PROPOSED TOWNSHIP ESTABLISHMENT IN DUMPHRIES ON PORTION 1 OF THE FARM NEWINGTON 255 KU – BUSHBUCKRIDGE LOCAL MUNICIPALITY

TRAFFIC IMPACT STUDY REPORT

DRAFT REPORT

REV 00

DATE: 30 November 2020

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Traffic Impact Assessment TRAFFIC IMPACT STUDY FOR THE PROPOSED TOWNSHIP ESTABLISHMENT IN DUMPHRIES. ON PORTION 1 OF THE FARM NEWINGTON 255 KU **Report Summary**	
Site Location	Portion 1 of the Farm Newington 255 KU, Bushbuckridge Local Municipality, Mpumalanga Province
Municipality	Bushbuckridge Local Municipality
Type of Assessment	Traffic Impact Assessment
Proposed Land use	Township establishment for proposed Residential 1
Proposed Site Size	88.41 hectares
Trip Generation Reference	South African Trip Generation Rates, TMH 17, September 2013, Version 1.01
Traffic counts date	12 November 2020
Assessment Years	Scenario 1: 2020 background traffic demand Scenario 2: 2025 background traffic demand with development trips (Design horizon year) Scenario 3: 2040 background traffic demand with development trips (Planning horizon year)
Access	Proposed Access to the site is via Dumphries Road and Access Road to School
Capacity of Access	The proposed access must be designed to accommodate the expected demand.
Proposed road upgrades	Formalized Accesses to be constructed at Dumphries Road and Access Road to School
Recommendations	• The proposed development should be considered favorably from a traffic engineering point of view by the relevant authorities, given the proposed road upgrades in this report. • NMT and universal access facilities be incorporated in the development especially on the roads / access that will be used by Public Transport and where the social facilities will be located. • Detailed designs for the development access should be undertaken by a professional engineer / technologist with suitable road design experience
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Report Date	30 November 2020

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LIST OF ACRONYMS

COTO	Committee of Transport Officials
GLA	Gross Leasable Area
LOS	Level of Service
SARTSM	South African Road and Traffic Signs Manual
TIA	Traffic Impact Assessment
TMH	Technical Methods for Highways
v/c	Volume capacity ratio
Veh/h	Vehicles per hour
PTF	Public Transport Facility
Km	Kilometre
NMT	Non-Motorized Transport

1 INTRODUCTION

Nyeleti Consulting was appointed by Nkanivo Development Consultants (Pty) Ltd to conduct a Traffic Impact Assessment for the proposed Township Establishment in Dumphries. on Portion 1 of the Farm Newington 255 KU. The proposed project area will accommodate 562 erven for residential purposes and is expected to cover an estimated 88.41 ha. This report addresses TIA aspects of the proposed development.

1.1 Objectives of the study

As part of the project implementation plan, several studies are undertaken to assess the technical aspects of developing the project. The assessment studies are aimed at formalising a submission for the approval of the development plans. Amongst the studies is a Traffic Impact Assessment that is aimed at assessing the traffic impact of the proposed development on the adjacent road network around the proposed development. The objectives of the traffic impact study are:

- Determine the existing, pre-development traffic volumes and patterns near the development site;
- Assess the land use of the proposed development to establish the expected trips to be generated;
- Assess any Public Transport operations in and around the proposed development;
- Determine the post-development, projected traffic volumes and assess its impact on the existing road network;
- Provide recommendations on the suitability and safety of the proposed access arrangements;
- Recommend infrastructure improvements, if deemed necessary, to accommodate the expected development traffic;

In essence the traffic study is one of the essential feasibility studies for the planning and implementation of the project.

1.2 Site location

The proposed development site is in the Mpumalanga Province, Bushbuckridge Local Municipality, approximately 15.0 km South-East of Thulamahashe and about 2.5km from the Kruger National Park fence. The project is located next to Newington and Dumphries Villages as shown in Figure 1 and Figure 2. The proposed site will be located on Portion 1 of the Farm Newington 255 KU. The site is currently vacant.

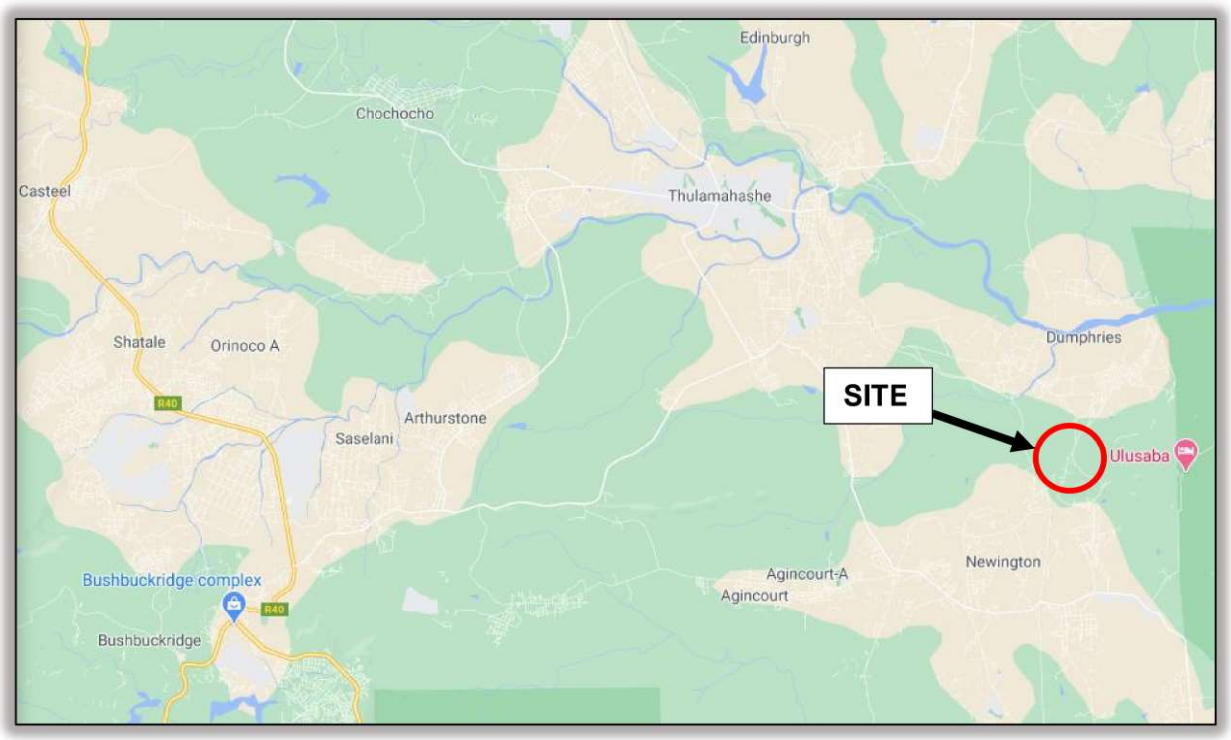

Figure 1: Locality of Proposed Township Establishment in Dumphries (Developed from Open Street Maps, 2020)

Figure 2: Location of Proposed Township Establishment in Dumphries (Developed from Google Maps, 2020).

1.3 Satus Quo

The land where the proposed development will be located, is currently an open space. Access to the Development will be obtained on Dumphries Road, which links up with an existing Gravel Road.

2 PROPOSED DEVELOPMENT

The development site is on Portion 1 of the Farm Newington 255 KU, which measures 88.41 ha in size. The proposed township establishment development is meant to accommodate 562 erven for residential purposes. The site development plan can be found in Appendix C.

3 DATA COLLECTION

3.1 Information from external sources

The following information was obtained from various interested and affected parties:

- Site Layout for the Proposed Township Establishment in Dumphries - On Portion 1 Of The Farm Newington 255 Ku.

The information mentioned above is referred to and used in this report.

3.2 Data collected by Nyeleti Consulting

The following data was collected by Nyeleti Consulting:

- Twelve hour classified traffic counts;
- Twelve hour turning movement traffic counts; and
- Photographs of the area and various affected roads and intersections.

Traffic counts data was collected through a traffic counting subconsultant on the 12 of November 2020. Traffic counts were collected over a period of 12 hours from 06:00am to 18:00pm.

4 TRAFFIC VOLUMES

4.1 Current traffic volumes

Current traffic volumes were determined by means of 12-hour traffic counts. Traffic was counted from 06:00 to 18:00 on Thursday the 12 of November 2020. Figure 3 indicate the traffic counting stations. Traffic counts consisted of turning movement counts and classified vehicle counts. The detailed traffic counting data is attached as Appendix A.

4.2 Turning movement traffic volumes

Turning movement traffic counts were conducted at the following intersections as illustrated in *Figure 3*:

- Dumphries Road and Access Road to School (intersection 1)

*Figure 3: Traffic counting positions (*Developed from Google Maps, 2020)

4.2.1 Traffic volumes for the morning peak and afternoon peak

The morning peak is between **06:45 to 07:45** and the afternoon peak is between **15:30 to 16:30** at the respective intersections. The traffic count data can be found in Appendix A and Table 1 shows the peak times and peak traffic volumes for each intersection.

Table 1: Morning and Afternoon Peak times

Intersection	Intersection Type	Traffic Volume		Peak Times	
		AM	PM	AM	PM
Dumphries Road and Access Road to School (Intersection 1)	Unsignalised, Stop on minor road	43	29	06:45-07:45	15:30-16:30

4.2.2 Traffic volumes for the 12 hour

Table 2 summarises the 12 hour traffic counts for the intersection and it also shows the Average Annual Daily Traffic (AADT), calculated by multiplying the 12-hour volumes with a factor of 1.4.

Table 2: 12 hour traffic volumes

Intersection Name	Intersection Type	12 Hour Traffic Volumes	AADT
Dumphries Road and Access Road to School (Intersection 1)	Unsignalised, Stop on minor road	310	434

4.3 Turning movement traffic counts

The peak hour traffic volumes for turning movement counts is summarized in Table 3 below.

Table 3: Peak Hour volumes at Dumphries Road and Access Road to School (Intersection 1)

APPROACH	**Morning Peak Volumes** (06h45 to 07h45)			
	Left	Through	Right	TOTAL
Dumphries Road (Eastbound)	N/A	18	9	27
Dumphries Road (Westbound)	1	13	N/A	14
Access Road to School (Northbound)	1	N/A	1	2
APPROACH	**Afternoon Peak Volumes** (15h30 to 16h30)			
	Left	Through	Right	TOTAL
Dumphries Road (Eastbound)	N/A	10	1	11
Dumphries Road (Westbound)	1	15	N/A	16
Access Road to School (Northbound)	1	N/A	1	2

4.4 Classified traffic counts (Modal Split)

Classified counts at the intersection of Dumphries Road and Access Road to School (Intersection 1) were conducted on the same day.

Table 4 shows a breakdown of the Classified traffic counts summary on Dumphries Road and Access Road to School (Intersection 1). It also shows the Average Annual Daily Traffic (AADT), calculated by multiplying the 12-hour volumes with a factor of 1.4.

The modal split on Dumphries Road and Access Road to School (Intersection 1) is made up of Light Vehicles (LV) at about 74.2% followed by Taxis at about 23.5%, Buses at 0% and Heavy Vehicles (HV) at about 2.3%.

Table 4: Classified traffic counts summary

Road	**12 Hour Volume**	**AADT**	**Modal Split**			
			Light Vehicles (LV)	Taxi	Buses	Heavy Vehicles (HV)
Dumphries Road and Access Road to School (Intersection 1)	310	**434**	230 (74.2%)	73 (23.5%)	0 (0%)	7 (2.3%)

5 CAPACITY ANALYSIS

The intersections were analysed using Sidra Intersection to understand current levels of service (LOS). The criteria for LOS are based on the Highway Capacity Manual as summarized in Table 5. Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements. When demand volume exceeds the capacity of the lane, extreme delays will be encountered. With the increase in delays, increase in queue lengths will be encountered causing congestion. This condition usually warrants improvement to the intersection.

5.1 Level of Service (LOS)

At the very least a LOS D has to be obtained in order for the traffic flow to be perceived as acceptable.

The performance of the intersections is based on the average delay in seconds.

Table 5: Level of Service criteria

UNSIGNALIZED INTERSECTION		
Average Control Delay (sec/veh)	**Level of Service (LOS)**	**Expected Delay to Minor Street Traffic**
0 - 10.0	A	Free Flow
> 10.0 - 15.0	B	Stable Flow (slight delays)
> 15.0 - 25.0	C	Stable Flow (acceptable delays)
> 25.0 - 35.0	D	Approaching unstable flow (tolerate delay, occasionally wait
> 35.0 - 50.0	E	Very long traffic delays
> 50.0	F	*
SIGNALIZED INTERSECTION		
Average Control Delay (sec/veh)	**Level of Service (LOS)**	**Expected Delay**
≤ 10	A	Free Flow
>10 - 20	B	Stable Flow (slight delays)
>20 - 35	C	Stable Flow (acceptable delays)
>35 - 55	D	Approaching unstable flow (tolerate delay, occasionally wait
>55 - 80	E	Very long traffic delays
>80	F	*

** When demand volume exceeds the capacity of the lane, extreme delays will be encountered. With the increase in delays, increase in queue lengths will be encountered causing congestion. This condition usually warrants improvement to the intersection.*

The turning movement peak traffic volumes and corresponding Levels of Service at all proposed intersections for the morning and afternoon peaks are shown on Table 6.

Table 6: Level of Service (Dumphries Road and Access Road to School (Intersection 1)) - Base Traffic)

Intersection (Weekday)	**Eastbound**			**Westbound**			**Northbound**			**Southbound**			**Intersection**
Movement	L	T	R	L	T	R	L	T	R	L	T	R	All
AM Peak Hour Volumes	N/A	18	9	1	13	N/A	1	N/A	1	N/A	N/A	N/A	43
Level of Service	N/A	A	A	A	A	N/A	A	N/A	A	N/A	N/A	N/A	N/A
PM Peak Hour Volumes	N/A	10	1	1	15	N/A	1	N/A	1	N/A	N/A	N/A	29
Level of Service	N/A	A	A	A	A	N/A	A	N/A	A	N/A	N/A	N/A	N/A

The intersections were analysed for performance for both morning and afternoon peaks. Table 7 below summarizes the intersection current operations.

The performance of the intersection is based on the average delay in seconds. The current average delays for the Dumphries Road and Access Road to School (Intersection 1), which operates a three-legged (east-west major road approach and stop controlled on minor road) intersection is 1.6 seconds for the morning peak hour and 0.9 seconds in afternoon peak, however, the average delay on the east approach is 0.4 seconds and 0.3 seconds for morning and afternoon peaks respectively and the average delay on the west approach is 1.8 seconds and 0.5 seconds for morning and afternoon peaks respectively.

Table 7: Morning and Afternoon Peak volumes with Corresponding LOS - Base Traffic (2020)

Intersection	**Intersection Type**	**Morning Peak**			**Afternoon Peak**		
		Traffic Volume	LOS	Average delays (sec)	Traffic Volume	LOS	Average delays (sec)
Dumphries Road and Access Road to School (Intersection 1)	Unsignalised, Stop on minor road	43	N/A	1.6	29	N/A	0.9

The intersection currently operates at acceptable Levels of Service for both morning and afternoon peaks. The Levels of Service for the intersection cannot be indicated (e.g. LOS E) due to the fact that and Major Road Approach LOS values are not applicable for two-way sign control intersection since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

6 TRAFFIC DEMAND

The traffic demand for the upgrading of the intersections will take into consideration two horizon years. The design and the planning horizon years. The design horizon year is the year selected for determining transportation improvements that are required to accommodate the upgrading of the intersections. The transportation / road improvements must be designed for a horizon year of 5 years. The planning horizon year, though not used for determining the transportation improvements that are required for the road network, is the year selected for determining whether it is physically possible to accommodate the proposed development together with future traffic growth. The planning horizon year to be used for the development is 20 years.

6.1 Traffic growth

Average annual economic growth rate for the Bushbuckridge Local Municipality was 0.7% over the period 1996 to 2015, the forecasted average annual GDP growth for the Bushbuckridge Local Municipality for 2015-2020 is around 1.7% per annum which is in line with national and provincial growth expectations (Integrated Development Plan 2017-2022, Bushbuckridge Local Municipality, Unknown).

Traffic growth rates for low growth areas should be between 0 and 3% (Technical Methods for Highways (TMH 17), 2013). It was assumed that traffic growth will be proportional to GDP growth, therefore an annual traffic growth rate of 1.7% was assumed for the design and planning horizon.

6.2 Trip generation

The development generates trips to the access / exit point and generates additional traffic on the road network based on site's Spatial Development Framework. The development is as discussed in Chapter 2 of this report.

According to TMH17, a single dwelling unit (shopping centre) will generate approximately 1 trip per dwelling unit during the morning peak and about 1 trip during the afternoon peak. A 70% reduction in trips for Single Dwelling Units was applied to the generated traffic, this low vehicle factors is applicable to developments that are located in areas with very low vehicle ownership.The trips that are generated by the development are as detailed in Table 8.

Table 8: Development Trip Generation

Land Use		Size Units	Peak Hour Trip Rate- AM	Peak Hour Trip Rate- PM	Generated Trips AM	Generated Trips PM	Trip Generation adjustment factor (Very Low Vehicle Ownership)	Adjusted Generated Trips AM	Adjusted Generated Trips PM	AM Peak Split In/Out	PM Peak Split In/Out	AM Peak In/Out	PM Peak In/Out
210 Single Dwelling Units	562 units	1 D/Unit	1	1	500	500	70%	150	150	25:75	70:30	38:113	105:45
Total					**500**	**500**		**150**	**150**	**25:75**	**70:30**	**38:113**	**105:45**

6.3 Trip distribution

Trip distribution is based on current trip patterns. The trips for both design and planning horizon years were distributed based on existing traffic patterns for analysis purposes.

The Traffic Impact Assessment of the existing intersection and proposed access in question is discussed in Chapter 5, whereby the traffic volumes and corresponding LOS of the design horizon are discussed in detail.

7 TRAFFIC IMPACT ASSESSMENT

Traffic impact assessment was undertaken for the following scenarios:

- Status quo
- Design horizon year
- Planning Horizon year

The status quo assessment is undertaken to understand where the current Levels of Service are at the proposed intersections. The status quo traffic assessment was discussed in Chapter 5 for the proposed intersections. The design horizon year assessment was undertaken with the purpose of establishing mitigation measures that are required to accommodate the upgrading of the intersections. The planning horizon year assessment was carried out to ascertain whether it was physically possible to accommodate the proposed upgrades and future developments in the spatial development framework of the study area.

Table 9 give a summary of the morning and afternoon peak volumes with corresponding LOS for the base traffic. Table 10 gives a summary of the counting station with corresponding LOS for the Design Horizon. Table 11 give a summary of the morning and afternoon peak volumes with corresponding LOS for the Design Horizon. Table 12 gives a summary of the counting station with corresponding LOS for the Planning Horizon. Table 13 give a summary of the morning and afternoon peak volumes with corresponding LOS for the Planning Horizon.

Table 9: Morning and Afternoon Peak volumes with Corresponding LOS - Base Traffic (2020)

Intersection	Intersection Type	Morning Peak			Afternoon Peak		
		Traffic Volume	LOS	Average delays (sec)	Traffic Volume	LOS	Average delays (sec)
Dumphries Road and Access Road to School (Intersection 1)	Unsignalised, Stop on minor road	43	N/A	1.6	29	N/A	0.9

Table 10: Level of Service (Dumphries Road and Access Road to School (Intersection 1)) - Design Horizon))

Intersection (Weekday)	Eastbound			Westbound			Northbound			Southbound			Intersection
Movement	L	T	R	L	T	R	L	T	R	L	T	R	All
AM Peak Hour Volumes	N/A	20	44	5	14	N/A	58	N/A	58	N/A	N/A	N/A	198
Level of Service	N/A	A	A	A	A	N/A	A	N/A	A	N/A	N/A	N/A	N/A
PM Peak Hour Volumes	N/A	11	54	54	16	N/A	24	N/A	24	N/A	N/A	N/A	182
Level of Service	N/A	A	A	A	A	N/A	A	N/A	A	N/A	N/A	N/A	N/A

Table 11: Morning and Afternoon Peak volumes with Corresponding LOS - Design Horizon (2025)

Intersection	Intersection Type	Morning Peak			Afternoon Peak		
		Traffic Volume	LOS	Average delays (sec)	Traffic Volume	LOS	Average delays (sec)
Dumphries Road and Access Road to School (Intersection 1)	Unsignalised, Stop on minor road	198	N/A	6.0	182	N/A	5.4

The Design Horizon traffic volumes average delays Dumphries Road and Access Road to School (Intersection 1), which will operates as a three-legged (east-west major road approach and stop controlled on minor road) intersection is 6.0 seconds for the morning peak hour and 5.4 seconds in afternoon peak, however, the average delay on the east approach is 1.5 seconds and 4.3 seconds for morning and afternoon peaks respectively and the average delay on the west approach is 3.8 seconds and 4.7 seconds for morning and afternoon peaks respectively..

It can be noted from Table 11 that for the Design Horizon traffic volumes, for the intersection of Dumphries Road and Access Road to School (Intersection 1) will operate at acceptable Level of service for both morning and afternoon peaks:

Table 12: Level of Service (Dumphries Road and Access Road to School (Intersection 1)) - Planning Horizon

Intersection (Weekday)	**Eastbound**			**Westbound**			**Northbound**			**Southbound**			**Intersection**
Movement	L	T	R	L	T	R	L	T	R	L	T	R	All
AM Peak Hour Volumes	N/A	25	57	6	18	N/A	74	N/A	74	N/A	N/A	N/A	255
Level of Service	N/A	A	A	A	A	N/A	A	N/A	A	N/A	N/A	N/A	N/A
PM Peak Hour Volumes	N/A	14	69	69	21	N/A	30	N/A	30	N/A	N/A	N/A	234
Level of Service	N/A	A	A	A	A	N/A	A	N/A	A	N/A	N/A	N/A	N/A

Table 13: Morning and Afternoon Peak Volumes with Corresponding LOS - Planning Horizon (2040)

Intersection	**Intersection Type**	**Morning Peak**			**Afternoon Peak**		
		Traffic Volume	LOS	Average delays (sec)	Traffic Volume	LOS	Average delays (sec)
Dumphries Road and Access Road to School (Intersection 1)	Unsignalised, Stop on minor road	255	N/A	6.0	234	N/A	5.4

The Planning Horizon traffic volumes average delays Dumphries Road and Access Road to School (Intersection 1), which will operates as a three-legged (east-west major road approach and stop controlled on minor road) intersection is 6.0 seconds for the morning peak hour and 5.4 seconds in afternoon peak, however, the average delay on the east approach is 1.4 seconds and 4.3 seconds for morning and afternoon peaks respectively and the average delay on the west approach is 3.9 seconds and 4.8 seconds for morning and afternoon peaks respectively..

It can be noted from Table 13 that for the Planning Horizon traffic volumes, for the intersection of Dumphries Road and Access Road to School (Intersection 1) will operate at acceptable Level of service for both morning and afternoon peaks:

8 PUBLIC TRANSPORT

Public transport will play an important role due to some public transport vehicles (minibus taxis) observed on the surrounding area.. The classified counts at the intersection of Dumphries Road and Access Road to School (Intersection 1) indicate that 23.5% of vehicles on this intersection are public transport vehicles consisting minibus taxis, therefore public transport facilities such as drop of/pick up laybys for taxis must be incorporated in the design and construction of the proposed development.

9 NON-MOTORISED TRANSPORT

Non-Motorised Transport (NMT) includes inter alia walking, bicycling and animal driven carts. Sustainability of a transport system requires integration of all modes of transport inclusive of NMT. NMT plays a leading role in previously disadvantaged communities, and it is an affordable mode of transport.

It is important to provide safe NMT infrastructure, such as pedestrian walkways and/or cycling lanes. It is therefore recommended that NMT and universal access facilities be incorporated in the development especially on the roads / access that will be used by Public Transport and where the social facilities will be located

10 CONCLUSION

Given the findings in the report, the following conclusions are drawn:

- The project is located approximately 15.0 km South-East of Thulamahashe and about 2.5km from the Kruger National Park fence, and next to Newington and Dumphries Villages. The development site is on Portion 1 of the Farm Newington 255 KU. This area falls within Bushbuckridge Local Municipality in Mpumalanga Province.
- Current traffic volumes were determined by means of 12-hour traffic counts. Traffic was counted from 06:00 to 18:00 on Thursday the 12 of November October 2020.
- The morning peak is between **06:45 to 07:45 and the afternoon peak is between 15:30 to 16:30** at the respective intersection.
- The modal split on Dumphries Road and Access Road to School (Intersection 1) is made up of Light Vehicles (LV) at about 74.2% followed by Taxis at about 23.5%, Buses at 0% and Heavy Vehicles (HV) at about 2.3%.
- The existing Intersection at Dumphries Road and Access Road to School (Intersection 1) operates at average delays of 1.6 seconds and 0.9 seconds for the morning and afternoon peaks respectively.
- The proposed development will generate 150 trips in the morning peak and 150 trips in the afternoon peak
- It was assumed that traffic growth will be proportional to GDP growth, therefore an annual traffic growth rate of 1.7% for design traffic was assumed.
- Design and Planning Horizon analysis was undertaken for the existing Dumphries Road and Access Road to School (Intersection 1) intersection.
- The Design Horizon traffic volumes for the Dumphries Road and Access Road to School (Intersection 1) intersection will operate at acceptable Level of service for both morning and afternoon peaks.
- The average delay for all vehicles is 6.0 seconds and 5.4 seconds for the morning and afternoon peaks at design horizon traffic volumes at the existing Dumphries Road and Access Road to School (Intersection 1) intersection.
- The average delay for all vehicles is 6.0 seconds and 5.4 seconds for the morning and afternoon peaks at planning horizon traffic volumes at the Dumphries Road and Access Road to School (Intersection 1) intersection.
- NMT and universal access facilities be incorporated in the design and construction of the proposed township establishment development and the roads adjacent to the development

- The access to the development must be designed and constructed such that it meets the Bushbuckridge local municipality requirements by a Professional Engineer or Engineering Technologist

11 RECOMMENDATIONS

The following recommendations are made:

- The proposed development should be considered favourably from a traffic engineering point of view by the relevant authorities, given the proposed road upgrades in this report.
- NMT and universal access facilities be incorporated in the development especially on the roads / access that will be used by Public Transport and where the social facilities will be located.
- Detailed designs for the development access should be undertaken by a professional engineer / technologist with suitable road design experience.

12 REFERENCES

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9. Guidelines for Geometric Design of Urban Arterial Roads, 1986
10. *South African Road Traffic Signs Manual (SARTSM), Volume 2.*
11. *South African Road Traffic Signs Manual (SARTSM), Volume 3.*
12. *Integrated Development Plan Draft 2017-2022, Bushbuckridge Local Municipality*

APPENDIX A: TRAFFIC COUNTS DATA

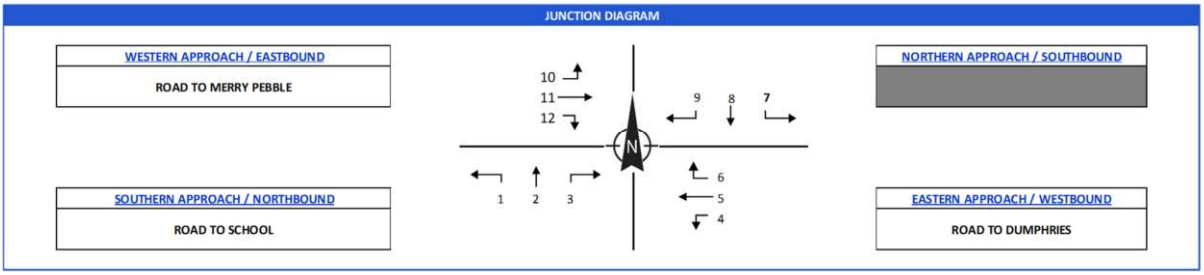
Dumphries Road and Access Road to School (Intersection 1) Turning Movements Traffic Counts Data

LOCATION:	BUSHBUCKRIDGE	PROJECT TITLE:	BUSHBUCKRIDGE-TRAFFIC COUNT				
PROJECT NR:	UT2020-802	INTERSECTION:	UNKNOWN RD & UNKNOWN RD				
SURVEY DATE:	12 November 2020						
SURVEY TIMES:	06H00-18H00	KMZ FILE NR:	UMPHRIES	DATA:	J.A.V	TYPE:	TS-12H-6-18-C

TOTAL SUMMARY

TIME		NORTHBOUND			WESTBOUND			SOUTHBOUND			EASTBOUND			VOLUME SUMMARY	
START	END	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	
06:00	06:15	-	-	-	-	1	-	-	-	-	-	1	1	3	
06:15	06:30	1	-	-	-	2	-	-	-	-	-	2	1	6	
06:30	06:45	-	-	-	-	3	-	-	-	-	-	5	1	9	
06:45	07:00	-	-	-	-	4	-	-	-	-	-	6	3	13	31
07:00	07:15	-	-	-	-	2	-	-	-	-	-	4	2	8	36
07:15	07:30	-	-	-	-	1	-	-	-	-	-	3	4	8	38
07:30	07:45	-	-	-	-	6	-	-	-	-	-	5	-	11	40
07:45	08:00	-	-	-	-	1	-	-	-	-	-	-	-	1	28
08:00	08:15	-	-	-	-	4	-	-	-	-	-	5	1	10	30
08:15	08:30	-	-	-	-	1	-	-	-	-	-	4	1	6	28
08:30	08:45	-	-	1	-	1	-	-	-	-	-	-	1	3	20
08:45	09:00	-	-	-	-	2	-	-	-	-	-	3	-	5	24
09:00	09:15	1	-	-	-	2	-	-	-	-	-	2	1	6	
09:15	09:30	-	-	-	-	2	-	-	-	-	-	5	-	7	
09:30	09:45	-	-	-	-	2	-	-	-	-	-	-	-	2	
09:45	10:00	-	-	-	-	2	-	-	-	-	-	2	-	4	19
10:00	10:15	-	-	-	-	3	-	-	-	-	-	3	1	7	20
10:15	10:30	1	-	-	-	2	-	-	-	-	-	1	-	4	17
10:30	10:45	-	-	-	-	1	-	-	-	-	-	5	2	8	23
10:45	11:00	-	-	-	-	4	-	-	-	-	-	2	-	6	25
11:00	11:15	1	-	-	-	2	-	-	-	-	-	4	-	7	25
11:15	11:30	1	-	-	-	2	-	-	-	-	-	3	-	6	27
11:30	11:45	-	-	-	-	3	-	-	-	-	-	1	2	6	25
11:45	12:00	2	-	1	-	1	-	-	-	-	-	1	1	6	25
12:00	12:15	-	-	-	-	2	-	-	-	-	-	2	1	5	23
12:15	12:30	-	-	-	-	4	-	-	-	-	-	5	1	10	27
12:30	12:45	4	-	-	1	2	-	-	-	-	-	1	1	9	30
12:45	13:00	-	-	-	-	1	-	-	-	-	-	3	-	4	28
13:00	13:15	2	-	-	-	4	-	-	-	-	-	3	1	10	33
13:15	13:30	2	-	-	-	5	-	-	-	-	-	1	-	8	31
13:30	13:45	2	-	-	-	3	-	-	-	-	-	6	1	12	34
13:45	14:00	-	-	-	-	4	-	-	-	-	-	3	-	7	37
14:00	14:15	-	-	-	-	-	-	-	-	-	-	3	2	5	32
14:15	14:30	2	-	-	-	5	-	-	-	-	-	4	1	12	36
14:30	14:45	-	-	-	-	1	-	-	-	-	-	1	-	2	26
14:45	15:00	-	-	-	-	8	-	-	-	-	-	1	-	9	28
15:00	15:15	1	-	-	-	4	-	-	-	-	-	2	-	7	
15:15	15:30	-	-	-	-	2	-	-	-	-	-	-	-	2	
15:30	15:45	-	-	-	-	3	-	-	-	-	-	3	1	7	
15:45	16:00	-	-	-	-	5	-	-	-	-	-	3	-	8	24
16:00	16:15	-	-	-	-	3	-	-	-	-	-	2	-	5	22
16:15	16:30	-	-	-	-	4	-	-	-	-	-	2	-	6	26
16:30	16:45	-	-	-	-	2	-	-	-	-	-	5	-	7	26
16:45	17:00	-	-	-	-	-	-	-	-	-	-	2	1	3	21
17:00	17:15	-	-	1	1	4	-	-	-	-	-	1	-	7	23
17:15	17:30	2	-	-	-	-	-	-	-	-	-	3	1	6	23
17:30	17:45	1	-	-	-	-	-	-	-	-	-	2	-	3	19
17:45	18:00	3	-	-	-	-	-	-	-	-	-	1	-	4	20
TOTAL		26	-	3	2	120	-	-	-	-	-	126	33	310	

JUNCTION DIAGRAM



Dumphries Road and Access Road to School Classified Traffic Counts Data – Light Vehicle

LOCATION:	BUSHBUCKRIDGE	PROJECT TITLE:	BUSHBUCKRIDGE-TRAFFIC COUNT				
PROJECT NR:	UT2020-802	INTERSECTION:	UNKNOWN RD & UNKNOWN RD				
SURVEY DATE:	12 November 2020						
SURVEY TIMES:	06H00-18H00	KMZ FILE NR:	DUMPHRIES	DATA:	J.A.V	TYPE:	TS-12H-6-18-C

LIGHT VEHICLE SUMMARY

TIME		NORTHBOUND			WESTBOUND			SOUTHBOUND			EASTBOUND			VOLUME SUMMARY	
START	END	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	
06:00	06:15	-	-	-	-	1	-	-	-	-	-	1	1	3	
06:15	06:30	1	-	-	-	2	-	-	-	-	-	1	1	5	
06:30	06:45	-	-	-	-	2	-	-	-	-	-	3	1	6	
06:45	07:00	-	-	-	-	3	-	-	-	-	-	6	3	12	26
07:00	07:15	-	-	-	-	2	-	-	-	-	-	4	2	8	31
07:15	07:30	-	-	-	-	-	-	-	-	-	-	1	4	5	31
07:30	07:45	-	-	-	-	4	-	-	-	-	-	4	-	8	33
07:45	08:00	-	-	-	-	1	-	-	-	-	-	-	-	1	22
08:00	08:15	-	-	-	-	3	-	-	-	-	-	4	1	8	22
08:15	08:30	-	-	-	-	1	-	-	-	-	-	3	1	5	22
08:30	08:45	-	-	1	-	-	-	-	-	-	-	-	1	2	16
08:45	09:00	-	-	-	-	1	-	-	-	-	-	2	-	3	18
09:00	09:15	1	-	-	-	2	-	-	-	-	-	2	1	6	
09:15	09:30	-	-	-	-	1	-	-	-	-	-	3	-	4	
09:30	09:45	-	-	-	-	1	-	-	-	-	-	-	-	1	
09:45	10:00	-	-	-	-	1	-	-	-	-	-	1	-	2	13
10:00	10:15	-	-	-	-	2	-	-	-	-	-	3	1	6	13
10:15	10:30	1	-	-	-	1	-	-	-	-	-	-	-	2	11
10:30	10:45	-	-	-	-	1	-	-	-	-	-	4	2	7	17
10:45	11:00	-	-	-	-	4	-	-	-	-	-	2	-	6	21
11:00	11:15	1	-	-	-	1	-	-	-	-	-	3	-	5	20
11:15	11:30	1	-	-	-	1	-	-	-	-	-	2	-	4	22
11:30	11:45	-	-	-	-	2	-	-	-	-	-	1	2	5	20
11:45	12:00	2	-	1	-	1	-	-	-	-	-	1	1	6	20
12:00	12:15	-	-	-	-	1	-	-	-	-	-	1	1	3	18
12:15	12:30	-	-	-	-	2	-	-	-	-	-	4	1	7	21
12:30	12:45	4	-	-	1	1	-	-	-	-	-	-	1	7	23
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13:00	13:15	2	-	-	-	2	-	-	-	-	-	1	1	6	20
13:15	13:30	2	-	-	-	4	-	-	-	-	-	1	-	7	20
13:30	13:45	2	-	-	-	2	-	-	-	-	-	4	1	9	22
13:45	14:00	-	-	-	-	2	-	-	-	-	-	2	-	4	26
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14:15	14:30	2	-	-	-	4	-	-	-	-	-	1	1	8	25
14:30	14:45	-	-	-	-	1	-	-	-	-	-	1	-	2	18
14:45	15:00	-	-	-	-	6	-	-	-	-	-	-	-	6	20
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15:30	15:45	-	-	-	-	2	-	-	-	-	-	2	1	5	
15:45	16:00	-	-	-	-	3	-	-	-	-	-	3	-	6	17
16:00	16:15	-	-	-	-	3	-	-	-	-	-	1	-	4	15
16:15	16:30	-	-	-	-	2	-	-	-	-	-	2	-	4	19
16:30	16:45	-	-	-	-	1	-	-	-	-	-	4	-	5	19
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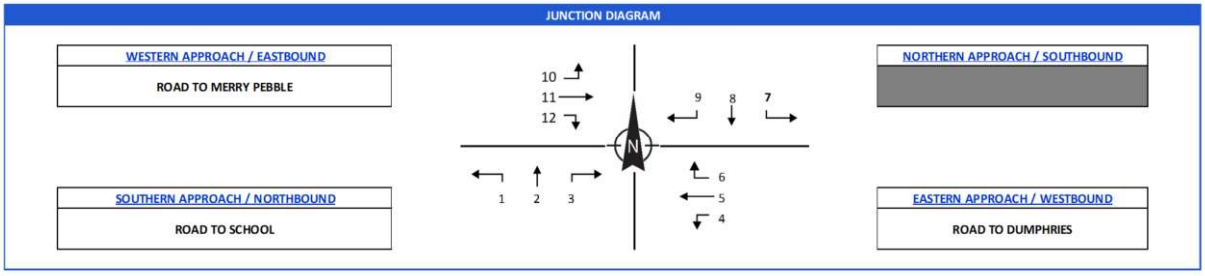
17:00	17:15	-	-	1	1	3	-	-	-	-	-	1	-	6	16
17:15	17:30	2	-	-	-	-	-	-	-	-	-	1	1	4	16
17:30	17:45	1	-	-	-	-	-	-	-	-	-	2	-	3	14
17:45	18:00	3	-	-	-	-	-	-	-	-	-	-	-	3	16
TOTAL		26	-	3	2	81	-	-	-	-	-	86	32	230	

JUNCTION DIAGRAM



Dumphries Road and Access Road to School Classified Traffic Counts Data – Minibus Taxis

LOCATION:	BUSHBUCKRIDGE	PROJECT TITLE:	BUSHBUCKRIDGE-TRAFFIC COUNT				
PROJECT NR:	UT2020-802	INTERSECTION:	UNKNOWN RD & UNKNOWN RD				
SURVEY DATE:	12 November 2020						
SURVEY TIMES:	06H00-18H00	KMZ FILE NR:	DUMPHRIES	DATA:	J.A.V	TYPE:	TS-12H-6-18-C

TAXI SUMMARY

TIME		NORTHBOUND			WESTBOUND			SOUTHBOUND			EASTBOUND			VOLUME SUMMARY	
START	END	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	
06:00	06:15	-	-	-	-	-	-	-	-	-	-	-	-	-	
06:15	06:30	-	-	-	-	-	-	-	-	-	-	1	-	1	
06:30	06:45	-	-	-	-	1	-	-	-	-	-	1	-	2	
06:45	07:00	-	-	-	-	1	-	-	-	-	-	-	-	1	4
07:00	07:15	-	-	-	-	-	-	-	-	-	-	-	-	-	4
07:15	07:30	-	-	-	-	1	-	-	-	-	-	2	-	3	6
07:30	07:45	-	-	-	-	2	-	-	-	-	-	1	-	3	7
07:45	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	6
08:00	08:15	-	-	-	-	1	-	-	-	-	-	1	-	2	8
08:15	08:30	-	-	-	-	-	-	-	-	-	-	1	-	1	6
08:30	08:45	-	-	-	-	1	-	-	-	-	-	-	-	1	4
08:45	09:00	-	-	-	-	1	-	-	-	-	-	1	-	2	6
09:00	09:15	-	-	-	-	-	-	-	-	-	-	-	-	-	
09:15	09:30	-	-	-	-	1	-	-	-	-	-	2	-	3	
09:30	09:45	-	-	-	-	1	-	-	-	-	-	-	-	1	
09:45	10:00	-	-	-	-	1	-	-	-	-	-	1	-	2	6
10:00	10:15	-	-	-	-	1	-	-	-	-	-	-	-	1	7
10:15	10:30	-	-	-	-	1	-	-	-	-	-	1	-	2	6
10:30	10:45	-	-	-	-	-	-	-	-	-	-	1	-	1	6
10:45	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	4
11:00	11:15	-	-	-	-	1	-	-	-	-	-	1	-	2	5
11:15	11:30	-	-	-	-	1	-	-	-	-	-	1	-	2	5
11:30	11:45	-	-	-	-	1	-	-	-	-	-	-	-	1	5
11:45	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	5
12:00	12:15	-	-	-	-	1	-	-	-	-	-	1	-	2	5
12:15	12:30	-	-	-	-	2	-	-	-	-	-	1	-	3	6
12:30	12:45	-	-	-	-	1	-	-	-	-	-	1	-	2	7
12:45	13:00	-	-	-	-	1	-	-	-	-	-	2	-	3	10
13:00	13:15	-	-	-	-	-	-	-	-	-	-	2	-	2	10
13:15	13:30	-	-	-	-	1	-	-	-	-	-	-	-	1	8
13:30	13:45	-	-	-	-	1	-	-	-	-	-	2	-	3	9
13:45	14:00	-	-	-	-	2	-	-	-	-	-	-	-	2	8
14:00	14:15	-	-	-	-	-	-	-	-	-	-	-	1	1	7
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15:15	15:30	-	-	-	-	2	-	-	-	-	-	-	-	2	
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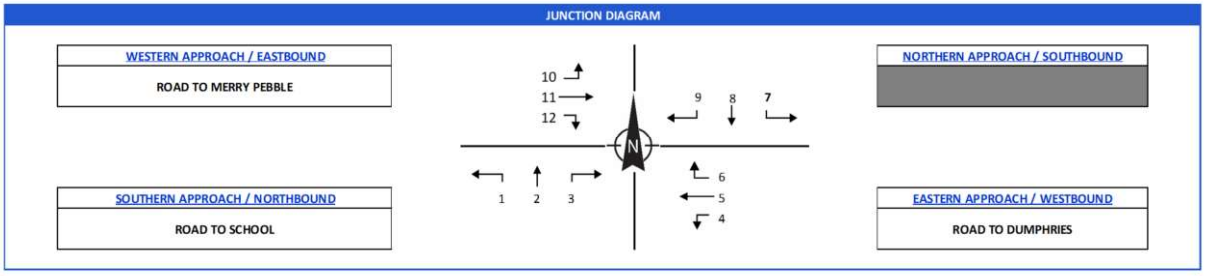
15:45	16:00	-	-	-	-	1	-	-	-	-	-	-	-	1	6
16:00	16:15	-	-	-	-	-	-	-	-	-	-	1	-	1	6
16:15	16:30	-	-	-	-	2	-	-	-	-	-	-	-	2	6
16:30	16:45	-	-	-	-	1	-	-	-	-	-	1	-	2	6
16:45	17:00	-	-	-	-	-	-	-	-	-	-	2	-	2	7
17:00	17:15	-	-	-	-	1	-	-	-	-	-	-	-	1	7
17:15	17:30	-	-	-	-	-	-	-	-	-	-	1	-	1	6
17:30	17:45	-	-	-	-	-	-	-	-	-	-	-	-	-	4
17:45	18:00	-	-	-	-	-	-	-	-	-	-	1	-	1	3
TOTAL		-	-	-	-	36	-	-	-	-	-	36	1	73	

JUNCTION DIAGRAM



Dumphries Road and Access Road to School Classified Traffic Counts Data – Buses

LOCATION:	BUSHBUCKRIDGE	PROJECT TITLE:	BUSHBUCKRIDGE-TRAFFIC COUNT				
PROJECT NR:	UT2020-802	INTERSECTION:	UNKNOWN RD & UNKNOWN RD				
SURVEY DATE:	12 November 2020						
SURVEY TIMES:	06H00-18H00	KMZ FILE NR:	DUMPHRIES	DATA:	J.A.V	TYPE:	TS-12H-6-18-C

BUS SUMMARY

TIME		NORTHBOUND			WESTBOUND			SOUTHBOUND			EASTBOUND			VOLUME SUMMARY	
START	END	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	
06:00	06:15	-	-	-	-	-	-	-	-	-	-	-	-	-	
06:15	06:30	-	-	-	-	-	-	-	-	-	-	-	-	-	
06:30	06:45	-	-	-	-	-	-	-	-	-	-	-	-	-	
06:45	07:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
07:00	07:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
07:15	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
07:30	07:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
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08:00	08:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
08:15	08:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
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08:45	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
09:00	09:15	-	-	-	-	-	-	-	-	-	-	-	-	-	
09:15	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	
09:30	09:45	-	-	-	-	-	-	-	-	-	-	-	-	-	
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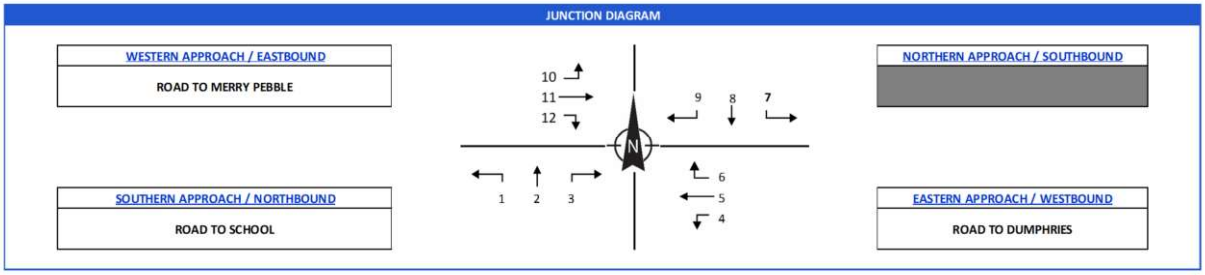
11:45	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
12:00	12:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
12:15	12:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
12:30	12:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
12:45	13:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
13:00	13:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
13:15	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
13:30	13:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
13:45	14:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
14:00	14:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
14:15	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
14:30	14:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
14:45	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
15:00	15:15	-	-	-	-	-	-	-	-	-	-	-	-	-	
15:15	15:30	-	-	-	-	-	-	-	-	-	-	-	-	-	
15:30	15:45	-	-	-	-	-	-	-	-	-	-	-	-	-	
15:45	16:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
16:00	16:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
16:15	16:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
16:30	16:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
16:45	17:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
17:00	17:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
17:15	17:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
17:30	17:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
17:45	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
TOTAL		-	-	-	-	-	-	-	-	-	-	-	-	-	

JUNCTION DIAGRAM



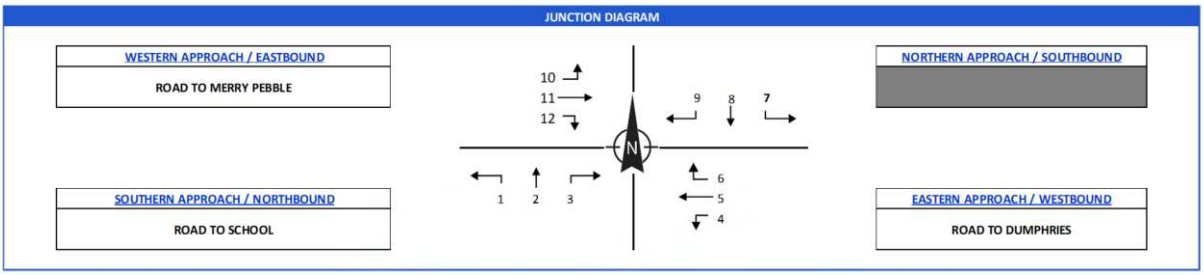
Dumphries Road and Access Road to School Classified Traffic Counts Data – Heavy Vehicles

LOCATION:	BUSHBUCKRIDGE	PROJECT TITLE:	BUSHBUCKRIDGE-TRAFFIC COUNT				
PROJECT NR:	UT2020-802	INTERSECTION:	UNKNOWN RD & UNKNOWN RD				
SURVEY DATE:	12 November 2020						
SURVEY TIMES:	06H00-18H00	KMZ FILE NR:	DUMPHRIE	DATA:	J.A.V	TYPE:	TS-12H-6-18-C

HEAVY VEHICLE SUMMARY

TIME		NORTHBOUND			WESTBOUND			SOUTHBOUND			EASTBOUND			VOLUME SUMMARY	
START	END	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL	
06:00	06:15	-	-	-	-	-	-	-	-	-	-	-	-	-	
06:15	06:30	-	-	-	-	-	-	-	-	-	-	-	-	-	
06:30	06:45	-	-	-	-	-	-	-	-	-	-	1	-	1	
06:45	07:00	-	-	-	-	-	-	-	-	-	-	-	-	-	1
07:00	07:15	-	-	-	-	-	-	-	-	-	-	-	-	-	1
07:15	07:30	-	-	-	-	-	-	-	-	-	-	-	-	-	1
07:30	07:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
07:45	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
08:00	08:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
08:15	08:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
08:30	08:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
08:45	09:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
09:00	09:15	-	-	-	-	-	-	-	-	-	-	-	-	-	
09:15	09:30	-	-	-	-	-	-	-	-	-	-	-	-	-	
09:30	09:45	-	-	-	-	-	-	-	-	-	-	-	-	-	
09:45	10:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
10:00	10:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
10:15	10:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
10:30	10:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
10:45	11:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
11:00	11:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
11:15	11:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
11:30	11:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
11:45	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
12:00	12:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
12:15	12:30	-	-	-	-	-	-	-	-	-	-	-	-	-	0
12:30	12:45	-	-	-	-	-	-	-	-	-	-	-	-	-	0
12:45	13:00	-	-	-	-	-	-	-	-	-	-	1	-	1	1
13:00	13:15	-	-	-	-	2	-	-	-	-	-	-	-	2	3
13:15	13:30	-	-	-	-	-	-	-	-	-	-	-	-	-	3
13:30	13:45	-	-	-	-	-	-	-	-	-	-	-	-	-	3
13:45	14:00	-	-	-	-	-	-	-	-	-	-	1	-	1	3
14:00	14:15	-	-	-	-	-	-	-	-	-	-	-	-	-	1
14:15	14:30	-	-	-	-	-	-	-	-	-	-	-	-	-	1
14:30	14:45	-	-	-	-	-	-	-	-	-	-	-	-	-	1
14:45	15:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
15:00	15:15	-	-	-	-	-	-	-	-	-	-	-	-	-	
15:15	15:30	-	-	-	-	-	-	-	-	-	-	-	-	-	
15:30	15:45	-	-	-	-	-	-	-	-	-	-	-	-	-	
15:45	16:00	-	-	-	-	1	-	-	-	-	-	-	-	1	1
16:00	16:15	-	-	-	-	-	-	-	-	-	-	-	-	-	1
16:15	16:30	-	-	-	-	-	-	-	-	-	-	-	-	-	1
16:30	16:45	-	-	-	-	-	-	-	-	-	-	-	-	-	1
16:45	17:00	-	-	-	-	-	-	-	-	-	-	-	-	-	0
17:00	17:15	-	-	-	-	-	-	-	-	-	-	-	-	-	0
17:15	17:30	-	-	-	-	-	-	-	-	-	-	1	-	1	1
17:30	17:45	-	-	-	-	-	-	-	-	-	-	-	-	-	1
17:45	18:00	-	-	-	-	-	-	-	-	-	-	-	-	-	1
TOTAL		-	-	-	-	3	-	-	-	-	-	4	-	7	

JUNCTION DIAGRAM



APPENDIX B: SIDRA ANALYSIS OUTPUT FILES

MOVEMENT SUMMARY

Site: 1 [Dumphries Road and Access Road to School (Intersection 1) - AM Peak]

Dumphries Road and Access Road to School (Intersection 1)
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access Road to School												
1	L2	1	0.0	0.002	8.1	LOS A	0.0	0.0	0.06	0.95	0.06	51.9
3	R2	1	0.0	0.002	7.6	LOS A	0.0	0.0	0.06	0.95	0.06	51.4
Approach		2	0.0	0.002	7.8	LOS A	0.0	0.0	0.06	0.95	0.06	51.7
East: Dumphries Road												
4	L2	1	0.0	0.007	5.5	LOS A	0.0	0.0	0.00	0.04	0.00	58.0
5	T1	13	0.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		14	0.0	0.007	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5
West: Dumphries Road												
11	T1	18	0.0	0.014	0.0	LOS A	0.0	0.3	0.04	0.20	0.04	58.1
12	R2	9	0.0	0.014	5.5	LOS A	0.0	0.3	0.04	0.20	0.04	56.0
Approach		27	0.0	0.014	1.8	NA	0.0	0.3	0.04	0.20	0.04	57.4
All Vehicles		43	0.0	0.014	1.6	NA	0.0	0.3	0.03	0.18	0.03	57.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Dumphries Road and Access Road to School (Intersection 1) - PM Peak]

Dumphries Road and Access Road to School (Intersection 1)
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access Road to School												
1	L2	1	0.0	0.002	8.1	LOS A	0.0	0.0	0.07	0.94	0.07	51.9
3	R2	1	0.0	0.002	7.5	LOS A	0.0	0.0	0.07	0.94	0.07	51.4
Approach		2	0.0	0.002	7.8	LOS A	0.0	0.0	0.07	0.94	0.07	51.7
East: Dumphries Road												
4	L2	1	0.0	0.008	5.5	LOS A	0.0	0.0	0.00	0.04	0.00	58.0
5	T1	15	0.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.7
Approach		16	0.0	0.008	0.3	NA	0.0	0.0	0.00	0.04	0.00	59.6
West: Dumphries Road												
11	T1	10	0.0	0.006	0.0	LOS A	0.0	0.0	0.01	0.06	0.01	59.5
12	R2	1	0.0	0.006	5.5	LOS A	0.0	0.0	0.01	0.06	0.01	57.2
Approach		11	0.0	0.006	0.5	NA	0.0	0.0	0.01	0.06	0.01	59.2
All Vehicles		29	0.0	0.008	0.9	NA	0.0	0.0	0.01	0.11	0.01	58.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Dumphries Road and Access Road to School (Intersection 1) - AM Peak - Design]

Dumphries Road and Access Road to School (Intersection 1)
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access Road to School												
1	L2	58	0.0	0.095	8.1	LOS A	0.4	2.5	0.07	0.95	0.07	51.9
3	R2	58	0.0	0.095	7.8	LOS A	0.4	2.5	0.07	0.95	0.07	51.4
Approach		116	0.0	0.095	7.9	LOS A	0.4	2.5	0.07	0.95	0.07	51.6
East: Dumphries Road												
4	L2	5	0.0	0.010	5.5	LOS A	0.0	0.0	0.00	0.16	0.00	57.0
5	T1	14	0.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.6
Approach		19	0.0	0.010	1.5	NA	0.0	0.0	0.00	0.16	0.00	58.2
West: Dumphries Road												
11	T1	20	0.0	0.035	0.0	LOS A	0.2	1.1	0.07	0.40	0.07	56.3
12	R2	44	0.0	0.035	5.5	LOS A	0.2	1.1	0.07	0.40	0.07	54.3
Approach		64	0.0	0.035	3.8	NA	0.2	1.1	0.07	0.40	0.07	54.9
All Vehicles		199	0.0	0.095	6.0	NA	0.4	2.5	0.06	0.70	0.06	53.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Dumphries Road and Access Road to School (Intersection 1) - PM Peak - Design]

Dumphries Road and Access Road to School (Intersection 1)
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access Road to School												
1	L2	24	0.0	0.040	8.1	LOS A	0.1	1.0	0.07	0.95	0.07	51.9
3	R2	24	0.0	0.040	7.9	LOS A	0.1	1.0	0.07	0.95	0.07	51.4
Approach		48	0.0	0.040	8.0	LOS A	0.1	1.0	0.07	0.95	0.07	51.6
East: Dumphries Road												
4	L2	54	0.0	0.037	5.5	LOS A	0.0	0.0	0.00	0.45	0.00	54.6
5	T1	16	0.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.45	0.00	56.1
Approach		70	0.0	0.037	4.3	NA	0.0	0.0	0.00	0.45	0.00	55.0
West: Dumphries Road												
11	T1	11	0.0	0.038	0.2	LOS A	0.2	1.2	0.16	0.47	0.16	55.3
12	R2	54	0.0	0.038	5.6	LOS A	0.2	1.2	0.16	0.47	0.16	53.4
Approach		65	0.0	0.038	4.7	NA	0.2	1.2	0.16	0.47	0.16	53.7
All Vehicles		183	0.0	0.040	5.4	NA	0.2	1.2	0.08	0.59	0.08	53.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Dumphries Road and Access Road to School (Intersection 1) - AM Peak - Planning]

Dumphries Road and Access Road to School (Intersection 1)
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access Road to School												
1	L2	74	0.0	0.122	8.1	LOS A	0.5	3.3	0.08	0.95	0.08	51.9
3	R2	74	0.0	0.122	7.9	LOS A	0.5	3.3	0.08	0.95	0.08	51.4
Approach		148	0.0	0.122	8.0	LOS A	0.5	3.3	0.08	0.95	0.08	51.6
East: Dumphries Road												
4	L2	6	0.0	0.012	5.5	LOS A	0.0	0.0	0.00	0.15	0.00	57.1
5	T1	18	0.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	58.7
Approach		24	0.0	0.012	1.4	NA	0.0	0.0	0.00	0.15	0.00	58.3
West: Dumphries Road												
11	T1	25	0.0	0.046	0.1	LOS A	0.2	1.5	0.09	0.40	0.09	56.2
12	R2	57	0.0	0.046	5.5	LOS A	0.2	1.5	0.09	0.40	0.09	54.2
Approach		82	0.0	0.046	3.9	NA	0.2	1.5	0.09	0.40	0.09	54.8
All Vehicles		254	0.0	0.122	6.0	NA	0.5	3.3	0.07	0.70	0.07	53.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Dumphries Road and Access Road to School (Intersection 1) - PM Peak - Planning]

Dumphries Road and Access Road to School (Intersection 1)
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

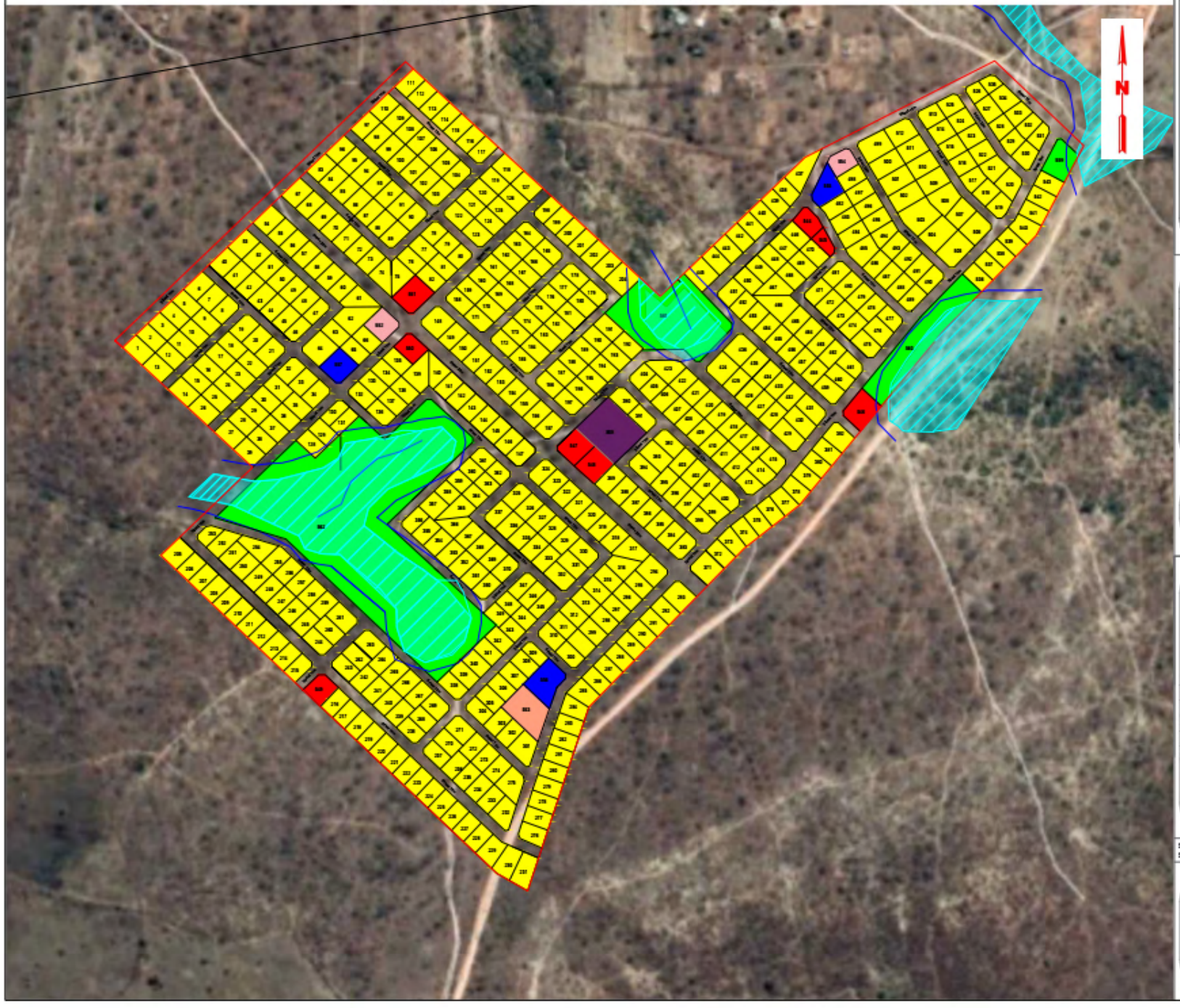
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Access Road to School												
1	L2	30	0.0	0.051	8.1	LOS A	0.2	1.3	0.08	0.95	0.08	51.8
3	R2	30	0.0	0.051	8.0	LOS A	0.2	1.3	0.08	0.95	0.08	51.3
Approach		60	0.0	0.051	8.1	LOS A	0.2	1.3	0.08	0.95	0.08	51.6
East: Dumphries Road												
4	L2	69	0.0	0.048	5.5	LOS A	0.0	0.0	0.00	0.45	0.00	54.7
5	T1	21	0.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.45	0.00	56.1
Approach		90	0.0	0.048	4.3	NA	0.0	0.0	0.00	0.45	0.00	55.0
West: Dumphries Road												
11	T1	14	0.0	0.049	0.3	LOS A	0.2	1.6	0.19	0.47	0.19	55.2
12	R2	69	0.0	0.049	5.7	LOS A	0.2	1.6	0.19	0.47	0.19	53.3
Approach		83	0.0	0.049	4.8	NA	0.2	1.6	0.19	0.47	0.19	53.6
All Vehicles		233	0.0	0.051	5.4	NA	0.2	1.6	0.09	0.58	0.09	53.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX C: TOWNSHIP ESTABLISHMENT IN DUMPHRIES. ON PORTION 1 OF THE FARM NEWINGTON 255 KU SITE LAYOUT

DEMARCATION LAYOUT PLAN

PORTION 1 OF THE FARM NEWINGTON 255 KU



LOCALITY MAP

ZONING	LAND USES	NO. OF ERF	AREA (HA)	AREA (%)	NOTATION
RESIDENTIAL 1	DWELLING UNIT	543	56.84	64.29	
BUSINESS 1	RETAIL	8	1.22	1.38	
INSTITUTIONAL	CRECHE	3	0.59	0.68	
INSTITUTIONAL	CHURCH	3	0.60	0.68	
GOVERNMENT/MUNICIPAL	MULTI-PURPOSE CENTRE	1	0.55	0.62	
PUBLIC OPEN SPACE	PUBLIC OPEN SPACE	4	10.24	11.58	
ROADS PURPOSES			18.37	20.78	
TOTAL DEVELOPABLE AREA		562	88.41	100%	

NOTES:

1. Represents Proposed Township Boundary.
2. All areas and distances are approximate and subject to final survey
3. Average Residential Stand Size 1000 sqm
4. Street Width: 12m, 16m, 20m
5. Ecological Sensitive Areas
6. Buffer Sensitive Area

SURVEY NOTES:

CLIENT:
BUSHBUCKRIDGE LOCAL MUNICIPALITY

CONSULTANTS	NAME	SIGNATURE
TOWN PLANNER (NKANIVO DEVELOPMENT CONSULTANTS)	SAMUEL CHAUKE	
FLOOD LINE ENGINEER (-)		
LAND SURVEYOR (WINDUS M & ASSOCIATES SURVEYS)		
CONSULTING ENGINEER (-)		

DESIGNED: SAMUEL CHAUKE Tech.Pln (-)
CHECKED: SAMUEL CHAUKE
DRAWING No: 2020DU-001
DATE: 04/12/2020

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SCALE 1: 2000(A0)
SCALE 1: 4000(A2)

COMPILED BY:

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