

# Traffic Impact Assessment

## De Wittekrans

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t r a n s p o r t   s t r a t e g i e s

## TABLE OF CONTENTS

	<b>Page</b>
<b>1 INTRODUCTION</b>	<b>1</b>
<b>2 SURROUNDING ROAD NETWORK</b>	<b>2</b>
<b>3 PROPOSED DEVELOPMENT &amp; ACCESS</b>	<b>3</b>
<b>4 TRAFFIC FLOWS &amp; TRIP GENERATION</b>	<b>4</b>
4.1 Existing Traffic Flows & Traffic Patterns	4
4.2 Background Traffic Flows	4
4.3 Trip Generation	4
<b>5 TRAFFIC IMPACT &amp; CAPACITY ANALYSES</b>	<b>5</b>
5.1 N11 and D383	6
<b>6 CONCLUSION &amp; RECOMMENDATIONS</b>	<b>8</b>

### **FIGURES**

Figure 1	Locality Plan
Figure 2	Existing 2010 Peak Hour Traffic Volumes
Figure 3	Trip Distribution & Assignment
Figure 4	Year of Opening Peak Hour Traffic Volumes
Figure 5	Year 21 Peak Hour Traffic Volumes

### **ANNEXURES**

Annexure A	Outputs of aaSIDRA Intersection Analyses
Annexure B	SANRAL Typical Drawings: T-junctions & Intersections
Annexure C	Predicted Yearly and Daily Peak Hour Truck Movements
Annexure D	Summary of Traffic Counts

## 1 INTRODUCTION

Route<sup>2</sup> – Transport Strategies have been appointed to undertake a Traffic Impact Assessment for a proposed new mine to be called De Wittekrans in Mpumalanga Province. As shown in **Figure 1**, the proposed mining area is located to the south of the N11 near Hendrina.

This study investigates the traffic flow conditions of the existing and additional mining traffic from the year of opening to an estimated 21 years afterwards and the potential traffic impact.



*The site*

## 2 SURROUNDING ROAD NETWORK

As indicated on **Figure 1** the site is located to the south of the N11 a national road under the jurisdiction of SANRAL and east of the D383 a provincial district gravel road linking Davel and the N17 with the N11. This gravel road mainly gives access to farms in the area.



*N11 at the D383 turnoff*



D383 between Davel and N11

### 3 PROPOSED DEVELOPMENT & ACCESS

It is proposed to mine the site for 21 years. Access into the mining area will be provided off the D383.



*D383 at the N11*

## **4 TRAFFIC FLOWS & TRIP GENERATION**

### **4.1 Existing Traffic Flows & Traffic Patterns**

12-hour traffic counts were conducted on Tuesday 27 July 2010 at the intersection of the N11 and D383. The existing weekday peak hour traffic volumes are summarised in **Figure 2** with the details attached in **Annexure D**.

Traffic data was also obtained from SANRAL for the N11 between Ermelo and Hendrina. This data is for the year 2008 and can be summarised as follow:

- Average Daily Traffic (both directions) = 3 647 vehicles
- Average Daily Truck Traffic (both directions) = 1 077 vehicles
- Percentage Heavy Goods Vehicles (HGVs) = 29,5%
- Highest volume vehicles to Hendrina at 18:00 = 382 vehicles
- Highest volume vehicles to Ermelo at 14:00 = 274 vehicles

### **4.2 Background Traffic Flows**

The background traffic along the N11 was grown by an assumed 3% per annum for 21 years.

### **4.3 Trip Generation**

The trip generation of the proposed mine for the 21 year mining period is attached in **Annexure C**. Movements will only occur during daylight hours. For the duration of the mining process approximately 33% will be transported to Ermelo on the N11 while the remaining 67% will be transported to a siding near Hendrina. During any daylight hour of a day up to 9 truck movements will be to and from Ermelo while up to 20 truck movements will be made to Hendrina in both directions.

## 5 TRAFFIC IMPACT & CAPACITY ANALYSES

The intersection of the N11 and D383 has been analysed using aaSIDRA traffic analysis software. SIDRA is a computer program that provides a number of performance measures including v/c ratios, delays, level of service (LOS), etc.

When elements of a road network such as intersections are analyzed, their operating conditions are described in terms of LOS. The six letters from A to F are used to indicate different LOS. LOS A indicates very light traffic with correspondingly low delays. LOS E reflects capacity conditions, with high delays and unstable flow. LOS F reflects conditions where traffic demand exceeds capacity and traffic experiences congestion and delays. Generally LOS A to D is considered acceptable in accordance with international standards. LOS E and F on the other hand are deemed unacceptable.

A further measure of the operating conditions prevailing at any one point in a road network is the volume to capacity ratio (v/c). As the name implies it is the traffic demand volume divided by the available capacity of the roadway element. Generally ratios of up to approximately 0.9 are internationally deemed acceptable.

For the capacity analyses using aaSIDRA, the following three scenarios were analysed for assuming 500 dwelling units, namely:

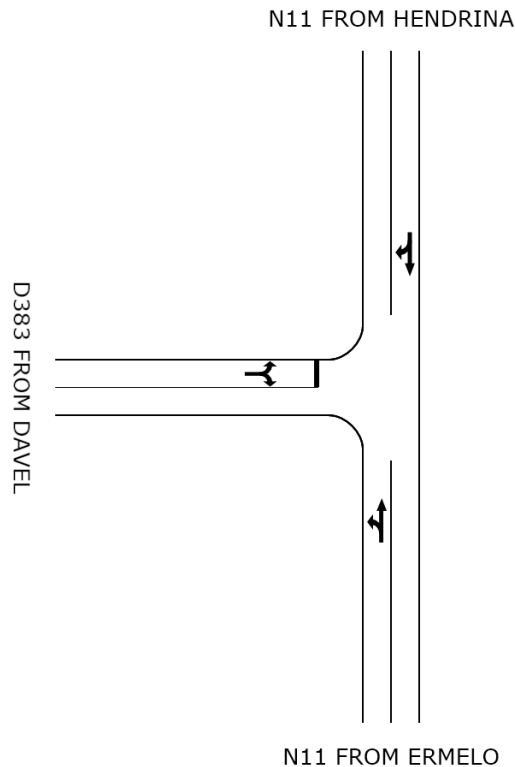
- Existing 2010 AM, MIDDAY and PM peak hour flows (as per **Figure 2**);
- Year of opening peak hour flows with mine traffic (as per **Figure 4**); and
- Future year 21 peak hour flows (as per **Figure 5**).

Results of the aaSIDRA capacity analyses are discussed in the following sub section, with details of the outputs enclosed in **Annexure A1**.

## 5.1 N11 and D383

### Annexure A1:

The intersection is priority controlled with the N11 having the right of way. The existing layout is illustrated below.



For the **existing 2010** scenario the results indicate that the intersection operates on acceptable LOS during the AM, MIDDAY and PM peak hours analysed.

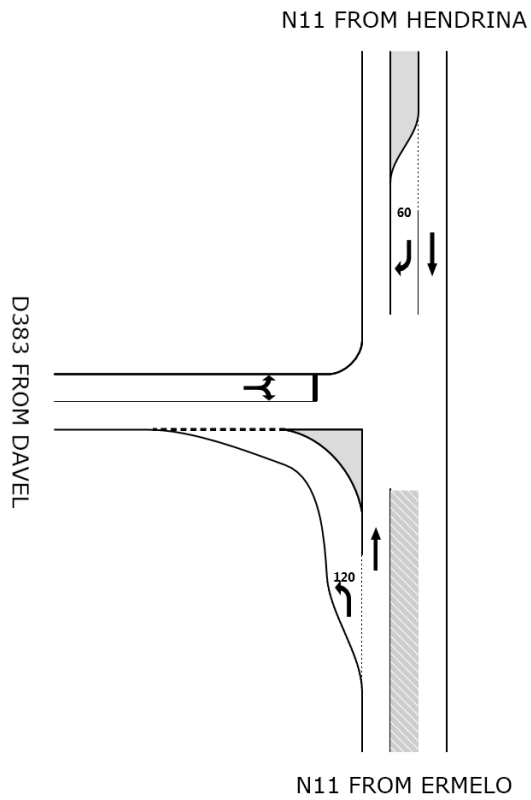
With introducing the required intersection upgrades of SANRAL the intersection would in the year of opening still operate acceptably during the peak hours analysed.

With allowing for an assumed 20-year growth of 3% in the background traffic the traffic along the N11 will still flow freely although some delays will be experienced along the D383 approach. Traffic turning out of the D383 will have to wait for gaps in the traffic although at most will be delayed by 2 minutes.



The following upgrades are required by SANRAL as is the case with all other mine accesses along the N11:

1. Southbound right turning lane of 60m
2. Northbound left turning short slip lane of 120m



## 6 CONCLUSION & RECOMMENDATIONS

The proposed De Wittekrans mine will be in operation for 21 years.

With regard to traffic generation and impact, it is estimated that in a worst case scenario 30 truck movements will be made to and from the mine during each daylight hour.

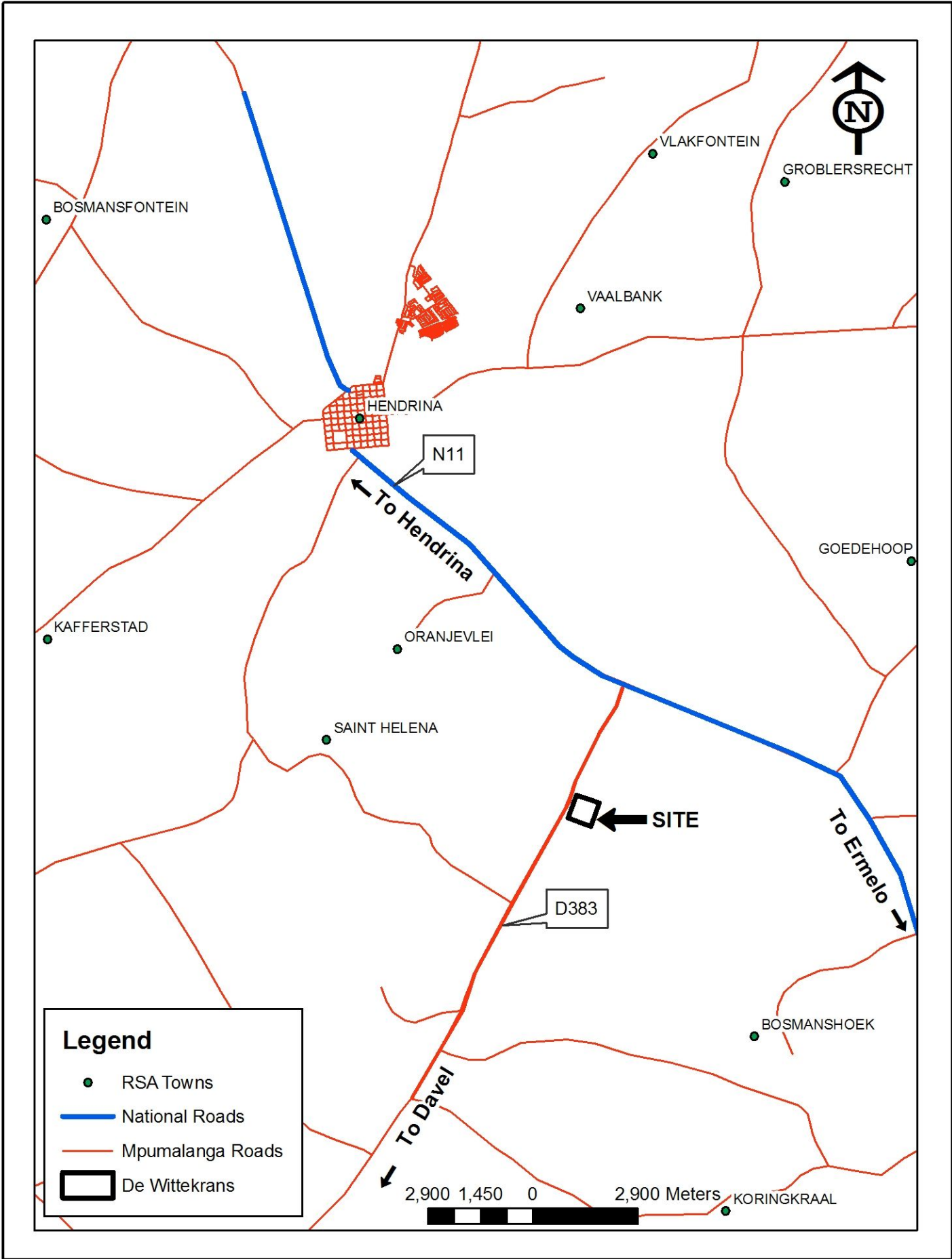
The analysis for the year of opening indicates that with the SANRAL required upgrades of the intersection between the N11 and D383 the intersection will cope during any daylight hour of operation.

The following is proposed:

- ***That the intersection of the N11 and D383 be upgraded to the SANRAL standards.***

## **Figures**

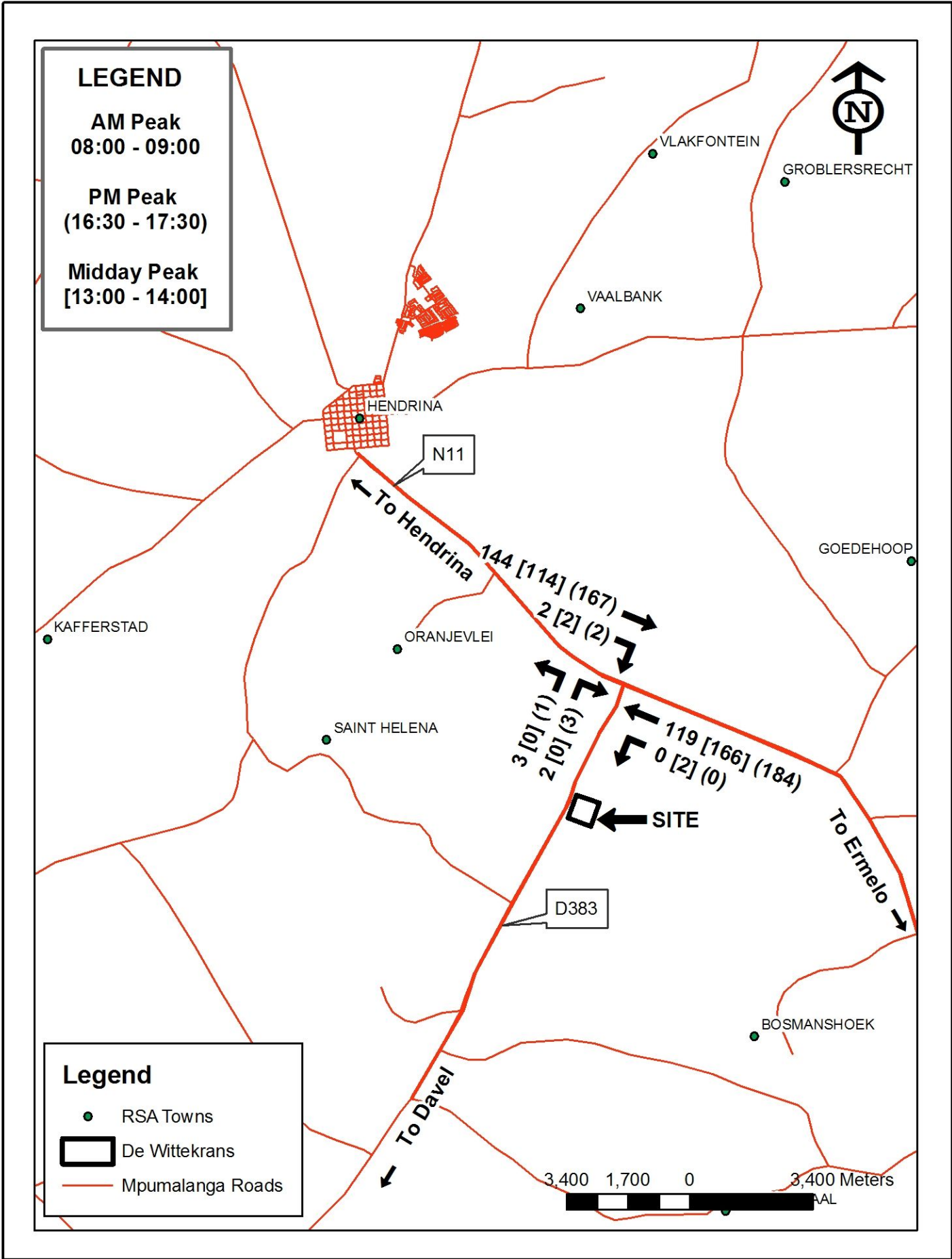
- Figure 1      Locality Plan**
- Figure 2      Existing 2010 Peak Hour Traffic Volumes**
- Figure 3      Trip Distribution & Assignment**
- Figure 4      Year of Opening Peak Hour Traffic Volumes**
- Figure 5      Year 21 Peak Hour Traffic Volumes**



Project:  
**De Wittekrans**



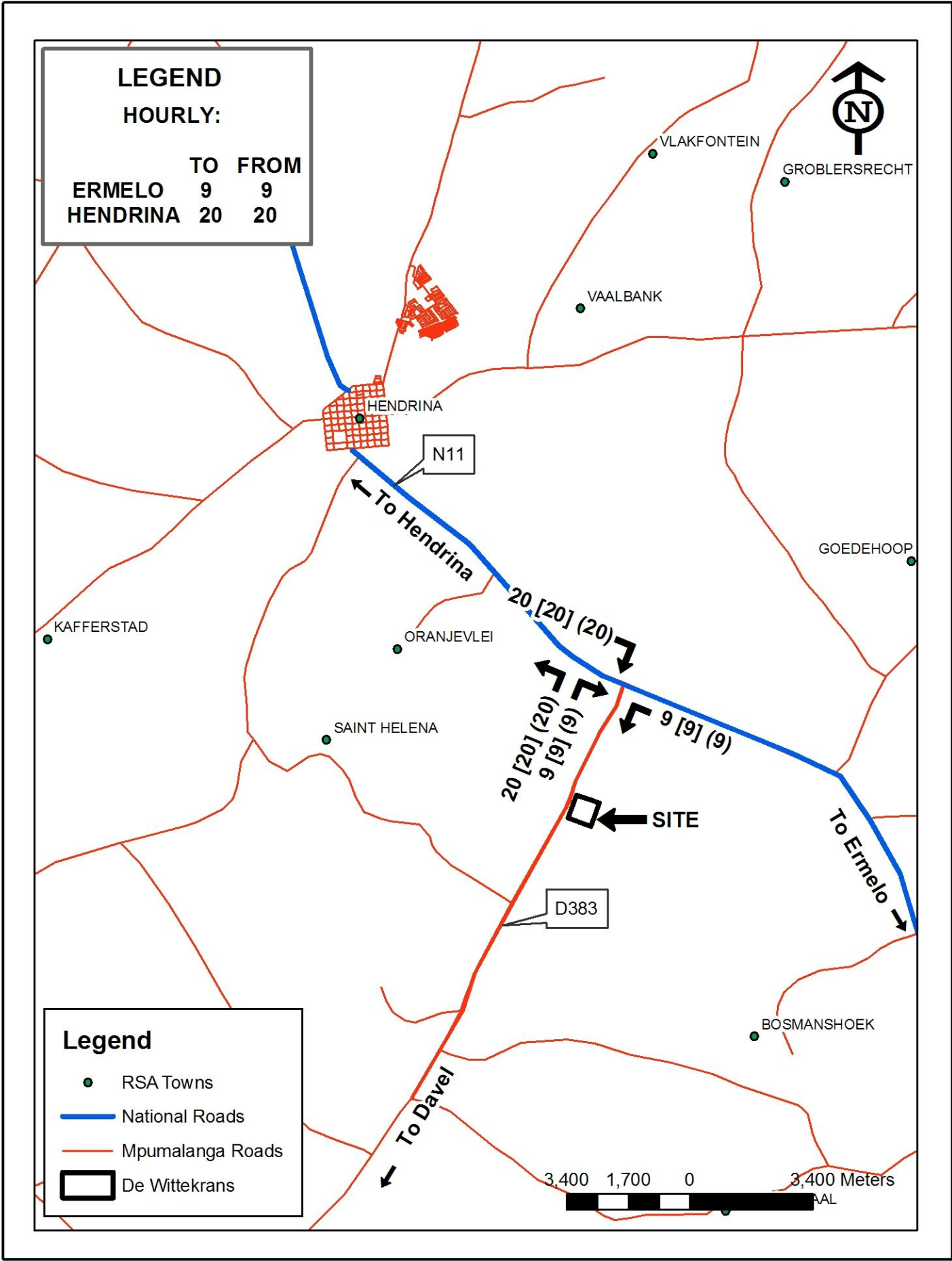
Figure: <b>Site Location</b>	No. <b>1</b>
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Project:  
**De Wittekrans**



Figure: <b>Existing 2010 Peak Hour Traffic</b>	No. <b>2</b>
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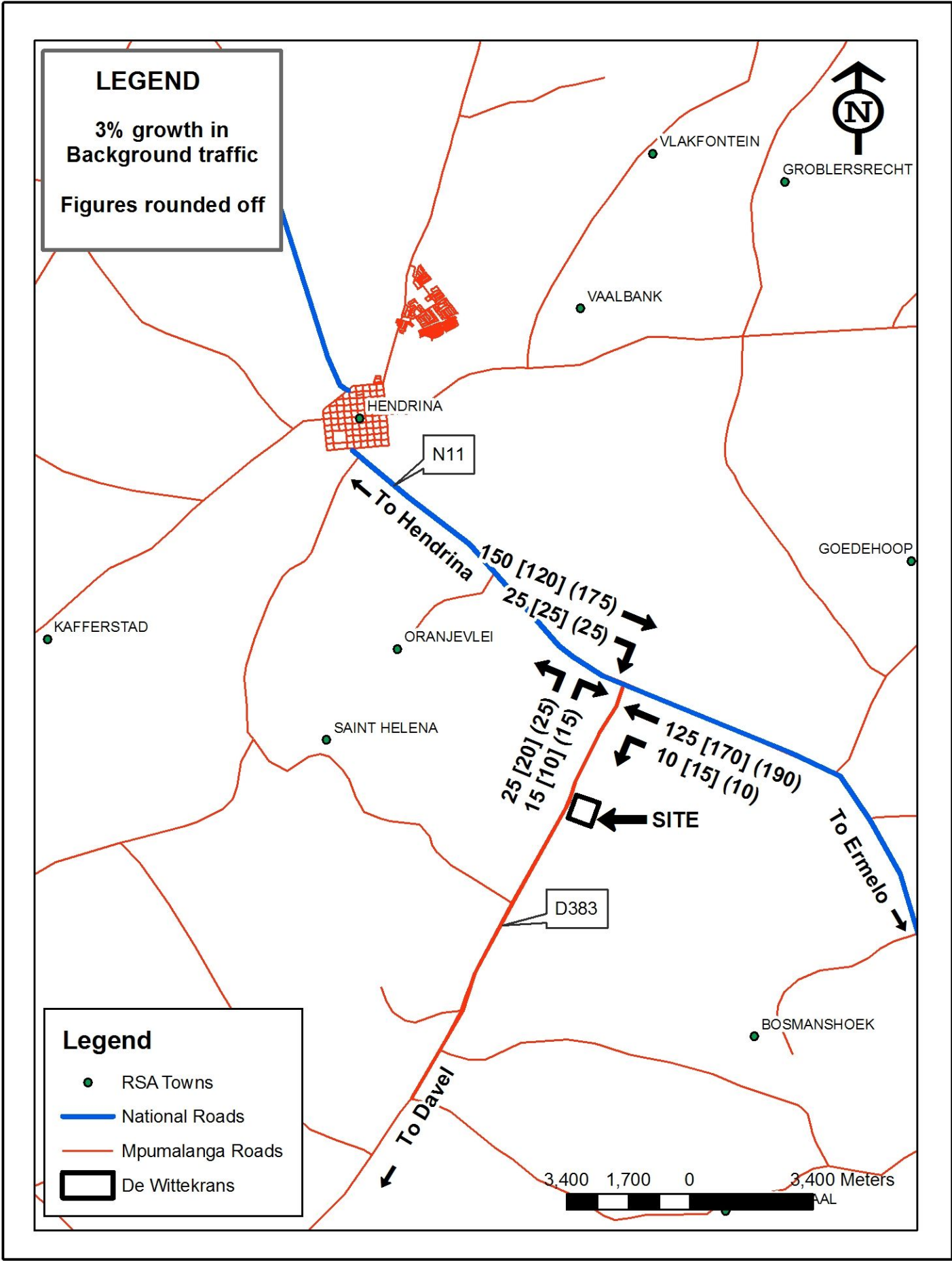


Project:  
**De Wittekrans**



Figure:  
**Trip Distribution & Assignment  
Year 1 to Year 21**

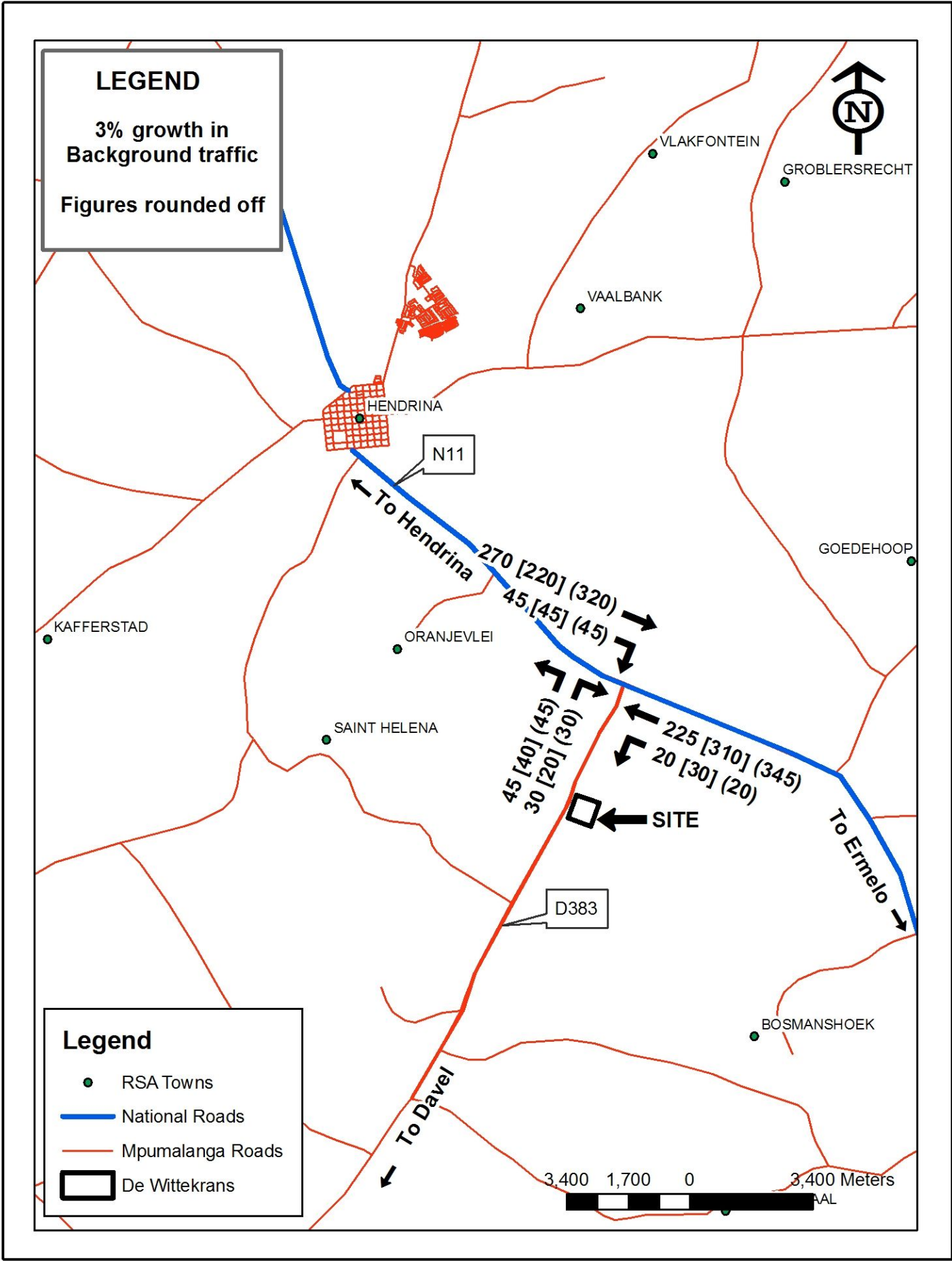
No.  
**3**



Project:  
**De Wittekrans**



Figure: <b>Year of Opening</b>	No. <b>4</b>
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Project:  
**De Wittekrans**



Figure: <b>Year 21</b>	No. <b>5</b>
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# **Annexure A**

## **OUTPUTS OF aaSIDRA INTERSECTION ANALYSES OF**

- A1 N11 and D383

# A1

# **Annexure B**

## **SANRAL TYPICAL DRAWINGS: T-JUNCTIONS & INTERSECTIONS**

# **Annexure C**

## **PREDICTED YEARLY AND DAILY PEAK HOUR TRUCK MOVEMENTS**

# **Annexure D**

## **SUMMARY OF TRAFFIC COUNTS**

**TRAFFIC COUNT:**  
**INTERSECTION: N11-8 AND DAVEL RD HENDRINA**  
**PEAK HOUR PERIOD:**  
**DATE: 27 JULY 2010**

**All VEHICLES**

TIME		MOVEMENT NUMBER											TOTAL	
BEGIN		WB L	WB T						EB T	EB R	NB L			NB R
6:00	6:15	1	27	0	0	0	0	0	10	0	1	0	0	39
6:15	6:30	0	20	0	0	0	0	0	40	1	0	0	0	61
6:30	6:45	1	27	0	0	0	0	0	20	1	2	0	0	51
6:45	7:00	0	34	0	0	0	0	0	14	1	1	0	1	51
7:00	7:15	0	28	0	0	0	0	0	32	0	0	0	1	61
7:15	7:30	0	30	0	0	0	0	0	23	2	0	0	0	55
7:30	7:45	1	30	0	0	0	0	0	23	0	1	0	0	55
7:45	8:00	0	39	0	0	0	0	0	39	0	0	0	0	78
8:00	8:15	0	28	0	0	0	0	0	23	2	1	0	1	55
8:15	8:30	0	28	0	0	0	0	0	42	0	1	0	1	72
8:30	8:45	0	32	0	0	0	0	0	25	0	0	0	0	57
8:45	9:00	0	31	0	0	0	0	0	54	0	1	0	0	86
9:00	9:15	1	11	0	0	0	0	0	36	1	1	0	0	50
9:15	9:30	0	23	0	0	0	0	0	31	1	1	0	0	56
9:30	9:45	0	26	0	0	0	0	0	39	1	1	0	0	67
9:45	10:00	0	28	0	0	0	0	0	34	0	0	0	0	62
10:00	10:15	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15	10:30	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30	10:45	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45	11:00	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00	11:15	3	21	0	0	0	0	0	34	0	0	0	0	58
11:15	11:30	0	37	0	0	0	0	0	33	1	1	0	3	75
11:30	11:45	0	24	0	0	0	0	0	28	1	0	0	2	55
11:45	12:00	0	42	0	0	0	0	0	25	0	0	0	0	67
12:00	12:15	0	27	0	0	0	0	0	24	0	2	0	0	53
12:15	12:30	0	28	0	0	0	0	0	25	1	1	0	1	56
12:30	12:45	0	30	0	0	0	0	0	23	2	2	0	0	57
12:45	13:00	0	21	0	0	0	0	0	42	0	0	0	0	63
13:00	13:15	0	40	0	0	0	0	0	27	2	0	0	0	69
13:15	13:30	0	41	0	0	0	0	0	20	0	0	0	0	61
13:30	13:45	1	49	0	0	0	0	0	37	0	0	0	0	87
13:45	14:00	1	36	0	0	0	0	0	30	0	0	0	0	67
14:00	14:15	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	14:30	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30	14:45	0	37	0	0	0	0	0	26	1	0	0	0	64
14:45	15:00	1	38	0	0	0	0	0	20	0	0	0	0	59
15:00	15:15	2	38	0	0	0	0	0	33	1	2	0	0	76
15:15	15:30	1	40	0	0	0	0	0	27	0	1	0	0	69
15:30	15:45	0	28	0	0	0	0	0	48	0	0	0	0	76
15:45	16:00	1	50	0	0	0	0	0	30	0	0	0	0	81
16:00	16:15	1	24	0	0	0	0	0	34	2	0	0	0	61
16:15	16:30	0	35	0	0	0	0	0	34	1	1	0	0	71
16:30	16:45	0	40	0	0	0	0	0	44	1	0	0	1	86
16:45	17:00	0	50	0	0	0	0	0	42	0	0	0	1	93
17:00	17:15	0	53	0	0	0	0	0	42	0	1	0	1	97
17:15	17:30	0	41	0	0	0	0	0	39	1	0	0	0	81
17:30	17:45	0	38	0	0	0	0	0	35	0	0	0	0	73
17:45	18:00	0	32	0	0	0	0	0	32	1	0	0	0	65
18:00	18:15	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	18:30	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>08:00 - 09:00</b>		<b>0</b>	<b>119</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>144</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>270</b>
<b>13:00 - 14:00</b>		<b>2</b>	<b>166</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>114</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>284</b>
<b>16:30 - 17:30</b>		<b>0</b>	<b>184</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>167</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>357</b>
<b>10.5 hours</b>		<b>15</b>	<b>1382</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1319</b>	<b>25</b>	<b>22</b>	<b>0</b>	<b>13</b>	<b>2776</b>