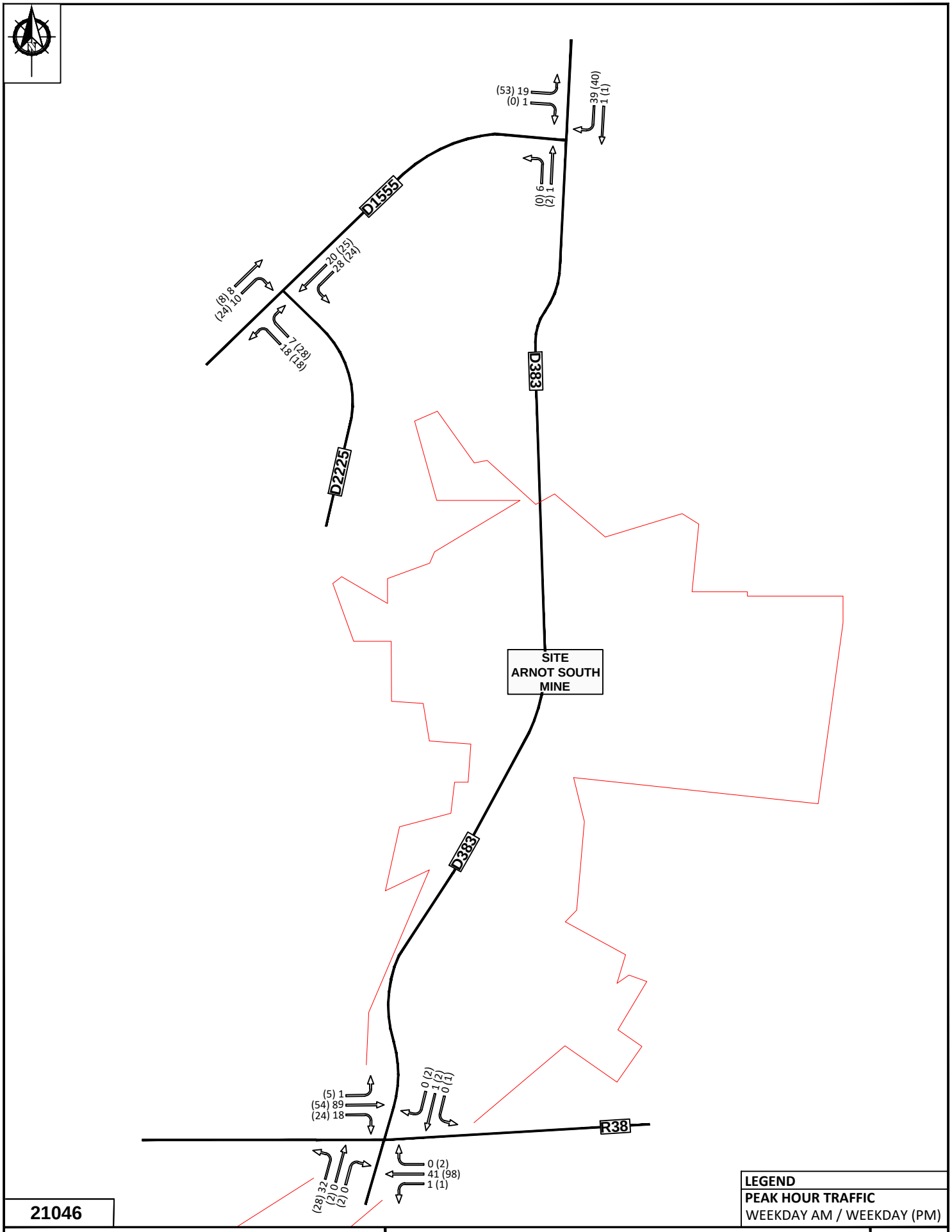
Figure 1 Locality Plan
Figure 2 Existing 2021 Peak Hour Traffic
Figure 3 Future 2026 Background Peak Hour Traffic
Figure 4 Development Peak Hour Traffic
Figure 5 Latent Rights Development Peak Hour Traffic
Figure 6 Existing 2021 + Development Peak Hour Traffic
Figure 7 Future 2026 Background + Development Peak Hour Traffic



21046

SITE:	TITLE:	
ARNOT SOUTH MINE	**LOCALITY**	FIG 1

EDL ENGINEERS



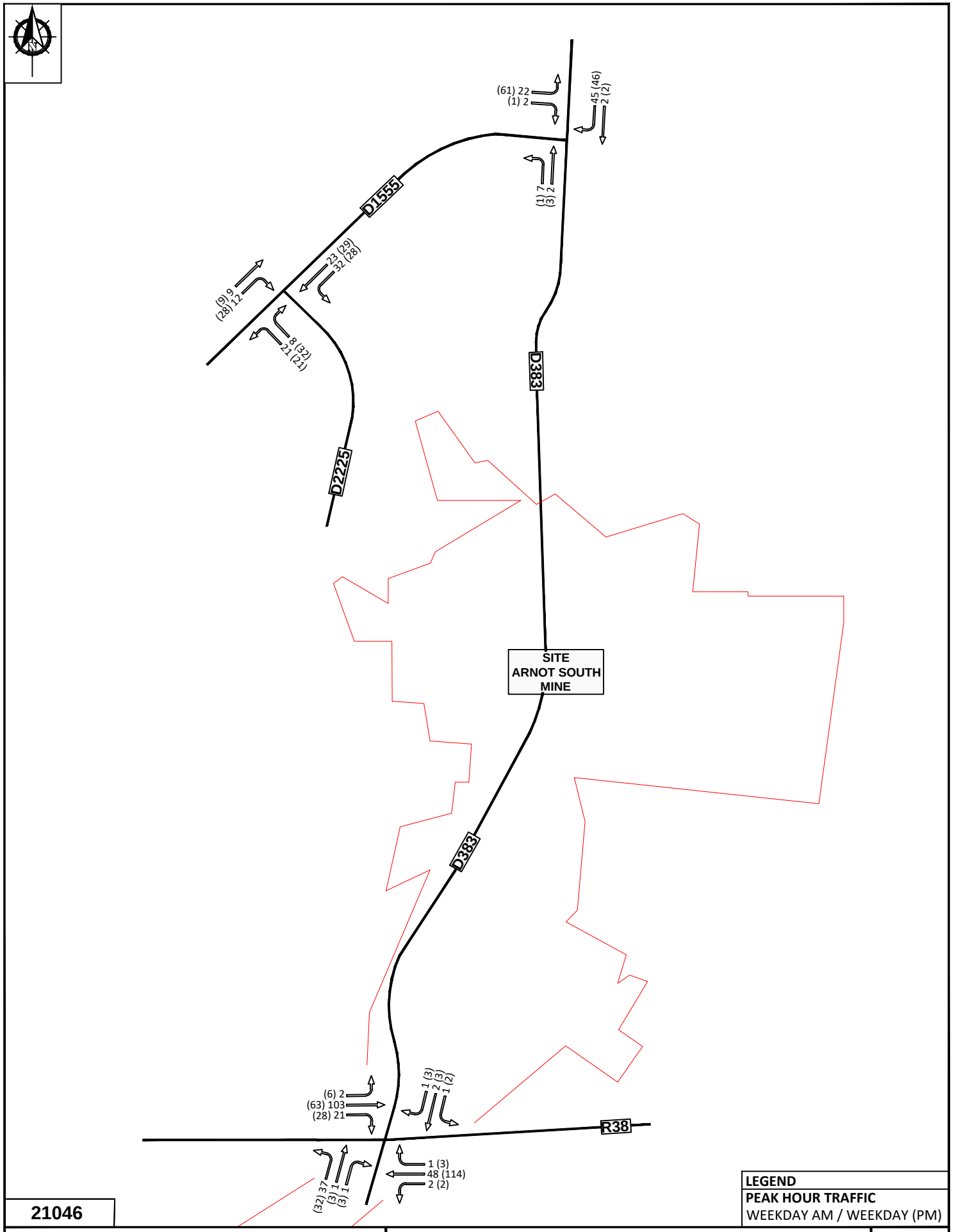
21046

SITE:
ARNOT SOUTH MINE

TITLE:
EXISTING 2021 PEAK HOUR TRAFFIC

FIG 2

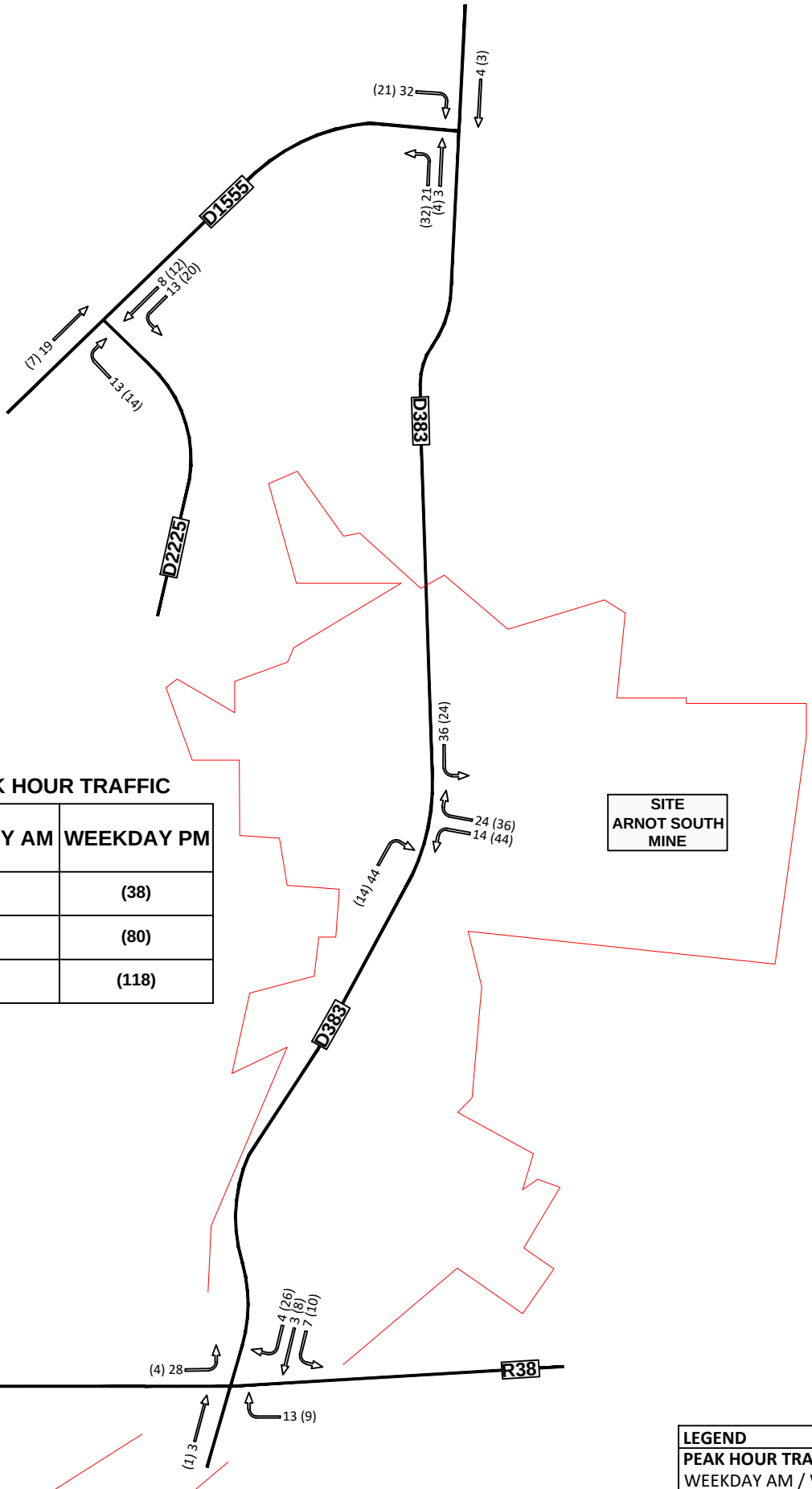
EDL ENGINEERS



21046		
SITE: **ARNOT SOUTH MINE**	TITLE: **FUTURE 2026 BACKGROUND PEAK HOUR TRAFFIC**	FIG 3

LEGEND
PEAK HOUR TRAFFIC
WEEKDAY AM / WEEKDAY (PM)

EDL ENGINEERS



DEVELOPMENT PEAK HOUR TRAFFIC

	WEEKDAY AM	WEEKDAY PM
IN	80	(38)
OUT	38	(80)
TOTAL	118	(118)

LEGEND
PEAK HOUR TRAFFIC
WEEKDAY AM / WEEKDAY (PM)

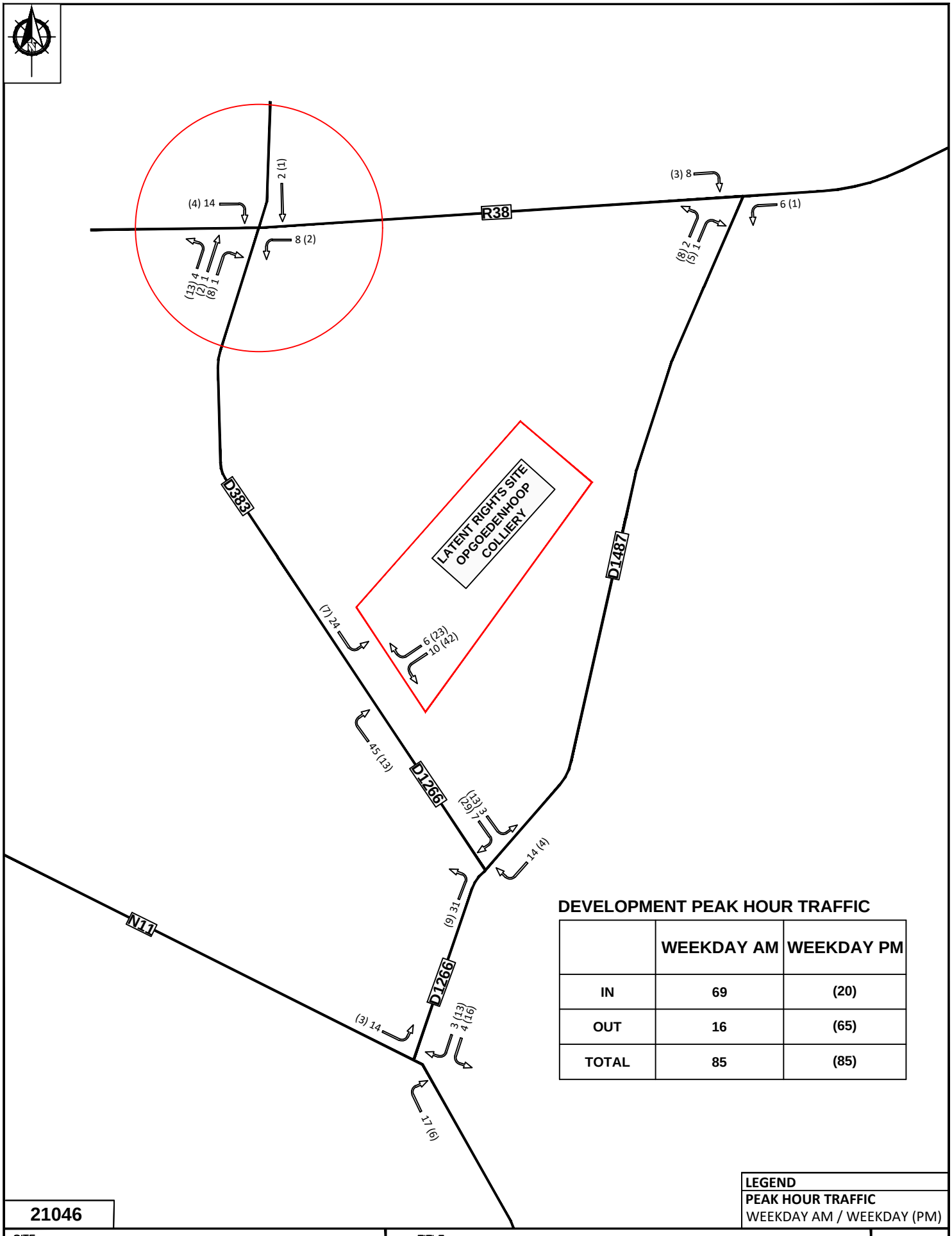
21046

SITE:
ARNOT SOUTH MINE

TITLE:
DEVELOPMENT PEAK HOUR TRAFFIC

FIG 4

EDL ENGINEERS



DEVELOPMENT PEAK HOUR TRAFFIC

	WEEKDAY AM	WEEKDAY PM
IN	69	(20)
OUT	16	(65)
TOTAL	85	(85)

LEGEND
PEAK HOUR TRAFFIC
WEEKDAY AM / WEEKDAY (PM)

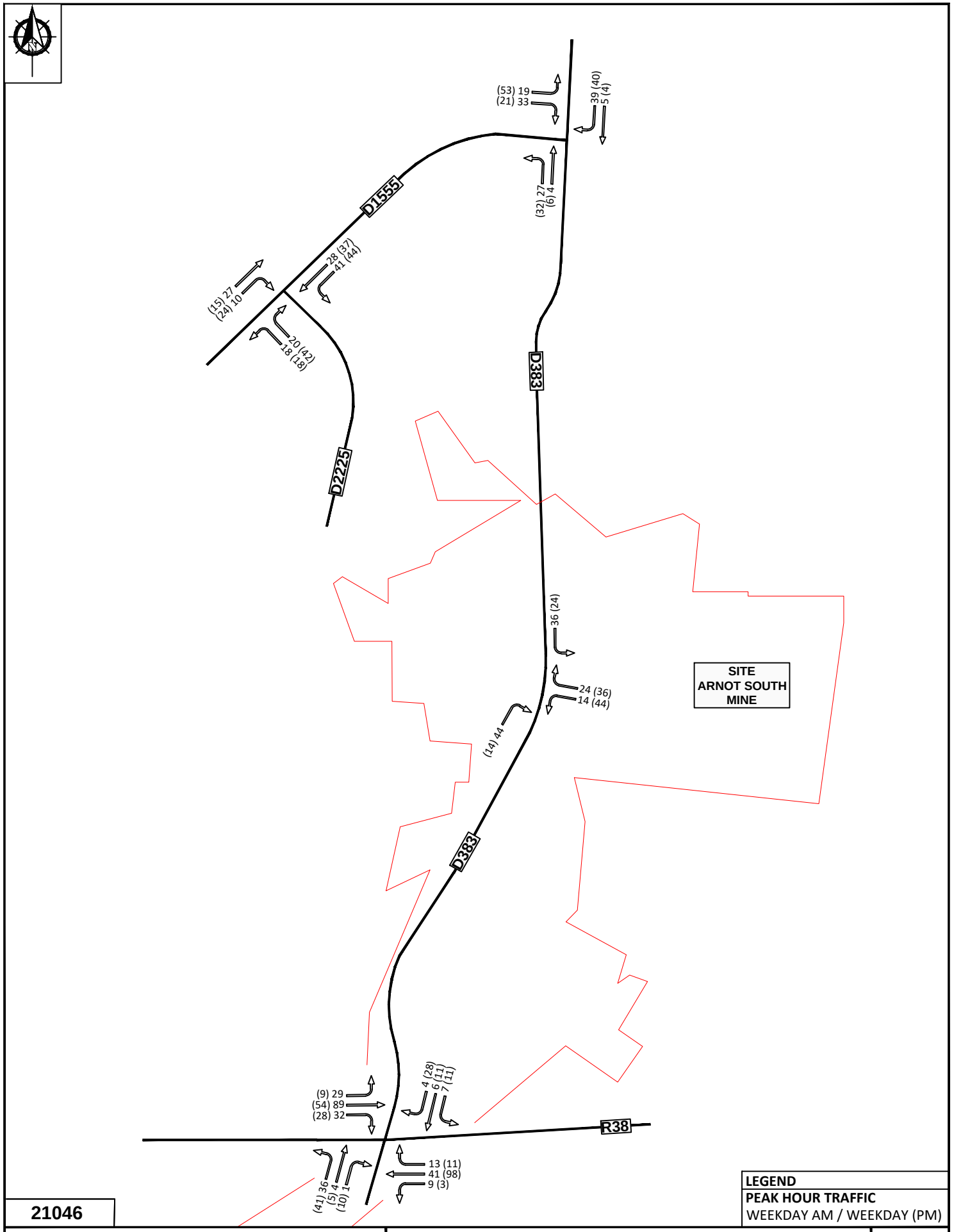
21046

SITE:
ARNOT SOUTH MINE

TITLE:
LATENT RIGHTS DEVELOPMENT PEAK HOUR TRAFFIC

FIG 5

EDL ENGINEERS



LEGEND

PEAK HOUR TRAFFIC

WEEKDAY AM / WEEKDAY (PM)

21046

SITE:

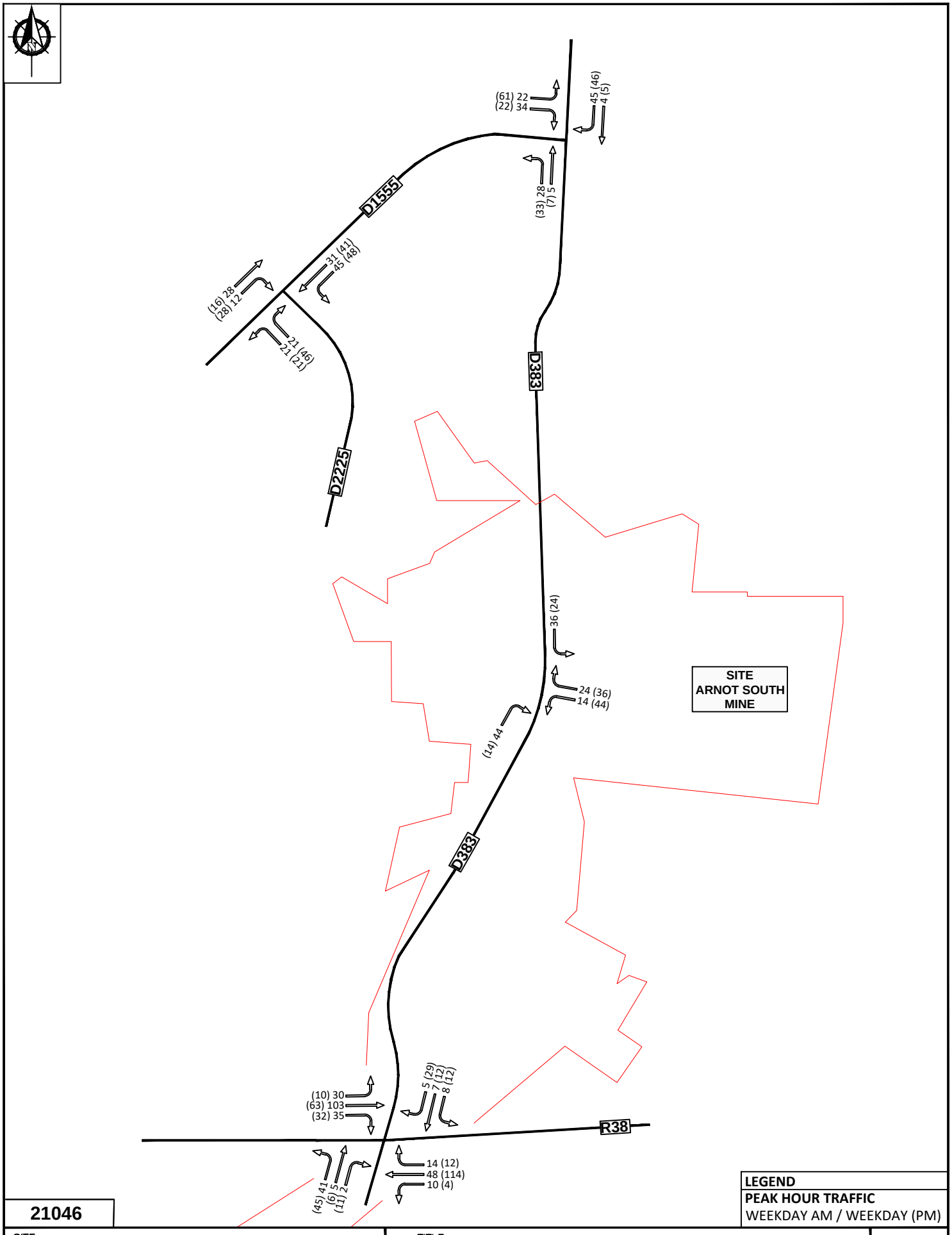
ARNOT SOUTH MINE

TITLE:

EXISTING 2021 + DEVELOPMENT PEAK HOUR TRAFFIC

FIG 6

EDL ENGINEERS



LEGEND

PEAK HOUR TRAFFIC

WEEKDAY AM / WEEKDAY (PM)

21046

SITE:

ARNOT SOUTH MINE

TITLE:

FUTURE 2026 BACKGROUND + DEVELOPMENT PEAK HOUR TRAFFIC

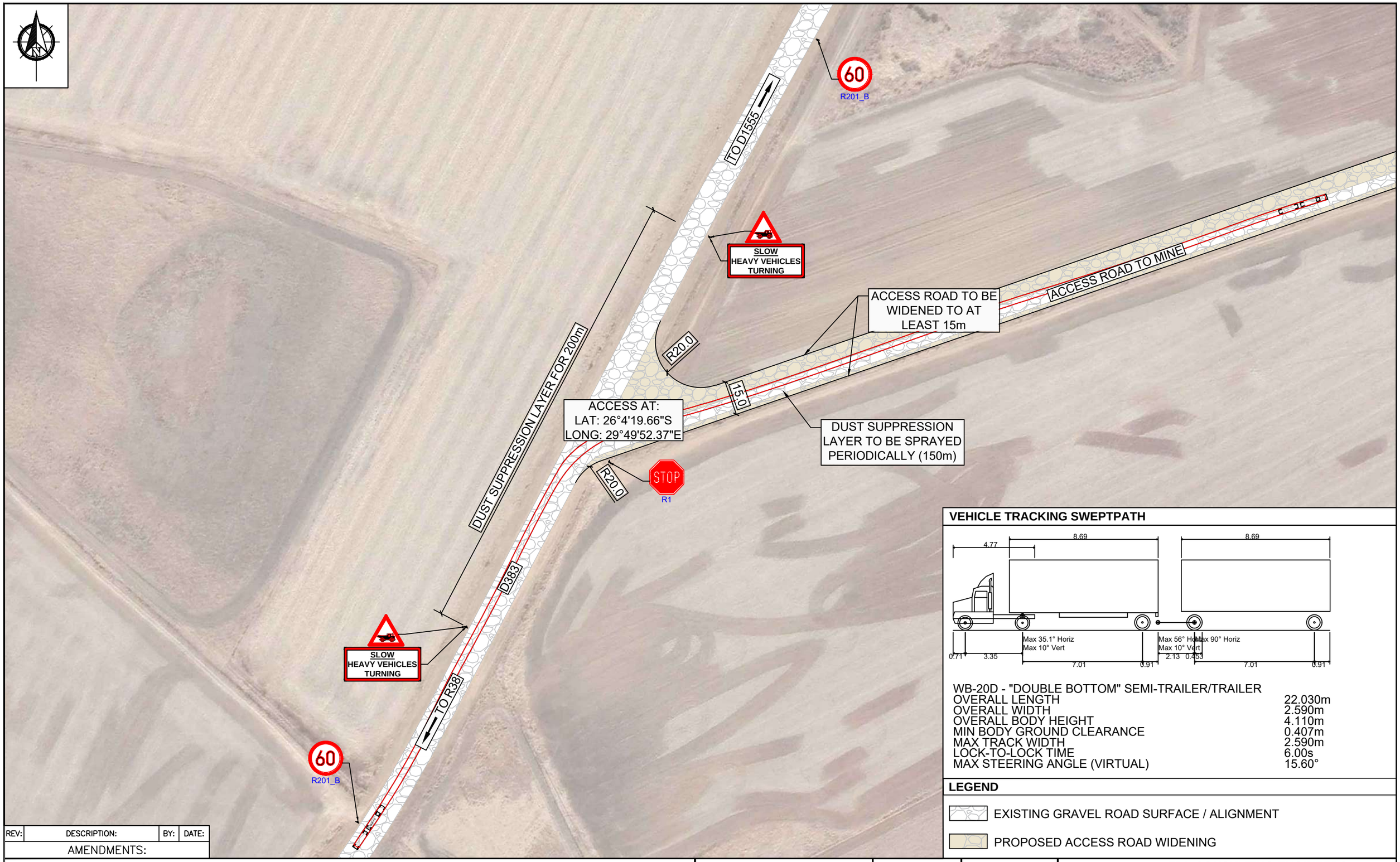
FIG 7

EDL ENGINEERS

Drawings

Drawing no: 21046/AL/01 Proposed Access Layout

21046/ID/01 Proposed Intersection Upgrades



VEHICLE TRACKING SWEPTPATH

WB-20D - "DOUBLE BOTTOM" SEMI-TRAILER/TRAILER	
OVERALL LENGTH	22.030m
OVERALL WIDTH	2.590m
OVERALL BODY HEIGHT	4.110m
MIN BODY GROUND CLEARANCE	0.407m
MAX TRACK WIDTH	2.590m
LOCK-TO-LOCK TIME	6.00s
MAX STEERING ANGLE (VIRTUAL)	15.60°

LEGEND

EXISTING GRAVEL ROAD SURFACE / ALIGNMENT

PROPOSED ACCESS ROAD WIDENING

REV:	DESCRIPTION:	BY:	DATE:
AMENDMENTS:			

SITE: **ARNOT SOUTH MINE**

TITLE: **PROPOSED ACCESS ROAD LAYOUT**

21046/AL/01	21046	AUG '21	
DRAWING NO.	PROJECT NO.	DATE.	
1:1 500	HB SENEKAL	ED KOTZE	0
SCALE AT A3.	DRAWN.	CHECKED.	REVISION.

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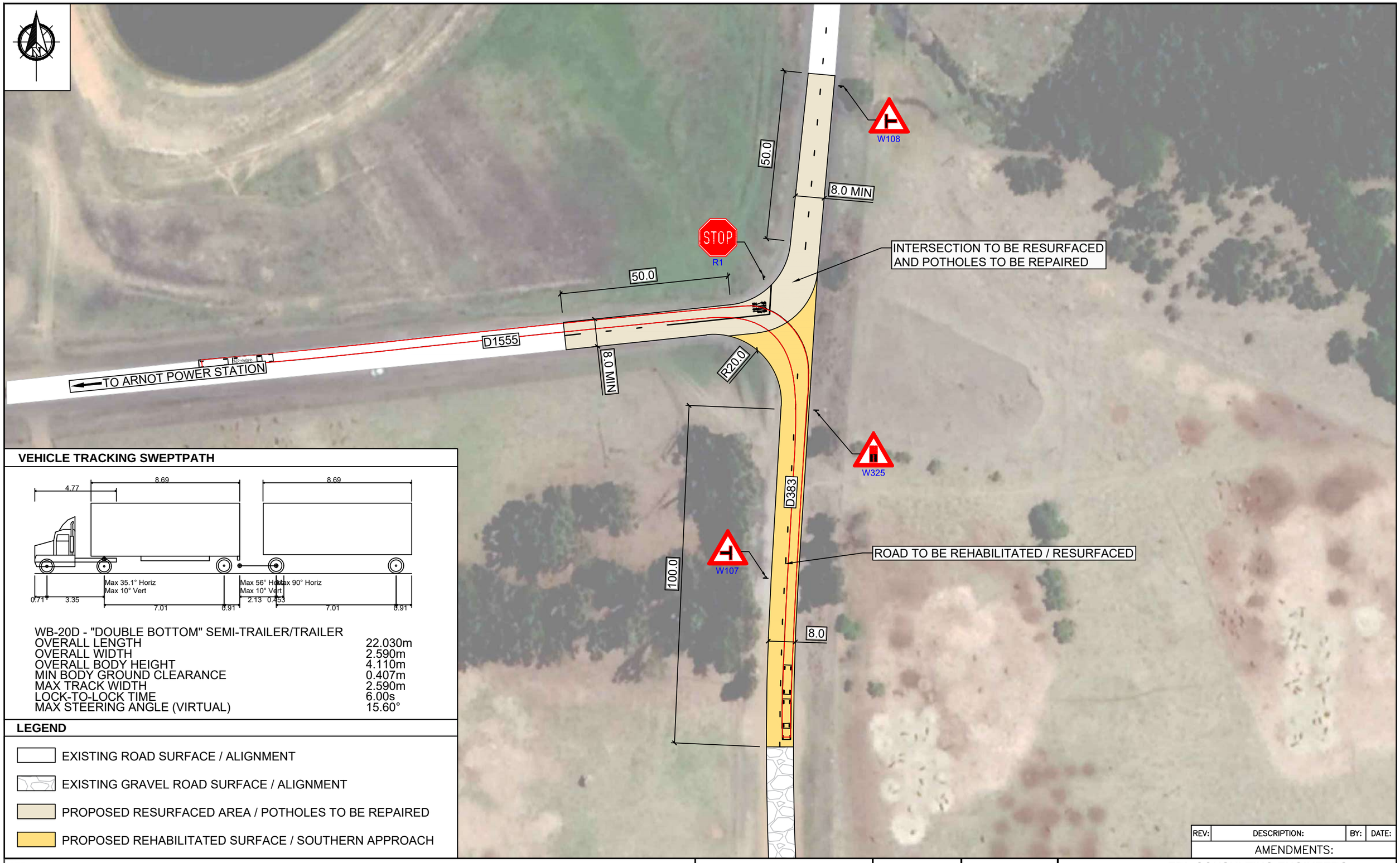

VEHICLE TRACKING SWEPTPATH

WB-20D - "DOUBLE BOTTOM" SEMI-TRAILER/TRAILER	
OVERALL LENGTH	22.030m
OVERALL WIDTH	2.590m
OVERALL BODY HEIGHT	4.110m
MIN BODY GROUND CLEARANCE	0.407m
MAX TRACK WIDTH	2.590m
LOCK-TO-LOCK TIME	6.00s
MAX STEERING ANGLE (VIRTUAL)	15.60°

LEGEND

- EXISTING ROAD SURFACE / ALIGNMENT
- EXISTING GRAVEL ROAD SURFACE / ALIGNMENT
- PROPOSED RESURFACED AREA / POTHOLES TO BE REPAIRED
- PROPOSED REHABILITATED SURFACE / SOUTHERN APPROACH

REV:	DESCRIPTION:	BY:	DATE:
AMENDMENTS:			

SITE: **ARNOT SOUTH MINE**

TITLE: **PROPOSED INTERSECTION UPGRADES**

21046/ID/01	21046	AUG. 21	
DRAWING NO.	PROJECT NO.	DATE.	
1:1 000	HB SENEKAL	ED KOTZE	0
SCALE AT A3.	DRAWN.	CHECKED.	REVISION.

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Annexure A

Relevant outputs of the SIDRA 9™ intersection capacity analyses at the key intersections

Annexure A1: R38 & D383

- A1.1 – Existing 2021 Weekday AM Peak Hour Traffic
- A1.2 – Existing 2021 Weekday PM Peak Hour Traffic
- A1.3 – Existing 2021 Plus Development Weekday AM Peak Hour Traffic
- A1.4 – Existing 2021 Plus Development Weekday PM Peak Hour Traffic
- A1.5 – Future 2026 Background Weekday AM Peak Hour Traffic
- A1.6 – Future 2026 Background Weekday PM Peak Hour Traffic
- A1.7 – Future 2026 Background Plus Development Plus Latent Rights Development Weekday AM Peak Hour Traffic
- A1.8 – Future 2026 Background Plus Development Plus Latent Rights Development Weekday PM Peak Hour Traffic

Annexure A1.1

Sidra Output: R38 & D383

Existing 2021 Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	32	25.0	34	25.0	0.035	9.2	LOS A	0.1	1.1	0.04	1.01	0.04	44.5
2	T1	1	25.0	1	25.0	0.035	11.0	LOS B	0.1	1.1	0.04	1.01	0.04	50.7
3	R2	1	25.0	1	25.0	0.035	11.0	LOS B	0.1	1.1	0.04	1.01	0.04	51.9
Approach		34	25.0	36	25.0	0.035	9.3	LOS A	0.1	1.1	0.04	1.01	0.04	44.8
East: R38														
4	L2	1	25.0	1	25.0	0.005	9.3	LOS A	0.0	0.0	0.00	0.09	0.00	76.8
5	T1	41	25.0	43	25.0	0.022	0.0	LOS A	0.0	0.1	0.01	0.03	0.01	118.2
6	R2	1	25.0	1	25.0	0.022	9.6	LOS A	0.0	0.1	0.02	0.02	0.02	74.1
Approach		43	25.0	45	25.0	0.022	0.5	NA	0.0	0.1	0.01	0.03	0.01	115.2
North: D383														
7	L2	1	25.0	1	25.0	0.004	9.3	LOS A	0.0	0.1	0.14	0.95	0.14	43.9
8	T1	1	25.0	1	25.0	0.004	10.8	LOS B	0.0	0.1	0.14	0.95	0.14	50.0
9	R2	1	25.0	1	25.0	0.004	11.3	LOS B	0.0	0.1	0.14	0.95	0.14	43.7
Approach		3	25.0	3	25.0	0.004	10.5	LOS B	0.0	0.1	0.14	0.95	0.14	45.7
West: R38														
10	L2	1	25.0	1	25.0	0.013	9.3	LOS A	0.0	0.0	0.00	0.03	0.00	58.9
11	T1	89	25.0	94	25.0	0.059	0.1	LOS A	0.1	1.2	0.05	0.12	0.05	113.7
12	R2	18	25.0	19	25.0	0.059	9.3	LOS A	0.1	1.2	0.07	0.14	0.07	71.6
Approach		108	25.0	114	25.0	0.059	1.7	NA	0.1	1.2	0.05	0.12	0.05	102.7
All Vehicles		188	25.0	198	25.0	0.059	2.9	NA	0.1	1.2	0.04	0.27	0.04	83.5

Annexure A1.2

Sidra Output: R38 & D383

Existing 2021 Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	28	25.0	29	25.0	0.035	9.3	LOS A	0.1	1.1	0.08	0.98	0.08	44.4
2	T1	2	25.0	2	25.0	0.035	11.4	LOS B	0.1	1.1	0.08	0.98	0.08	50.6
3	R2	2	25.0	2	25.0	0.035	11.5	LOS B	0.1	1.1	0.08	0.98	0.08	51.8
Approach		32	25.0	34	25.0	0.035	9.6	LOS A	0.1	1.1	0.08	0.98	0.08	45.2
East: R38														
4	L2	1	25.0	1	25.0	0.012	9.3	LOS A	0.0	0.0	0.00	0.04	0.00	77.8
5	T1	98	25.0	103	25.0	0.052	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	118.8
6	R2	2	25.0	2	25.0	0.052	9.4	LOS A	0.0	0.1	0.01	0.02	0.01	74.2
Approach		101	25.0	106	25.0	0.052	0.3	NA	0.0	0.1	0.01	0.02	0.01	116.8
North: D383														
7	L2	1	25.0	1	25.0	0.008	9.2	LOS A	0.0	0.3	0.14	0.96	0.14	43.6
8	T1	2	25.0	2	25.0	0.008	11.3	LOS B	0.0	0.3	0.14	0.96	0.14	49.6
9	R2	2	25.0	2	25.0	0.008	11.8	LOS B	0.0	0.3	0.14	0.96	0.14	43.4
Approach		5	25.0	5	25.0	0.008	11.1	LOS B	0.0	0.3	0.14	0.96	0.14	45.7
West: R38														
10	L2	5	25.0	5	25.0	0.011	9.3	LOS A	0.0	0.0	0.00	0.20	0.00	57.1
11	T1	54	25.0	57	25.0	0.049	0.3	LOS A	0.2	1.5	0.13	0.23	0.13	107.4
12	R2	24	25.0	25	25.0	0.049	9.6	LOS A	0.2	1.5	0.17	0.24	0.17	69.1
Approach		83	25.0	87	25.0	0.049	3.5	NA	0.2	1.5	0.14	0.23	0.14	88.5
All Vehicles		221	25.0	233	25.0	0.052	3.1	NA	0.2	1.5	0.07	0.26	0.07	84.3

Annexure A1.3

Sidra Output: R38 & D383

Existing 2021 + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	36	25.0	38	25.0	0.044	9.2	LOS A	0.2	1.4	0.02	1.03	0.02	44.4
2	T1	4	25.0	4	25.0	0.044	11.9	LOS B	0.2	1.4	0.02	1.03	0.02	50.5
3	R2	1	25.0	1	25.0	0.044	11.8	LOS B	0.2	1.4	0.02	1.03	0.02	51.7
Approach		41	25.0	43	25.0	0.044	9.5	LOS A	0.2	1.4	0.02	1.03	0.02	45.1
East: R38														
4	L2	9	25.0	9	25.0	0.008	9.3	LOS A	0.0	0.0	0.00	0.50	0.00	69.5
5	T1	41	25.0	43	25.0	0.036	0.2	LOS A	0.1	0.9	0.13	0.20	0.13	108.6
6	R2	13	25.0	14	25.0	0.036	9.7	LOS A	0.1	0.9	0.15	0.17	0.15	70.5
Approach		63	25.0	66	25.0	0.036	3.5	NA	0.1	0.9	0.12	0.24	0.12	91.1
North: D383														
7	L2	7	25.0	7	25.0	0.025	9.2	LOS A	0.1	0.6	0.00	1.04	0.00	43.6
8	T1	6	25.0	6	25.0	0.025	11.6	LOS B	0.1	0.6	0.00	1.04	0.00	49.6
9	R2	4	25.0	4	25.0	0.025	12.3	LOS B	0.1	0.6	0.00	1.04	0.00	43.4
Approach		17	25.0	18	25.0	0.025	10.8	LOS B	0.1	0.6	0.00	1.04	0.00	45.5
West: R38														
10	L2	29	25.0	31	25.0	0.019	9.3	LOS A	0.0	0.0	0.00	0.68	0.00	66.6
11	T1	89	25.0	94	25.0	0.085	0.1	LOS A	0.2	2.1	0.09	0.18	0.09	110.3
12	R2	32	25.0	34	25.0	0.085	9.4	LOS A	0.2	2.1	0.09	0.18	0.09	70.8
Approach		150	25.0	158	25.0	0.085	3.9	NA	0.2	2.1	0.07	0.28	0.07	88.5
All Vehicles		271	25.0	285	25.0	0.085	5.1	NA	0.2	2.1	0.07	0.43	0.07	73.8

Annexure A1.4

Sidra Output: R38 & D383

Existing 2021 + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	41	25.0	43	25.0	0.070	9.4	LOS A	0.3	2.3	0.08	0.99	0.08	44.1
2	T1	5	25.0	5	25.0	0.070	11.8	LOS B	0.3	2.3	0.08	0.99	0.08	50.3
3	R2	10	25.0	11	25.0	0.070	12.3	LOS B	0.3	2.3	0.08	0.99	0.08	51.4
Approach		56	25.0	59	25.0	0.070	10.1	LOS B	0.3	2.3	0.08	0.99	0.08	45.8
East: R38														
4	L2	3	25.0	3	25.0	0.014	9.3	LOS A	0.0	0.0	0.00	0.10	0.00	76.6
5	T1	98	25.0	103	25.0	0.060	0.1	LOS A	0.1	0.8	0.04	0.09	0.04	115.2
6	R2	11	25.0	12	25.0	0.060	9.4	LOS A	0.1	0.8	0.05	0.08	0.05	72.7
Approach		112	25.0	118	25.0	0.060	1.3	NA	0.1	0.8	0.04	0.09	0.04	107.5
North: D383														
7	L2	11	25.0	12	25.0	0.089	9.2	LOS A	0.3	2.9	0.12	0.99	0.12	43.2
8	T1	11	25.0	12	25.0	0.089	11.8	LOS B	0.3	2.9	0.12	0.99	0.12	49.1
9	R2	28	25.0	29	25.0	0.089	12.8	LOS B	0.3	2.9	0.12	0.99	0.12	43.0
Approach		50	25.0	53	25.0	0.089	11.8	LOS B	0.3	2.9	0.12	0.99	0.12	44.3
West: R38														
10	L2	9	25.0	9	25.0	0.012	9.3	LOS A	0.0	0.0	0.00	0.33	0.00	55.8
11	T1	54	25.0	57	25.0	0.054	0.3	LOS A	0.2	1.7	0.15	0.27	0.15	105.7
12	R2	28	25.0	29	25.0	0.054	9.6	LOS A	0.2	1.7	0.18	0.26	0.18	68.8
Approach		91	25.0	96	25.0	0.054	4.1	NA	0.2	1.7	0.14	0.27	0.14	84.3
All Vehicles		309	25.0	325	25.0	0.089	5.4	NA	0.3	2.9	0.09	0.45	0.09	69.0

Annexure A1.5

Sidra Output: R38 & D383

Future 2026 Background Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	37	25.0	39	25.0	0.040	9.2	LOS A	0.1	1.2	0.04	1.01	0.04	44.5
2	T1	1	25.0	1	25.0	0.040	11.4	LOS B	0.1	1.2	0.04	1.01	0.04	50.7
3	R2	1	25.0	1	25.0	0.040	11.5	LOS B	0.1	1.2	0.04	1.01	0.04	51.9
Approach		39	25.0	41	25.0	0.040	9.3	LOS A	0.1	1.2	0.04	1.01	0.04	44.8
East: R38														
4	L2	2	25.0	2	25.0	0.006	9.3	LOS A	0.0	0.0	0.00	0.15	0.00	75.6
5	T1	48	25.0	51	25.0	0.026	0.0	LOS A	0.0	0.1	0.01	0.04	0.01	118.0
6	R2	1	25.0	1	25.0	0.026	9.6	LOS A	0.0	0.1	0.01	0.02	0.01	74.2
Approach		51	25.0	54	25.0	0.026	0.6	NA	0.0	0.1	0.01	0.04	0.01	114.2
North: D383														
7	L2	1	25.0	1	25.0	0.006	9.3	LOS A	0.0	0.2	0.19	0.93	0.19	43.8
8	T1	2	25.0	2	25.0	0.006	11.2	LOS B	0.0	0.2	0.19	0.93	0.19	49.8
9	R2	1	25.0	1	25.0	0.006	11.9	LOS B	0.0	0.2	0.19	0.93	0.19	43.6
Approach		4	25.0	4	25.0	0.006	10.9	LOS B	0.0	0.2	0.19	0.93	0.19	46.5
West: R38														
10	L2	2	25.0	2	25.0	0.016	9.3	LOS A	0.0	0.0	0.00	0.06	0.00	58.7
11	T1	103	25.0	108	25.0	0.069	0.1	LOS A	0.2	1.4	0.06	0.12	0.06	113.3
12	R2	21	25.0	22	25.0	0.069	9.4	LOS A	0.2	1.4	0.07	0.14	0.07	71.5
Approach		126	25.0	133	25.0	0.069	1.8	NA	0.2	1.4	0.06	0.12	0.06	101.9
All Vehicles		220	25.0	232	25.0	0.069	3.0	NA	0.2	1.4	0.05	0.28	0.05	83.3

Annexure A1.6

Sidra Output: R38 & D383

Future 2026 Background Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	32	25.0	34	25.0	0.044	9.4	LOS A	0.2	1.4	0.08	0.98	0.08	44.3
2	T1	3	25.0	3	25.0	0.044	12.0	LOS B	0.2	1.4	0.08	0.98	0.08	50.5
3	R2	3	25.0	3	25.0	0.044	12.2	LOS B	0.2	1.4	0.08	0.98	0.08	51.7
Approach		38	25.0	40	25.0	0.044	9.8	LOS A	0.2	1.4	0.08	0.98	0.08	45.3
East: R38														
4	L2	2	25.0	2	25.0	0.014	9.3	LOS A	0.0	0.0	0.00	0.06	0.00	77.3
5	T1	114	25.0	120	25.0	0.062	0.0	LOS A	0.0	0.2	0.01	0.03	0.01	118.4
6	R2	3	25.0	3	25.0	0.062	9.5	LOS A	0.0	0.2	0.01	0.02	0.01	74.1
Approach		119	25.0	125	25.0	0.062	0.4	NA	0.0	0.2	0.01	0.03	0.01	115.6
North: D383														
7	L2	2	25.0	2	25.0	0.014	9.2	LOS A	0.1	0.4	0.14	0.97	0.14	43.4
8	T1	3	25.0	3	25.0	0.014	11.8	LOS B	0.1	0.4	0.14	0.97	0.14	49.4
9	R2	3	25.0	3	25.0	0.014	12.6	LOS B	0.1	0.4	0.14	0.97	0.14	43.2
Approach		8	25.0	8	25.0	0.014	11.4	LOS B	0.1	0.4	0.14	0.97	0.14	45.4
West: R38														
10	L2	6	25.0	6	25.0	0.013	9.3	LOS A	0.0	0.0	0.00	0.21	0.00	57.1
11	T1	63	25.0	66	25.0	0.058	0.3	LOS A	0.2	1.8	0.15	0.23	0.15	107.1
12	R2	28	25.0	29	25.0	0.058	9.7	LOS A	0.2	1.8	0.19	0.24	0.19	69.0
Approach		97	25.0	102	25.0	0.058	3.6	NA	0.2	1.8	0.15	0.24	0.15	88.3
All Vehicles		262	25.0	276	25.0	0.062	3.3	NA	0.2	1.8	0.08	0.27	0.08	83.3

Annexure A1.7

Sidra Output: R38 & D383

Future 2026 Background + Development + Latent Rights Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total	HV]	DEMAND FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: D383														
1	L2	41	25.0	43	25.0	0.054	9.2	LOS A	0.2	1.7	0.02	1.02	0.02	44.3
2	T1	5	25.0	5	25.0	0.054	12.4	LOS B	0.2	1.7	0.02	1.02	0.02	50.5
3	R2	2	25.0	2	25.0	0.054	12.4	LOS B	0.2	1.7	0.02	1.02	0.02	51.6
Approach		48	25.0	51	25.0	0.054	9.7	LOS A	0.2	1.7	0.02	1.02	0.02	45.1
East: R38														
4	L2	10	25.0	11	25.0	0.009	9.3	LOS A	0.0	0.0	0.00	0.49	0.00	69.8
5	T1	48	25.0	51	25.0	0.041	0.3	LOS A	0.1	1.0	0.14	0.19	0.14	108.9
6	R2	14	25.0	15	25.0	0.041	9.8	LOS A	0.1	1.0	0.15	0.16	0.15	70.6
Approach		72	25.0	76	25.0	0.041	3.4	NA	0.1	1.0	0.12	0.23	0.12	92.0
North: D383														
7	L2	8	25.0	8	25.0	0.031	9.3	LOS A	0.1	1.0	0.02	1.03	0.02	43.5
8	T1	7	25.0	7	25.0	0.031	12.1	LOS B	0.1	1.0	0.02	1.03	0.02	49.4
9	R2	5	25.0	5	25.0	0.031	13.0	LOS B	0.1	1.0	0.02	1.03	0.02	43.3
Approach		20	25.0	21	25.0	0.031	11.2	LOS B	0.1	1.0	0.02	1.03	0.02	45.3
West: R38														
10	L2	30	25.0	32	25.0	0.022	9.3	LOS A	0.0	0.0	0.00	0.64	0.00	52.8
11	T1	103	25.0	108	25.0	0.095	0.1	LOS A	0.3	2.3	0.10	0.18	0.10	109.9
12	R2	35	25.0	37	25.0	0.095	9.4	LOS A	0.3	2.3	0.10	0.17	0.10	70.8
Approach		168	25.0	177	25.0	0.095	3.7	NA	0.3	2.3	0.08	0.26	0.08	84.0
All Vehicles		308	25.0	324	25.0	0.095	5.0	NA	0.3	2.3	0.08	0.42	0.08	71.8

Annexure A1.8

Sidra Output: R38 & D383

Future 2026 Background + Development + Latent Rights Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	45	25.0	47	25.0	0.080	9.4	LOS A	0.3	2.6	0.09	0.98	0.09	44.0
2	T1	6	25.0	6	25.0	0.080	12.4	LOS B	0.3	2.6	0.09	0.98	0.09	50.1
3	R2	11	25.0	12	25.0	0.080	13.0	LOS B	0.3	2.6	0.09	0.98	0.09	51.3
Approach		62	25.0	65	25.0	0.080	10.4	LOS B	0.3	2.6	0.09	0.98	0.09	45.7
East: R38														
4	L2	4	25.0	4	25.0	0.016	9.3	LOS A	0.0	0.0	0.00	0.11	0.00	76.3
5	T1	114	25.0	120	25.0	0.070	0.1	LOS A	0.1	0.9	0.04	0.08	0.04	115.2
6	R2	12	25.0	13	25.0	0.070	9.5	LOS A	0.1	0.9	0.05	0.08	0.05	72.8
Approach		130	25.0	137	25.0	0.070	1.2	NA	0.1	0.9	0.04	0.09	0.04	107.7
North: D383														
7	L2	12	25.0	13	25.0	0.100	9.3	LOS A	0.4	3.3	0.14	0.99	0.14	43.0
8	T1	12	25.0	13	25.0	0.100	12.4	LOS B	0.4	3.3	0.14	0.99	0.14	48.7
9	R2	29	25.0	31	25.0	0.100	13.7	LOS B	0.4	3.3	0.14	0.99	0.14	42.8
Approach		53	25.0	56	25.0	0.100	12.4	LOS B	0.4	3.3	0.14	0.99	0.14	44.0
West: R38														
10	L2	10	25.0	11	25.0	0.014	9.3	LOS A	0.0	0.0	0.00	0.32	0.00	55.9
11	T1	63	25.0	66	25.0	0.063	0.4	LOS A	0.2	2.1	0.16	0.27	0.16	105.6
12	R2	32	25.0	34	25.0	0.063	9.8	LOS A	0.2	2.1	0.20	0.26	0.20	68.7
Approach		105	25.0	111	25.0	0.063	4.1	NA	0.2	2.1	0.16	0.27	0.16	84.6
All Vehicles		350	25.0	368	25.0	0.100	5.4	NA	0.4	3.3	0.10	0.44	0.10	69.8

Annexure A2: D383 & D1555

- A2.1 – Existing 2021 Weekday AM Peak Hour Traffic
- A2.2 – Existing 2021 Weekday PM Peak Hour Traffic
- A2.3 – Existing 2021 Plus Development Weekday AM Peak Hour Traffic
- A2.4 – Existing 2021 Plus Development Weekday PM Peak Hour Traffic
- A2.5 – Future 2026 Background Weekday AM Peak Hour Traffic
- A2.6 – Future 2026 Background Weekday PM Peak Hour Traffic
- A2.7 – Future 2026 Background Plus Development Plus Latent Rights Development Weekday AM Peak Hour Traffic
- A2.8 – Future 2026 Background Plus Development Plus Latent Rights Development Weekday PM Peak Hour Traffic

Annexure A2.1

Sidra Output: D383 & D1555

Existing 2021 Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	6	50.0	6	50.0	0.005	6.1	LOS A	0.0	0.0	0.00	0.49	0.00	52.1
2	T1	1	50.0	1	50.0	0.005	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	55.7
Approach		7	50.0	7	50.0	0.005	5.2	NA	0.0	0.0	0.00	0.49	0.00	52.6
North: D383														
8	T1	1	50.0	1	50.0	0.030	0.0	LOS A	0.1	1.4	0.06	0.57	0.06	55.0
9	R2	39	50.0	41	50.0	0.030	6.1	LOS A	0.1	1.4	0.06	0.57	0.06	50.9
Approach		40	50.0	42	50.0	0.030	5.9	NA	0.1	1.4	0.06	0.57	0.06	51.0
West: D1555														
10	L2	19	50.0	20	50.0	0.019	10.1	LOS B	0.1	0.7	0.01	1.07	0.01	49.8
12	R2	1	50.0	1	50.0	0.019	9.8	LOS A	0.1	0.7	0.01	1.07	0.01	49.2
Approach		20	50.0	21	50.0	0.019	10.1	LOS B	0.1	0.7	0.01	1.07	0.01	49.8
All Vehicles		67	50.0	71	50.0	0.030	7.1	NA	0.1	1.4	0.04	0.71	0.04	50.8

Annexure A2.2

Sidra Output: D383 & D1555

Existing 2021 Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	1	50.0	1	50.0	0.002	6.1	LOS A	0.0	0.0	0.00	0.19	0.00	54.4
2	T1	2	50.0	2	50.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.2
Approach		3	50.0	3	50.0	0.002	2.0	NA	0.0	0.0	0.00	0.19	0.00	56.9
North: D383														
8	T1	1	50.0	1	50.0	0.030	0.0	LOS A	0.1	1.4	0.03	0.57	0.03	55.1
9	R2	40	50.0	42	50.0	0.030	6.1	LOS A	0.1	1.4	0.03	0.57	0.03	51.0
Approach		41	50.0	43	50.0	0.030	5.9	NA	0.1	1.4	0.03	0.57	0.03	51.0
West: D1555														
10	L2	53	50.0	56	50.0	0.050	10.1	LOS B	0.2	2.0	0.02	1.05	0.02	49.8
12	R2	1	50.0	1	50.0	0.050	9.9	LOS A	0.2	2.0	0.02	1.05	0.02	49.2
Approach		54	50.0	57	50.0	0.050	10.1	LOS B	0.2	2.0	0.02	1.05	0.02	49.8
All Vehicles		98	50.0	103	50.0	0.050	8.1	NA	0.2	2.0	0.03	0.83	0.03	50.5

Annexure A2.3

Sidra Output: D383 & D1555

Existing 2021 + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	27	50.0	28	50.0	0.024	6.1	LOS A	0.0	0.0	0.00	0.50	0.00	52.1
2	T1	4	50.0	4	50.0	0.024	0.0	LOS A	0.0	0.0	0.00	0.50	0.00	55.6
Approach		31	50.0	33	50.0	0.024	5.3	NA	0.0	0.0	0.00	0.50	0.00	52.5
North: D383														
8	T1	5	50.0	5	50.0	0.034	0.2	LOS A	0.2	1.5	0.14	0.50	0.14	55.2
9	R2	39	50.0	41	50.0	0.034	6.2	LOS A	0.2	1.5	0.14	0.50	0.14	51.0
Approach		44	50.0	46	50.0	0.034	5.5	NA	0.2	1.5	0.14	0.50	0.14	51.5
West: D1555														
10	L2	19	50.0	20	50.0	0.059	10.2	LOS B	0.2	2.1	0.04	1.06	0.04	49.8
12	R2	33	50.0	35	50.0	0.059	10.0	LOS B	0.2	2.1	0.04	1.06	0.04	49.2
Approach		52	50.0	55	50.0	0.059	10.1	LOS B	0.2	2.1	0.04	1.06	0.04	49.5
All Vehicles		127	50.0	134	50.0	0.059	7.3	NA	0.2	2.1	0.06	0.73	0.06	50.9

Annexure A2.4

Sidra Output: D383 & D1555

Existing 2021 + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	32	50.0	34	50.0	0.029	6.1	LOS A	0.0	0.0	0.00	0.48	0.00	52.2
2	T1	6	50.0	6	50.0	0.029	0.0	LOS A	0.0	0.0	0.00	0.48	0.00	55.7
Approach		38	50.0	40	50.0	0.029	5.2	NA	0.0	0.0	0.00	0.48	0.00	52.7
North: D383														
8	T1	4	50.0	4	50.0	0.034	0.2	LOS A	0.2	1.5	0.15	0.51	0.15	55.0
9	R2	40	50.0	42	50.0	0.034	6.3	LOS A	0.2	1.5	0.15	0.51	0.15	50.9
Approach		44	50.0	46	50.0	0.034	5.7	NA	0.2	1.5	0.15	0.51	0.15	51.2
West: D1555														
10	L2	53	50.0	56	50.0	0.075	10.2	LOS B	0.3	2.9	0.04	1.05	0.04	49.8
12	R2	21	50.0	22	50.0	0.075	10.1	LOS B	0.3	2.9	0.04	1.05	0.04	49.2
Approach		74	50.0	78	50.0	0.075	10.1	LOS B	0.3	2.9	0.04	1.05	0.04	49.7
All Vehicles		156	50.0	164	50.0	0.075	7.7	NA	0.3	2.9	0.06	0.76	0.06	50.8

Annexure A2.5

Sidra Output: D383 & D1555

Future 2026 Background Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	7	50.0	7	50.0	0.007	6.1	LOS A	0.0	0.0	0.00	0.45	0.00	52.5
2	T1	2	50.0	2	50.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.45	0.00	56.0
Approach		9	50.0	9	50.0	0.007	4.8	NA	0.0	0.0	0.00	0.45	0.00	53.2
North: D383														
8	T1	2	50.0	2	50.0	0.035	0.0	LOS A	0.2	1.6	0.06	0.55	0.06	55.1
9	R2	45	50.0	47	50.0	0.035	6.1	LOS A	0.2	1.6	0.06	0.55	0.06	50.9
Approach		47	50.0	49	50.0	0.035	5.8	NA	0.2	1.6	0.06	0.55	0.06	51.1
West: D1555														
10	L2	22	50.0	23	50.0	0.023	10.1	LOS B	0.1	0.9	0.02	1.06	0.02	49.8
12	R2	2	50.0	2	50.0	0.023	9.9	LOS A	0.1	0.9	0.02	1.06	0.02	49.2
Approach		24	50.0	25	50.0	0.023	10.1	LOS B	0.1	0.9	0.02	1.06	0.02	49.8
All Vehicles		80	50.0	84	50.0	0.035	7.0	NA	0.2	1.6	0.04	0.69	0.04	50.9

Annexure A2.6

Sidra Output: D383 & D1555

Future 2026 Background Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	1	50.0	1	50.0	0.003	6.1	LOS A	0.0	0.0	0.00	0.14	0.00	54.7
2	T1	3	50.0	3	50.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	58.7
Approach		4	50.0	4	50.0	0.003	1.5	NA	0.0	0.0	0.00	0.14	0.00	57.6
North: D383														
8	T1	2	50.0	2	50.0	0.035	0.0	LOS A	0.2	1.6	0.04	0.56	0.04	55.1
9	R2	46	50.0	48	50.0	0.035	6.1	LOS A	0.2	1.6	0.04	0.56	0.04	51.0
Approach		48	50.0	51	50.0	0.035	5.8	NA	0.2	1.6	0.04	0.56	0.04	51.2
West: D1555														
10	L2	61	50.0	64	50.0	0.057	10.1	LOS B	0.2	2.3	0.03	1.05	0.03	49.8
12	R2	1	50.0	1	50.0	0.057	9.9	LOS A	0.2	2.3	0.03	1.05	0.03	49.2
Approach		62	50.0	65	50.0	0.057	10.1	LOS B	0.2	2.3	0.03	1.05	0.03	49.8
All Vehicles		114	50.0	120	50.0	0.057	8.0	NA	0.2	2.3	0.03	0.81	0.03	50.6

Annexure A2.7

Sidra Output: D383 & D1555

Future 2026 Background + Development + Latent Rights Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	28	50.0	29	50.0	0.025	6.1	LOS A	0.0	0.0	0.00	0.48	0.00	52.2
2	T1	5	50.0	5	50.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.48	0.00	55.7
Approach		33	50.0	35	50.0	0.025	5.2	NA	0.0	0.0	0.00	0.48	0.00	52.7
North: D383														
8	T1	4	50.0	4	50.0	0.038	0.2	LOS A	0.2	1.7	0.14	0.52	0.14	55.0
9	R2	45	50.0	47	50.0	0.038	6.2	LOS A	0.2	1.7	0.14	0.52	0.14	50.9
Approach		49	50.0	52	50.0	0.038	5.7	NA	0.2	1.7	0.14	0.52	0.14	51.2
West: D1555														
10	L2	22	50.0	23	50.0	0.063	10.2	LOS B	0.2	2.3	0.04	1.05	0.04	49.8
12	R2	34	50.0	36	50.0	0.063	10.1	LOS B	0.2	2.3	0.04	1.05	0.04	49.2
Approach		56	50.0	59	50.0	0.063	10.1	LOS B	0.2	2.3	0.04	1.05	0.04	49.5
All Vehicles		138	50.0	145	50.0	0.063	7.4	NA	0.2	2.3	0.07	0.73	0.07	50.8

Annexure A2.8

Sidra Output: D383 & D1555

Future 2026 Background + Development + Latent Rights Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: D383														
1	L2	33	50.0	35	50.0	0.030	6.1	LOS A	0.0	0.0	0.00	0.47	0.00	52.3
2	T1	7	50.0	7	50.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.47	0.00	55.8
Approach		40	50.0	42	50.0	0.030	5.1	NA	0.0	0.0	0.00	0.47	0.00	52.8
North: D383														
8	T1	5	50.0	5	50.0	0.039	0.2	LOS A	0.2	1.8	0.16	0.51	0.16	55.0
9	R2	46	50.0	48	50.0	0.039	6.3	LOS A	0.2	1.8	0.16	0.51	0.16	50.9
Approach		51	50.0	54	50.0	0.039	5.7	NA	0.2	1.8	0.16	0.51	0.16	51.3
West: D1555														
10	L2	61	50.0	64	50.0	0.084	10.2	LOS B	0.3	3.3	0.04	1.04	0.04	49.8
12	R2	22	50.0	23	50.0	0.084	10.2	LOS B	0.3	3.3	0.04	1.04	0.04	49.2
Approach		83	50.0	87	50.0	0.084	10.2	LOS B	0.3	3.3	0.04	1.04	0.04	49.7
All Vehicles		174	50.0	183	50.0	0.084	7.7	NA	0.3	3.3	0.07	0.75	0.07	50.8

Annexure A3: D1555 & D2225

- A3.1 – Existing 2021 Weekday AM Peak Hour Traffic
- A3.2 – Existing 2021 Weekday PM Peak Hour Traffic
- A3.3 – Existing 2021 Plus Development Weekday AM Peak Hour Traffic
- A3.4 – Existing 2021 Plus Development Weekday PM Peak Hour Traffic
- A3.5 – Future 2026 Background Weekday AM Peak Hour Traffic
- A3.6 – Future 2026 Background Weekday PM Peak Hour Traffic
- A3.7 – Future 2026 Background Plus Development Plus Latent Rights Development Weekday AM Peak Hour Traffic
- A3.8 – Future 2026 Background Plus Development Plus Latent Rights Development Weekday PM Peak Hour Traffic

Annexure A3.1

Sidra Output: D1555 & D2225

Existing 2021 Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: D2225														
1	L2	18	50.0	19	50.0	0.026	10.3	LOS B	0.1	0.9	0.10	1.00	0.10	49.9
3	R2	7	50.0	7	50.0	0.026	9.9	LOS A	0.1	0.9	0.10	1.00	0.10	49.3
Approach		25	50.0	26	50.0	0.026	10.2	LOS B	0.1	0.9	0.10	1.00	0.10	49.7
NorthEast: D1555														
4	L2	28	50.0	29	50.0	0.036	6.1	LOS A	0.0	0.0	0.00	0.34	0.00	53.3
5	T1	20	50.0	21	50.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	57.0
Approach		48	50.0	51	50.0	0.036	3.6	NA	0.0	0.0	0.00	0.34	0.00	54.7
SouthWest: D1555														
11	T1	8	50.0	8	50.0	0.014	0.2	LOS A	0.1	0.6	0.16	0.31	0.16	56.6
12	R2	10	50.0	11	50.0	0.014	6.3	LOS A	0.1	0.6	0.16	0.31	0.16	52.3
Approach		18	50.0	19	50.0	0.014	3.6	NA	0.1	0.6	0.16	0.31	0.16	54.1
All Vehicles		91	50.0	96	50.0	0.036	5.4	NA	0.1	0.9	0.06	0.51	0.06	53.1

Annexure A3.2

Sidra Output: D1555 & D2225

Existing 2021 Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: D2225														
1	L2	18	50.0	19	50.0	0.052	10.3	LOS B	0.2	1.9	0.14	0.99	0.14	49.9
3	R2	28	50.0	29	50.0	0.052	10.1	LOS B	0.2	1.9	0.14	0.99	0.14	49.3
Approach		46	50.0	48	50.0	0.052	10.2	LOS B	0.2	1.9	0.14	0.99	0.14	49.5
NorthEast: D1555														
4	L2	24	50.0	25	50.0	0.036	6.1	LOS A	0.0	0.0	0.00	0.28	0.00	53.7
5	T1	25	50.0	26	50.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	57.4
Approach		49	50.0	52	50.0	0.036	3.0	NA	0.0	0.0	0.00	0.28	0.00	55.5
SouthWest: D1555														
11	T1	8	50.0	8	50.0	0.025	0.3	LOS A	0.1	1.1	0.17	0.42	0.17	55.7
12	R2	24	50.0	25	50.0	0.025	6.3	LOS A	0.1	1.1	0.17	0.42	0.17	51.5
Approach		32	50.0	34	50.0	0.025	4.8	NA	0.1	1.1	0.17	0.42	0.17	52.4
All Vehicles		127	50.0	134	50.0	0.052	6.1	NA	0.2	1.9	0.09	0.57	0.09	52.5

Annexure A3.3

Sidra Output: D1555 & D2225

Existing 2021 + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: D2225														
1	L2	18	50.0	19	50.0	0.043	10.3	LOS B	0.2	1.5	0.14	0.99	0.14	49.9
3	R2	20	50.0	21	50.0	0.043	10.2	LOS B	0.2	1.5	0.14	0.99	0.14	49.3
Approach		38	50.0	40	50.0	0.043	10.3	LOS B	0.2	1.5	0.14	0.99	0.14	49.5
NorthEast: D1555														
4	L2	41	50.0	43	50.0	0.052	6.1	LOS A	0.0	0.0	0.00	0.34	0.00	53.2
5	T1	28	50.0	29	50.0	0.052	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	56.9
Approach		69	50.0	73	50.0	0.052	3.6	NA	0.0	0.0	0.00	0.34	0.00	54.6
SouthWest: D1555														
11	T1	27	50.0	28	50.0	0.028	0.2	LOS A	0.1	0.7	0.12	0.16	0.12	58.1
12	R2	10	50.0	11	50.0	0.028	6.5	LOS A	0.1	0.7	0.12	0.16	0.12	53.5
Approach		37	50.0	39	50.0	0.028	1.9	NA	0.1	0.7	0.12	0.16	0.12	56.8
All Vehicles		144	50.0	152	50.0	0.052	4.9	NA	0.2	1.5	0.07	0.46	0.07	53.7

Annexure A3.4

Sidra Output: D1555 & D2225

Existing 2021 + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: D2225														
1	L2	18	50.0	19	50.0	0.073	10.4	LOS B	0.3	2.6	0.19	0.98	0.19	49.8
3	R2	42	50.0	44	50.0	0.073	10.4	LOS B	0.3	2.6	0.19	0.98	0.19	49.2
Approach		60	50.0	63	50.0	0.073	10.4	LOS B	0.3	2.6	0.19	0.98	0.19	49.4
NorthEast: D1555														
4	L2	44	50.0	46	50.0	0.060	6.1	LOS A	0.0	0.0	0.00	0.31	0.00	53.4
5	T1	37	50.0	39	50.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	57.1
Approach		81	50.0	85	50.0	0.060	3.3	NA	0.0	0.0	0.00	0.31	0.00	55.1
SouthWest: D1555														
11	T1	15	50.0	16	50.0	0.031	0.4	LOS A	0.1	1.4	0.22	0.35	0.22	56.1
12	R2	24	50.0	25	50.0	0.031	6.5	LOS A	0.1	1.4	0.22	0.35	0.22	51.8
Approach		39	50.0	41	50.0	0.031	4.2	NA	0.1	1.4	0.22	0.35	0.22	53.4
All Vehicles		180	50.0	189	50.0	0.073	5.9	NA	0.3	2.6	0.11	0.54	0.11	52.7

Annexure A3.5

Sidra Output: D1555 & D2225

Future 2026 Background Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: D2225														
1	L2	21	50.0	22	50.0	0.030	10.3	LOS B	0.1	1.1	0.11	0.99	0.11	49.9
3	R2	8	50.0	8	50.0	0.030	10.0	LOS A	0.1	1.1	0.11	0.99	0.11	49.3
Approach		29	50.0	31	50.0	0.030	10.2	LOS B	0.1	1.1	0.11	0.99	0.11	49.7
NorthEast: D1555														
4	L2	32	50.0	34	50.0	0.041	6.1	LOS A	0.0	0.0	0.00	0.33	0.00	53.3
5	T1	23	50.0	24	50.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.33	0.00	57.0
Approach		55	50.0	58	50.0	0.041	3.6	NA	0.0	0.0	0.00	0.33	0.00	54.8
SouthWest: D1555														
11	T1	9	50.0	9	50.0	0.016	0.2	LOS A	0.1	0.7	0.17	0.32	0.17	56.5
12	R2	12	50.0	13	50.0	0.016	6.4	LOS A	0.1	0.7	0.17	0.32	0.17	52.2
Approach		21	50.0	22	50.0	0.016	3.7	NA	0.1	0.7	0.17	0.32	0.17	53.9
All Vehicles		105	50.0	111	50.0	0.041	5.4	NA	0.1	1.1	0.07	0.51	0.07	53.1

Annexure A3.6

Sidra Output: D1555 & D2225

Future 2026 Background Weekday PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: D2225														
1	L2	21	50.0	22	50.0	0.061	10.3	LOS B	0.2	2.2	0.15	0.99	0.15	49.9
3	R2	32	50.0	34	50.0	0.061	10.2	LOS B	0.2	2.2	0.15	0.99	0.15	49.3
Approach		53	50.0	56	50.0	0.061	10.3	LOS B	0.2	2.2	0.15	0.99	0.15	49.5
NorthEast: D1555														
4	L2	28	50.0	29	50.0	0.042	6.1	LOS A	0.0	0.0	0.00	0.28	0.00	53.7
5	T1	29	50.0	31	50.0	0.042	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	57.4
Approach		57	50.0	60	50.0	0.042	3.0	NA	0.0	0.0	0.00	0.28	0.00	55.5
SouthWest: D1555														
11	T1	9	50.0	9	50.0	0.029	0.3	LOS A	0.1	1.3	0.19	0.42	0.19	55.6
12	R2	28	50.0	29	50.0	0.029	6.4	LOS A	0.1	1.3	0.19	0.42	0.19	51.4
Approach		37	50.0	39	50.0	0.029	4.9	NA	0.1	1.3	0.19	0.42	0.19	52.3
All Vehicles		147	50.0	155	50.0	0.061	6.1	NA	0.2	2.2	0.10	0.57	0.10	52.4

Annexure A3.7

Sidra Output: D1555 & D2225

Future 2026 Background + Development + Latent Rights Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: D2225														
1	L2	21	50.0	22	50.0	0.048	10.3	LOS B	0.2	1.7	0.15	0.98	0.15	49.8
3	R2	21	50.0	22	50.0	0.048	10.3	LOS B	0.2	1.7	0.15	0.98	0.15	49.2
Approach		42	50.0	44	50.0	0.048	10.3	LOS B	0.2	1.7	0.15	0.98	0.15	49.5
NorthEast: D1555														
4	L2	45	50.0	47	50.0	0.057	6.1	LOS A	0.0	0.0	0.00	0.34	0.00	53.2
5	T1	31	50.0	33	50.0	0.057	0.0	LOS A	0.0	0.0	0.00	0.34	0.00	56.9
Approach		76	50.0	80	50.0	0.057	3.6	NA	0.0	0.0	0.00	0.34	0.00	54.7
SouthWest: D1555														
11	T1	28	50.0	29	50.0	0.030	0.2	LOS A	0.1	0.9	0.14	0.17	0.14	57.9
12	R2	12	50.0	13	50.0	0.030	6.5	LOS A	0.1	0.9	0.14	0.17	0.14	53.4
Approach		40	50.0	42	50.0	0.030	2.1	NA	0.1	0.9	0.14	0.17	0.14	56.4
All Vehicles		158	50.0	166	50.0	0.057	5.0	NA	0.2	1.7	0.07	0.47	0.07	53.6

Annexure A3.8

Sidra Output: D1555 & D2225

Future 2026 Background + Development Weekday + Latent Rights Development PM Peak Hour Traffic

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: D2225														
1	L2	21	50.0	22	50.0	0.082	10.4	LOS B	0.3	2.9	0.20	0.97	0.20	49.8
3	R2	46	50.0	48	50.0	0.082	10.5	LOS B	0.3	2.9	0.20	0.97	0.20	49.2
Approach		67	50.0	71	50.0	0.082	10.5	LOS B	0.3	2.9	0.20	0.97	0.20	49.4
NorthEast: D1555														
4	L2	48	50.0	51	50.0	0.066	6.1	LOS A	0.0	0.0	0.00	0.31	0.00	53.4
5	T1	41	50.0	43	50.0	0.066	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	57.2
Approach		89	50.0	94	50.0	0.066	3.3	NA	0.0	0.0	0.00	0.31	0.00	55.1
SouthWest: D1555														
11	T1	16	50.0	17	50.0	0.035	0.5	LOS A	0.2	1.6	0.24	0.36	0.24	55.9
12	R2	28	50.0	29	50.0	0.035	6.6	LOS A	0.2	1.6	0.24	0.36	0.24	51.7
Approach		44	50.0	46	50.0	0.035	4.4	NA	0.2	1.6	0.24	0.36	0.24	53.2
All Vehicles		200	50.0	211	50.0	0.082	5.9	NA	0.3	2.9	0.12	0.54	0.12	52.6

Annexure B

Mining Infrastructure Layout

Arnot South EA & IWUL Application

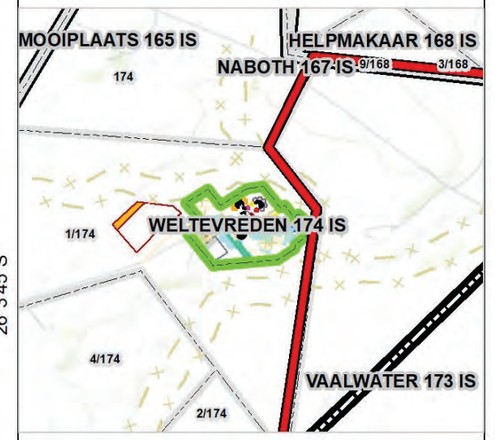
Infrastructure Layout

Site Infrastructure

- Reservoir
- Substation
- Water Storage Tank and Booster
- Buildings & Workshops
- Box Cut
- Box Cut Contractor's Laydown Area
- Parking Area
- Diesel Tanks
- Discard Dump
- Duff or Export Product Stockpiles
- Fire Water Pump
- Fuel Dispensary / Storage
- Gensets
- Mass Meeting Area
- Overburden
- PCD Pump Station
- PCD Silt Trap and Drying Bed
- Paved Walkway
- Peas Stockpile
- Plant Area
- Pollution Control Dam
- Potable Water Tank
- Possible Laydown Area
- Product Spiral
- Salvage Yard
- Sewer Treatment Plant
- Small Nuts Stockpiles
- Stockpiles
- Stone Dust Silo
- Topsoil Berm
- Vehicle Washbay
- Vent Shaft Area
- Vent Shaft Fans
- Waste Disposal Area

Legend

- Street
- Non-Perennial Stream
- Electrical
- Fence
- Incline Conveyor
- Plant Infrastructure
- Pipeline
- Road
- Arnot South Mining Right Boundary
- Infrastructure Footprint Area
- Farm Portion Boundary
- Parent Farm Boundary



DIGBY WELLS ENVIRONMENTAL

Projection: Transverse Mercator
Datum: WGS 1984
Central Meridian: 29°E
Date: 04/06/2021
Ref #: UCD6802_02_PC_v2

N

0 100 200 400
Metres