

**Portion of the Remainder of
Bultfontein 396**

TOWNSHIP ESTABLISHMENT

TRAFFIC IMPACT STATEMENT

SEPTEMBER 2013



Project: 6815.01

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REPORT SHEET

Property Description:	<i>Portion of the Remainder of Bultfontein 396</i>
Municipal Area:	<i>Tswelopele Local Municipality</i>
Application:	<i>Township Establishment</i>
Type of Report:	<i>Traffic Impact Statement</i>
Project Number:	<i>6815.01</i>
Declaration	<i>I, Koot Marais, author of this traffic impact study, hereby certify that I am a professional traffic engineer (registration No 920023) and that I have the required experience and training in the field of traffic and transportation engineering as required by the Engineering Council of South Africa (ECSA), to compile this traffic impact study and I take full responsibility for the content, including all calculations, conclusions and recommendations made herein.</i>
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Date:	<i>September 2013</i>

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1. INTRODUCTION

1.1 Aim of the Study

The aim of this study is to determine the traffic impact of an intended township establishment on **a Portion of the Remainder of Bultfontein 396** in the Tswelopele Local Municipality area.

1.2 Background

It is the intention to extend the existing Bultfontein residential area to the southeast. The developer is as follows:

Tswelopele Local Municipality
PO Box 3,
Bultfontein,
9670

The aim of this document is to report on the traffic impact in support of the township establishment.

1.3 Study Area



Figure 1.1 Location Plan

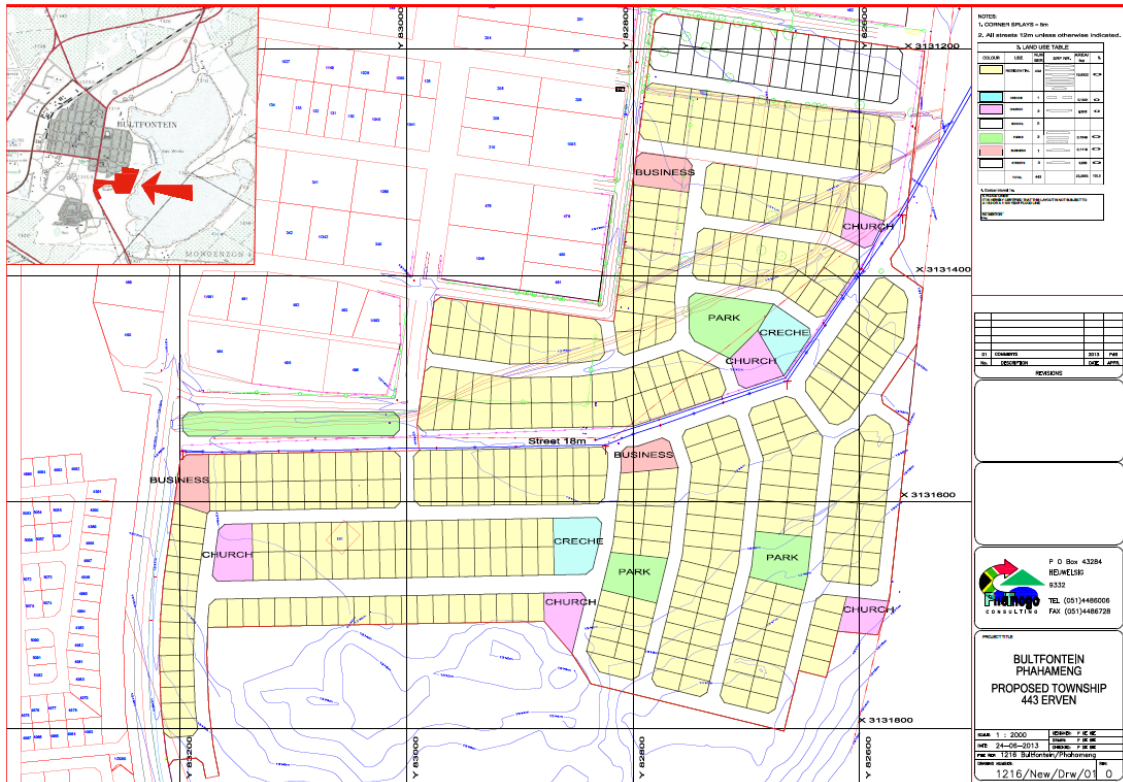


Figure 1.2 Planned Layout

The development is situated to the south of the existing Bultfontein residential area, to the east of the existing Phahameng Area and to the east of A173.

1.4 Proposed Development

The development will mainly consist of the following:

Residential	Business	Crèche	Church	School
432	1	1	3	0
432	1	1	3	0

Apart from the residential development, other land uses are not expected to result in significant trip generation on the external road network, and mainly serve the immediate area.

The layout of the development with the different land-uses is shown in the attached drawings.

1.5 Scope of Analysis

a) Period for Analysis

Based on the type of proposed development and the nature of traffic flow in the area, both the morning and afternoon peak periods need to be investigated.

b) Warrants for a Traffic Impact Study

The development could generate in between 50 and 150 peak hour trips and according to the "Manual for Traffic Impact Studies"¹, a Traffic Impact Statement is warranted.

c) Extent of Analysis

As per the requirements of the Manual only the access to the development and the intersections on both sides of the access need to be investigated. Given the specific situation, the following intersections were investigated. Due to the relatively low traffic volumes not all of the shown intersections were formally analysed:



Figure 1.3 Intersections Investigated

d) Assessment Years

Both the base year and five years after the base year have been analysed.

1.6 Available Information

a) Traffic Counts

Traffic counts were undertaken on 11 September 2013. Horizon year traffic counts were determined by using a generally accepted 3% growth rate.

2. BACKGROUND INFORMATION

2.1 Existing Road Network

The most important roads in the area are as follows:

a) **A173**

This road functions as the access from Phahameng to the main town as well as linking the P17/4 with the town. The road is a paved two-lane road.



Photo 1: A173 as seen from the south

b) **Other Roads**

All other roads in the area are two-lane undivided roads.

2.2 Existing Land Use

The area is mostly vacant as shown below.



Photo 2: Development site as seen from Diamond Street

2.3 Road Planning

There is no known road planning that will directly affect the development under consideration.

3. TRIP GENERATION

3.1 Trip Generation Rates

Trip generation rates based on the document "The South African Trip Generation Rates"² for low-income housing are as follows:

AM Peak	=	0.5 trips/erf	Directional Split 35:65
PM Peak	=	0.5 trips/erf	Directional Split 65:35

Actual surveys done as part of various traffic impact studies undertaken in the Free State showed that these rates are in general an overestimation of the expected trip generation in most areas and that actual rates could be as low as 0.03 trips per erf, such as in Memel where the main mode of transport is walking. Based on the different surveys, it is unlikely that actual trip generation will exceed the following:

AM Peak	=	0.25 trips/erf	Directional Split 35:65
PM Peak	=	0.25 trips/erf	Directional Split 65:35

Based on traffic counts in the area and observations of movement this is still an overestimation, as the main mode of transport is walking as can be seen in the photograph below as well as in Photo 1.



Photo 3: Walking as the main mode of transport

3.2 Trips Generated

Based on the calculated trip generation rates, the development could generate the following trips.

Table 3.1: Trip generation of proposed development

Land Use	Size	Unit	AM PEAK				PM PEAK					
			TGR	Split	AM Trips	In	Out	TGR	Split	PM Trips	In	Out
Residential	432	unit	0.250	35:65	108	38	70	0.250	65:35	108	70	38
Total					108	38	70			108	70	38

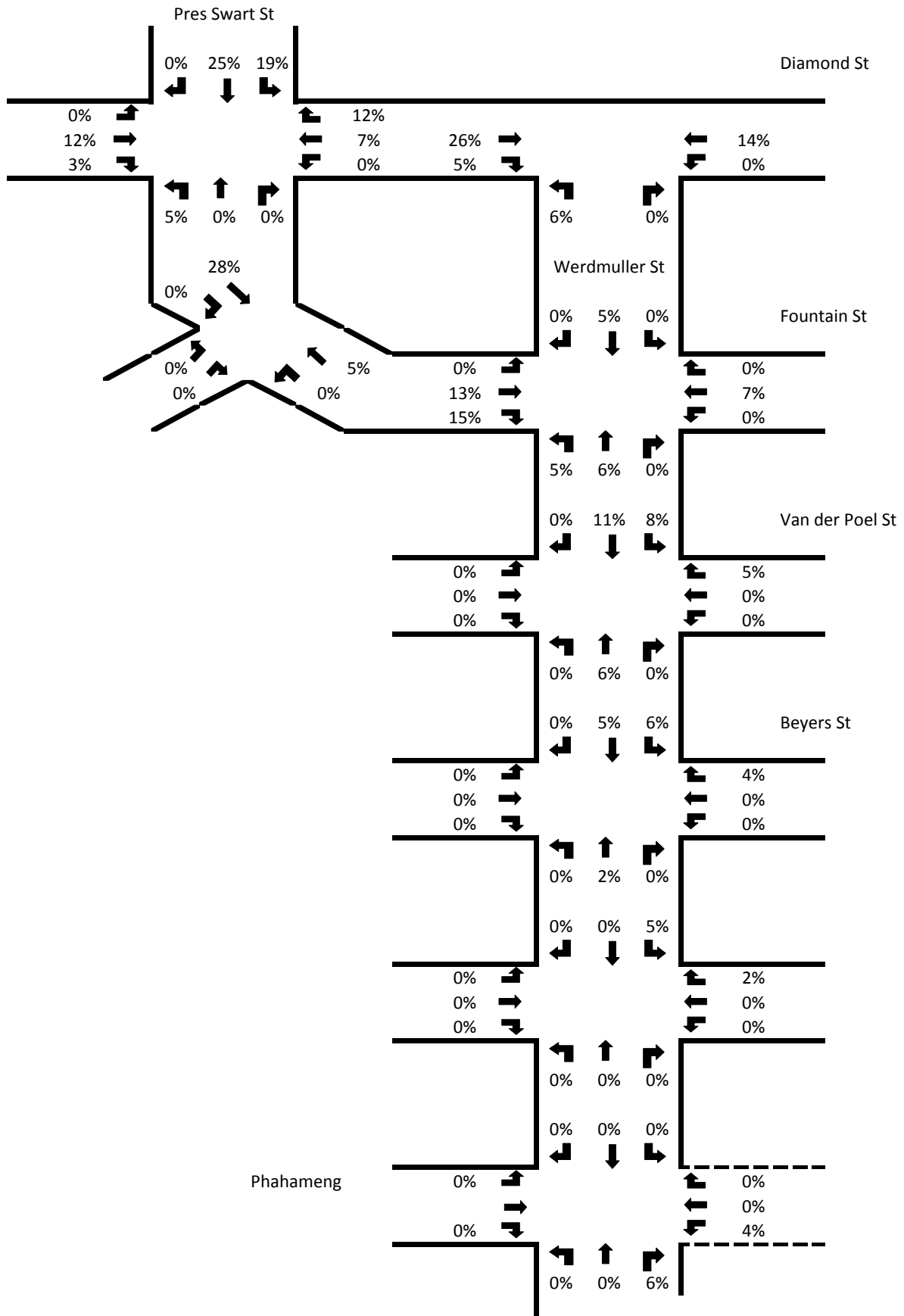


Figure 4.2b PM Trip Distribution

5. TRIP ASSIGNMENT

The generated trips have been assigned to the background traffic volumes. The following figures show the traffic volumes for the different peak periods and scenarios.

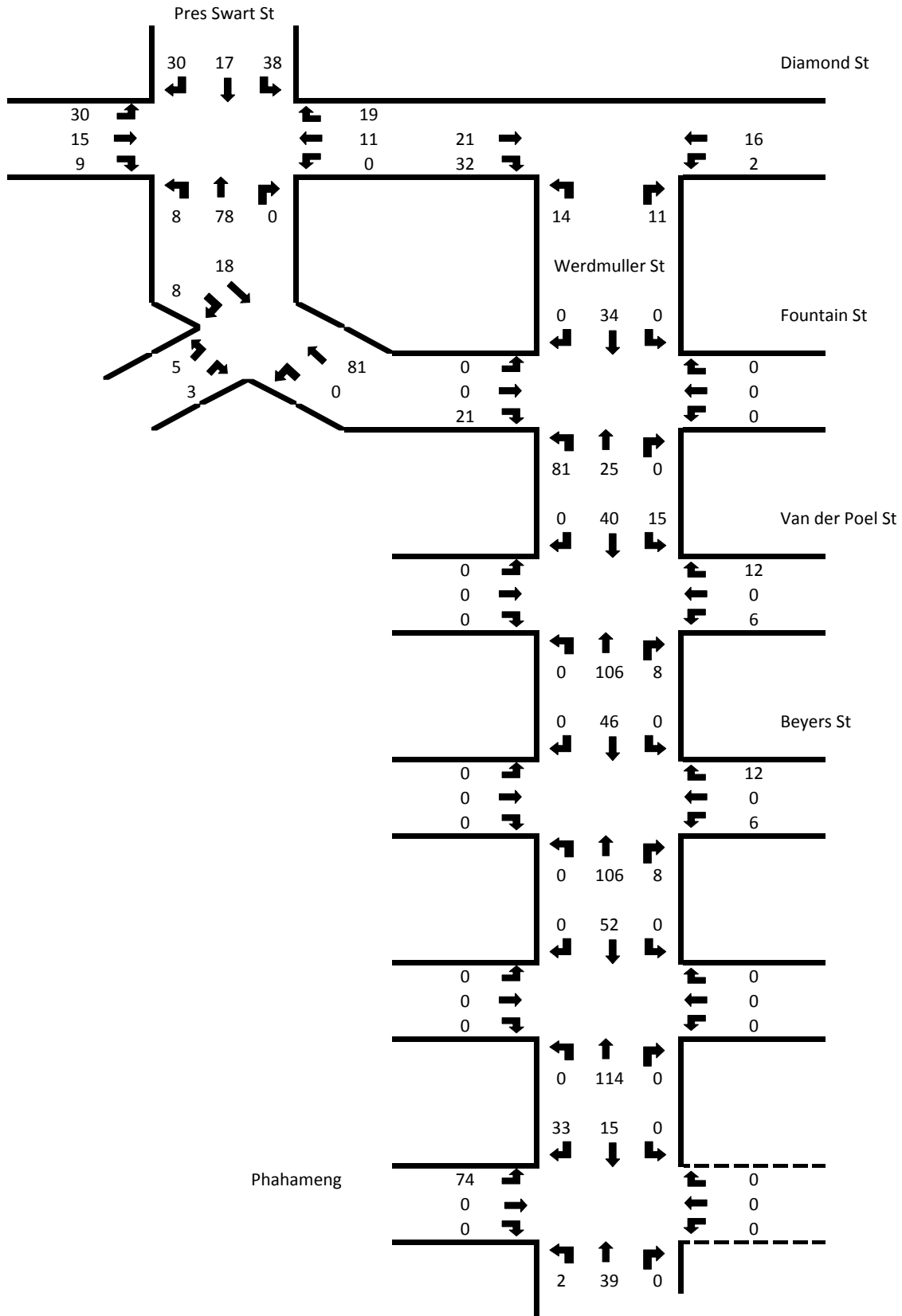


Figure 5.1 2013 AM Peak Hour Traffic Volumes

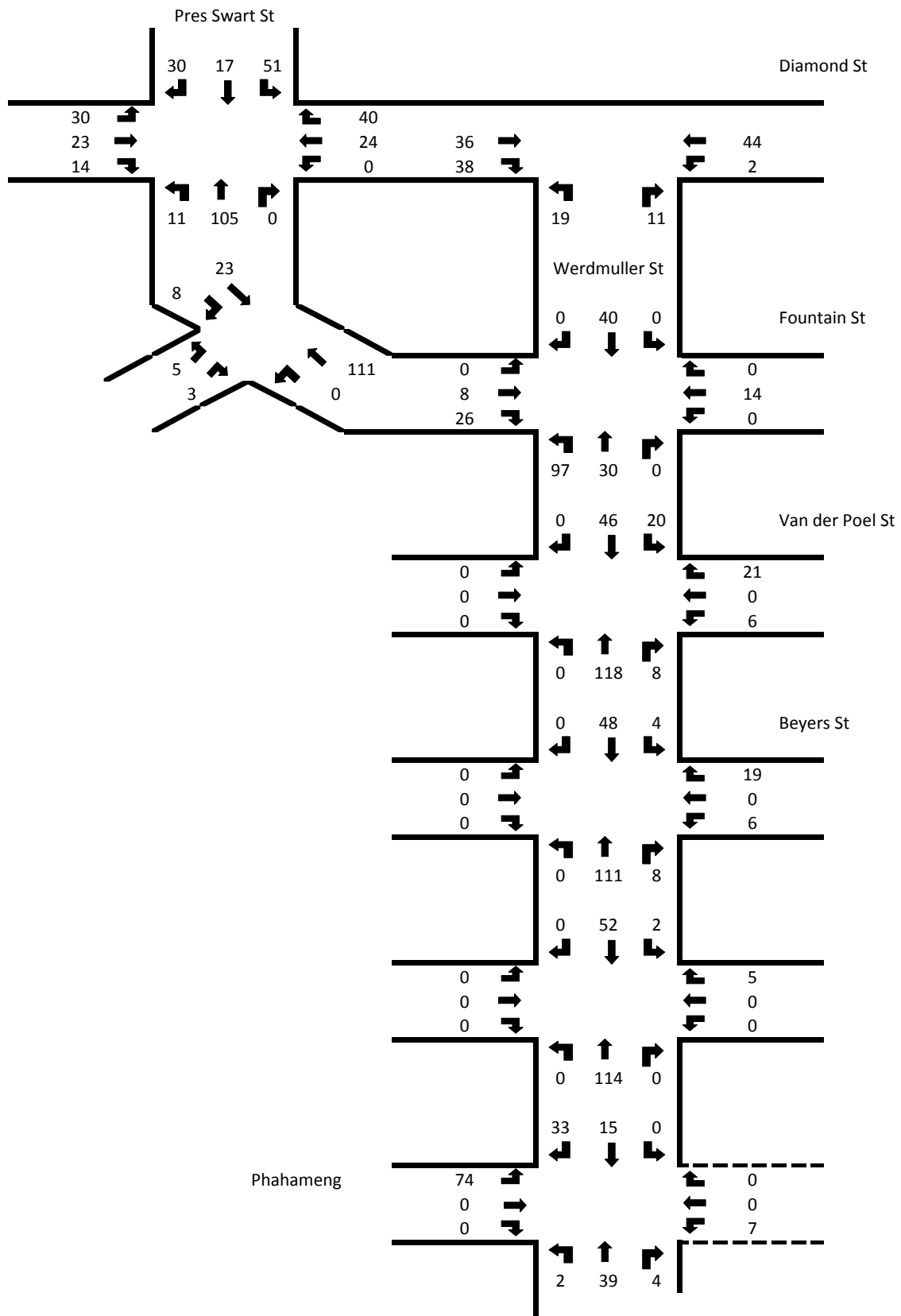


Figure 5.2 2013 AM Peak Hour Traffic Volumes with Development

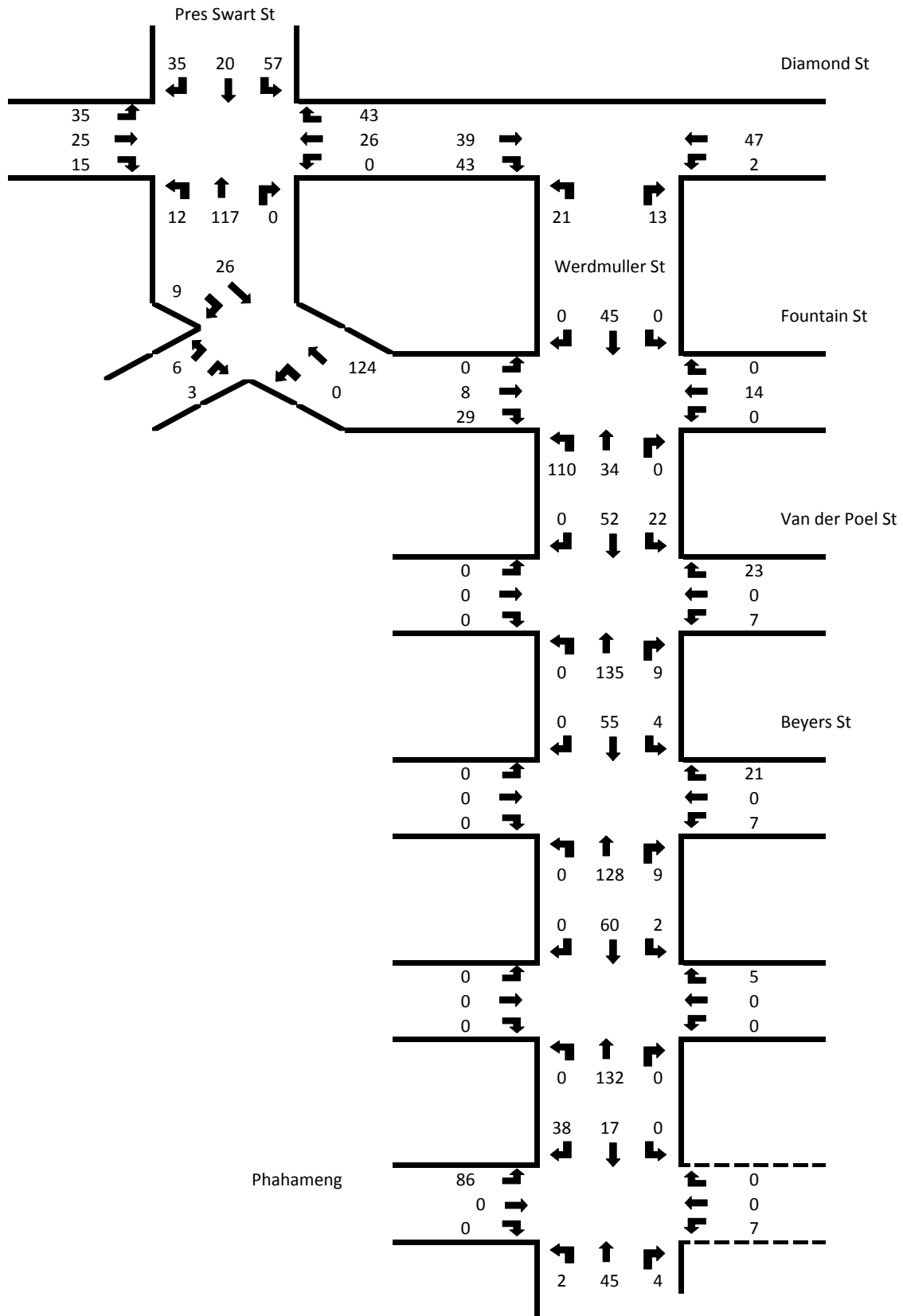


Figure 5.4 2018 AM Peak Hour Traffic Volumes with Development

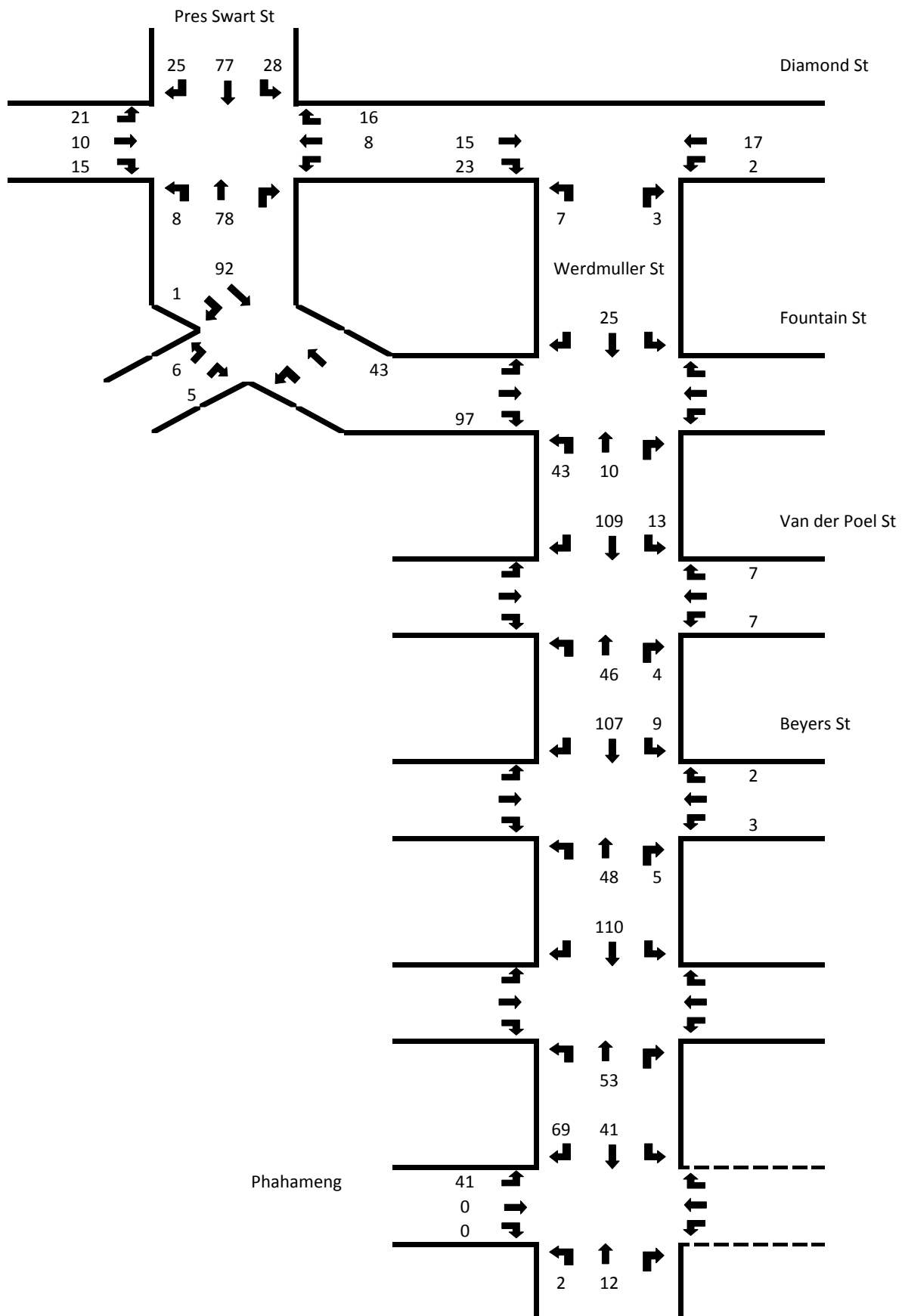


Figure 5.5 2013 PM Peak Hour Traffic Volumes

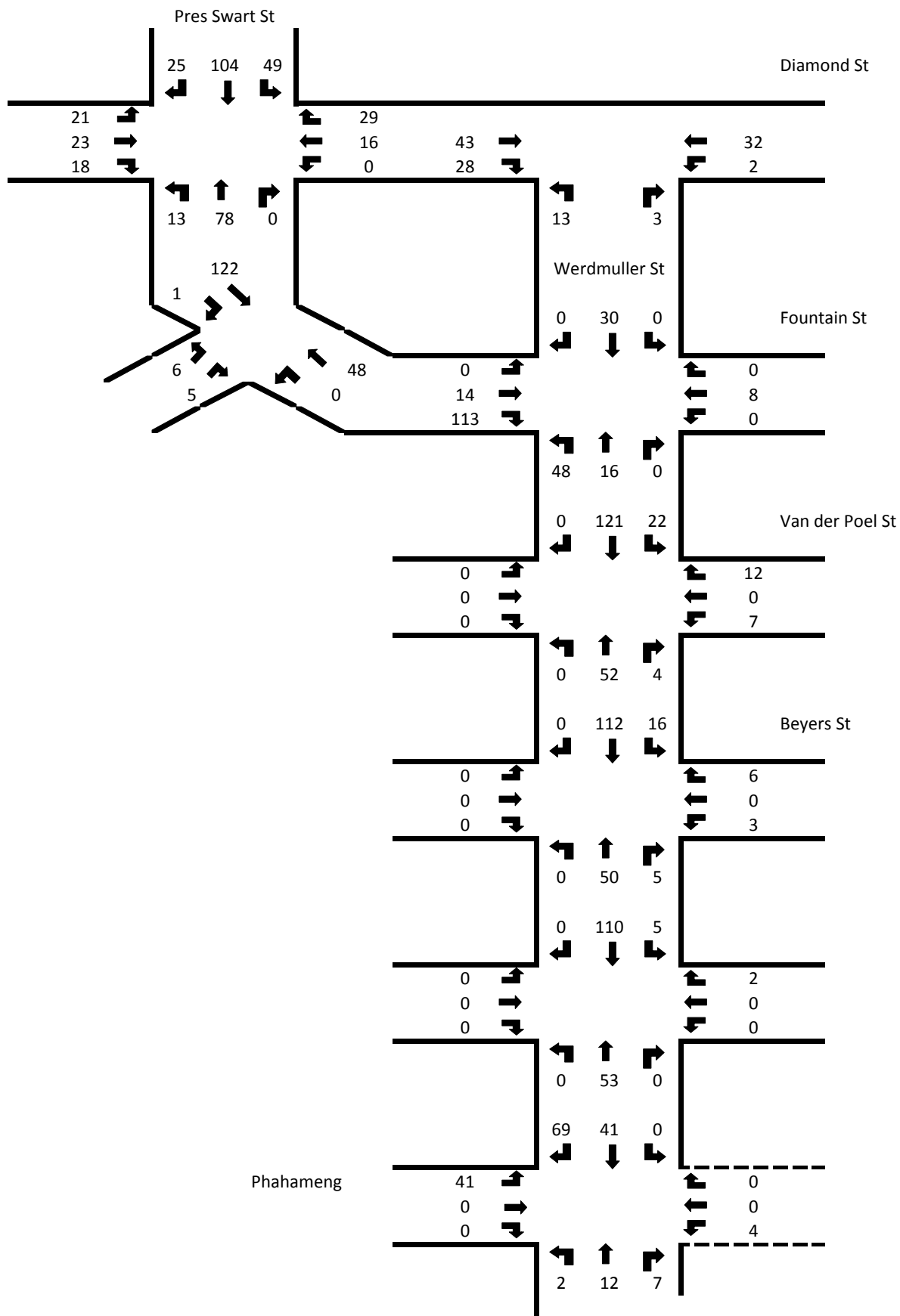


Figure 5.6 2013 PM Peak Hour Traffic Volumes with Development

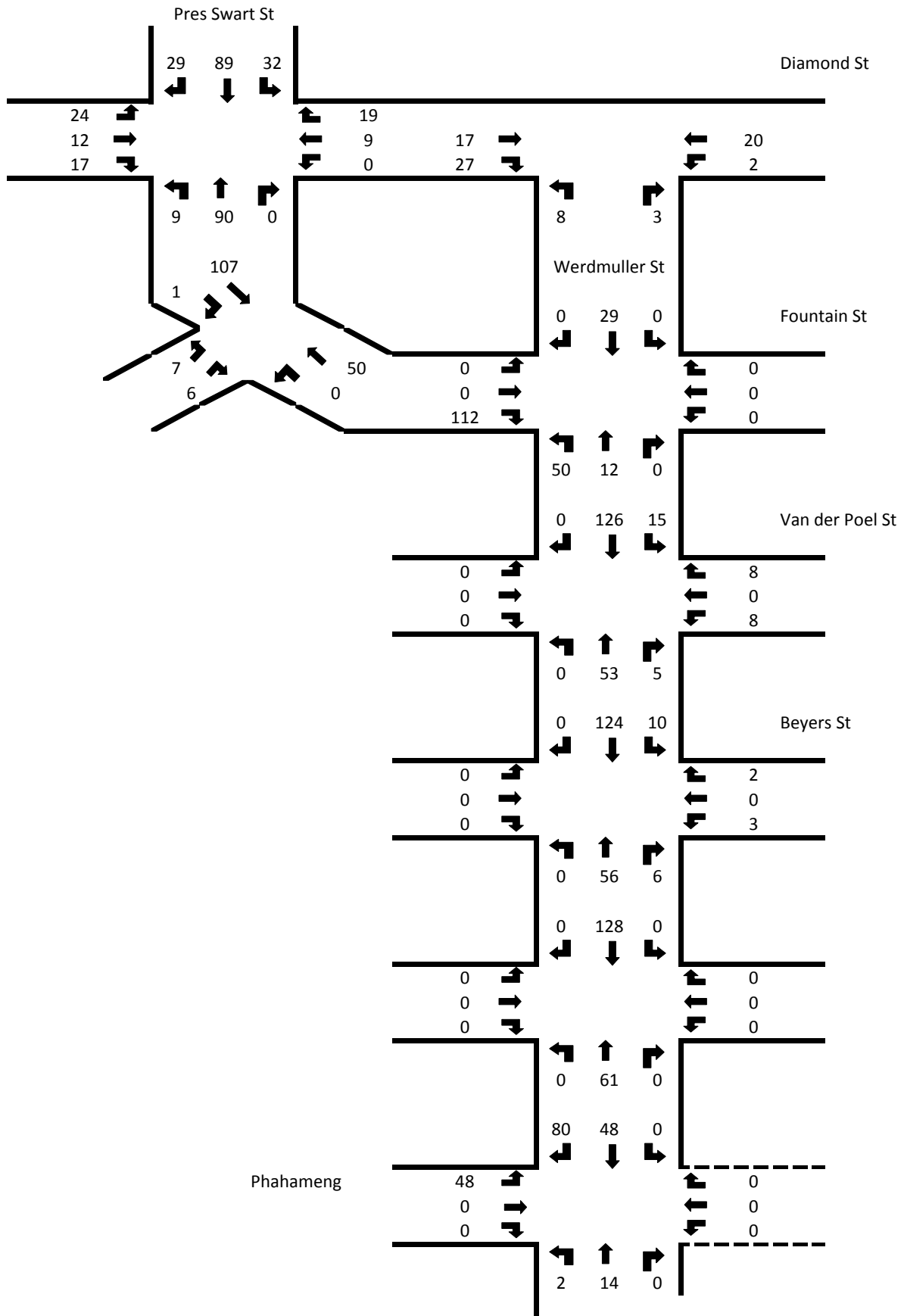


Figure 5.7 2018 PM Peak Hour Traffic Volumes

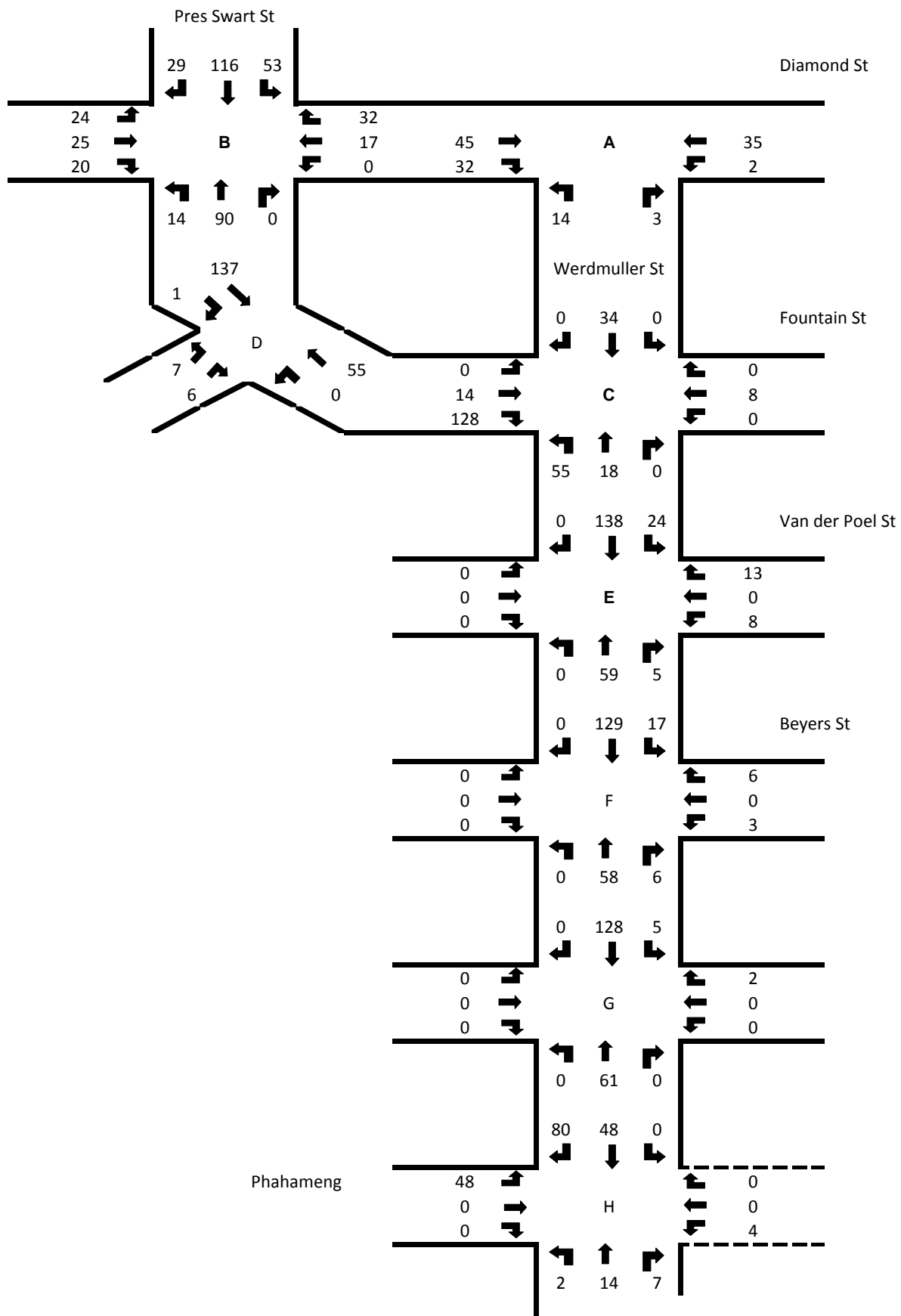


Figure 5.8 2018 PM Peak Hour Traffic Volumes with Development

6. CAPACITY ANALYSIS

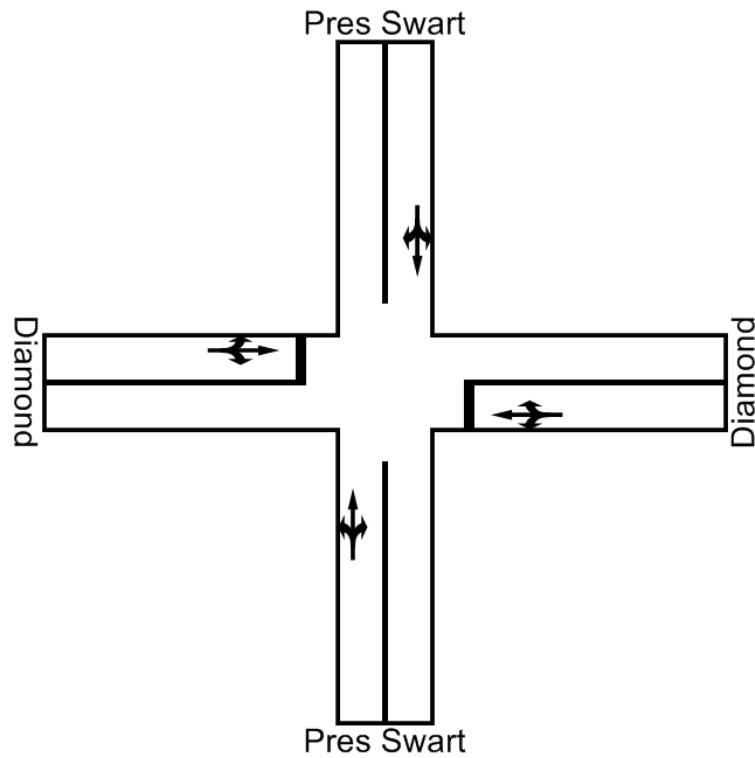
Capacity analyses were performed by means of the SIDRA program. The tables below show the Levels of Service of the different traffic movements. Levels of Service (LOS) give an indication of operational characteristics in a traffic stream and their perception by motorists and passengers. Levels of service A to D are usually assumed to be acceptable, with LOS E regarded as the maximum flow rate, or capacity of the facility.

The analysed intersections are shown below.



6.1 Intersection A

The layout is as follows:



Current Layout



Photo 4: Intersection A as seen from the west

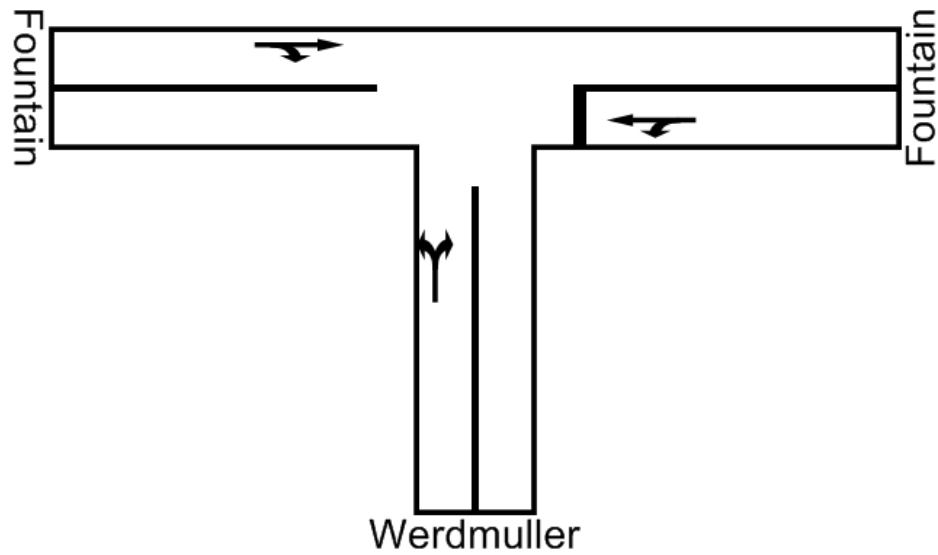
Levels of service for the worst-case scenarios will be as follows:

Intersection A		North			East			South			West		
		L	T	R	L	T	R	L	T	R	L	T	R
4	2018 AM Peak with development	A	A	A	B	B	B	A	A	A	B	B	B
8	2018 PM Peak with development	A	A	A	B	B	B	A	A	A	B	B	B

Levels of service will be high for all scenarios.

6.2 Intersection B

The layout is as follows:



Current Layout



Photo 5: Intersection B as seen from the east

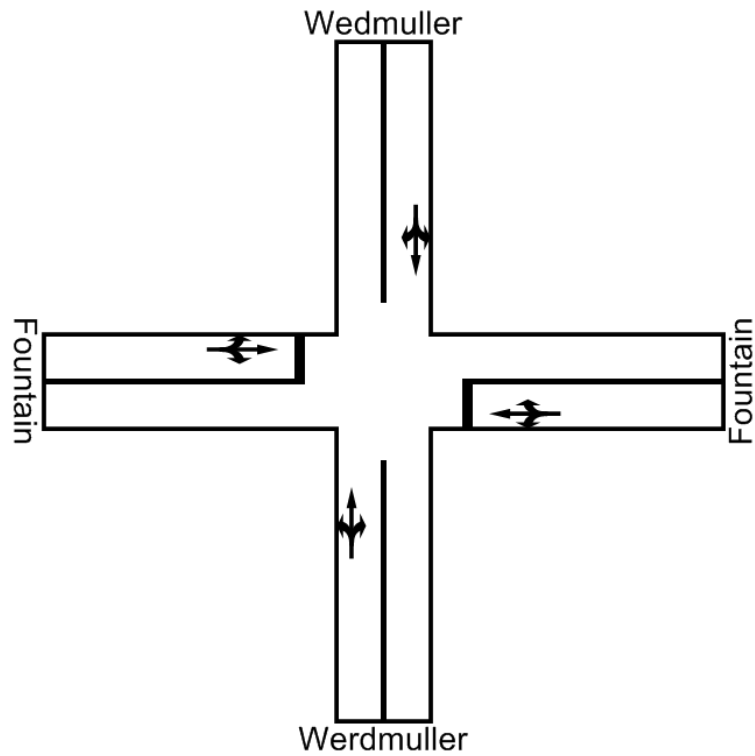
Levels of service for the worst-case scenarios will be as follows:

Intersection B		North			East			South			West		
		L	T	R	L	T	R	L	T	R	L	T	R
4	2018 AM Peak with development				C	C		A		A		A	A
8	2018 PM Peak with development				B	B		A		A		A	A

Levels of service will remain acceptable.

6.3 Intersection C

The layout is as follows:



Current Layout



Photo 6: Intersection C as seen from the west

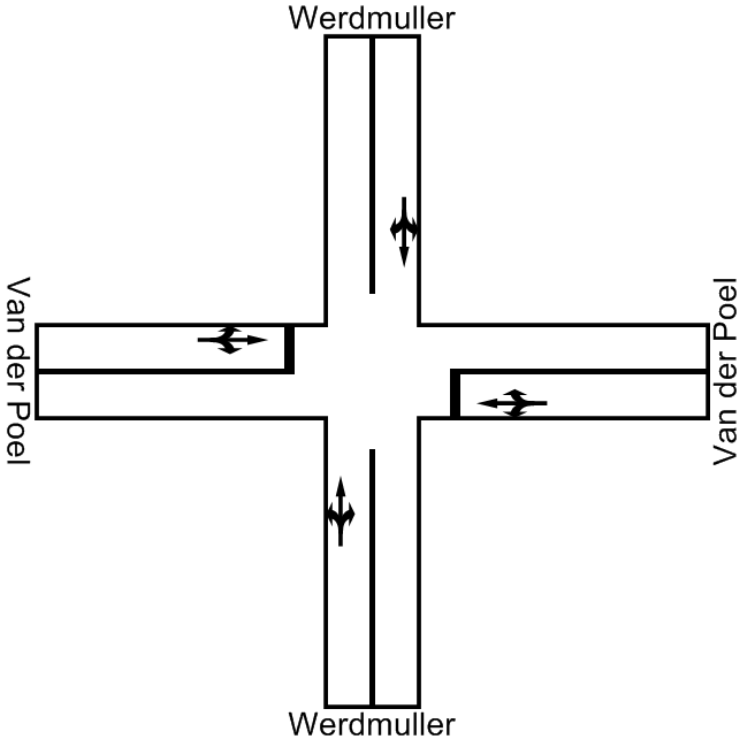
Levels of service for the worst-case scenarios will be as follows:

Intersection C		North			East			South			West		
		L	T	R	L	T	R	L	T	R	L	T	R
4	2018 AM Peak with development	A	A	A	B	B	B	A	A	A	B	B	B
8	2018 PM Peak with development	A	A	A	B	B	B	A	A	A	B	B	B

Levels of service will be high for all scenarios.

6.4 Intersection D

The layout is as follows:



Current Layout



Photo 7: Intersection D as seen from the southwest

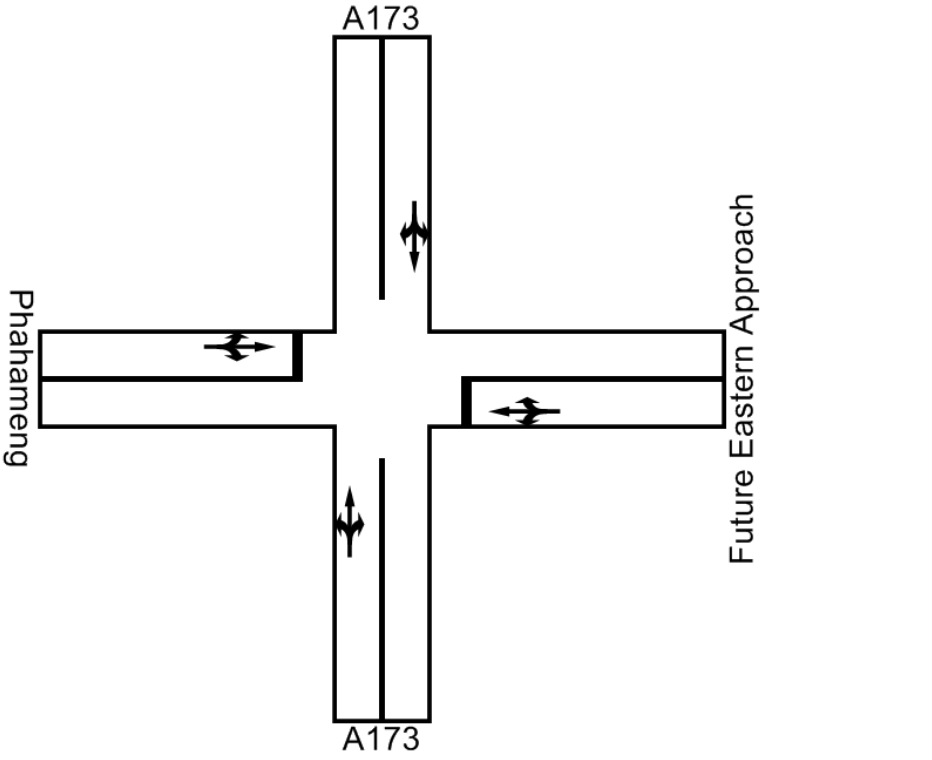
Levels of service for the worst-case scenarios will be as follows:

Intersection D		North			East			South			West		
		L	T	R	L	T	R	L	T	R	L	T	R
4	2018 AM Peak with development	B	B	B	A	A	A	B	B	B	A	A	A
8	2018 PM Peak with development	B	B	B	A	A	A	B	B	B	A	A	A

Levels of service will be high for all scenarios.

6.5 Intersection E

The layout is as follows:



Current Layout with Future Eastern Approach



Photo 8: Intersection E as seen from the north

Levels of service for the worst-case scenarios will be as follows:

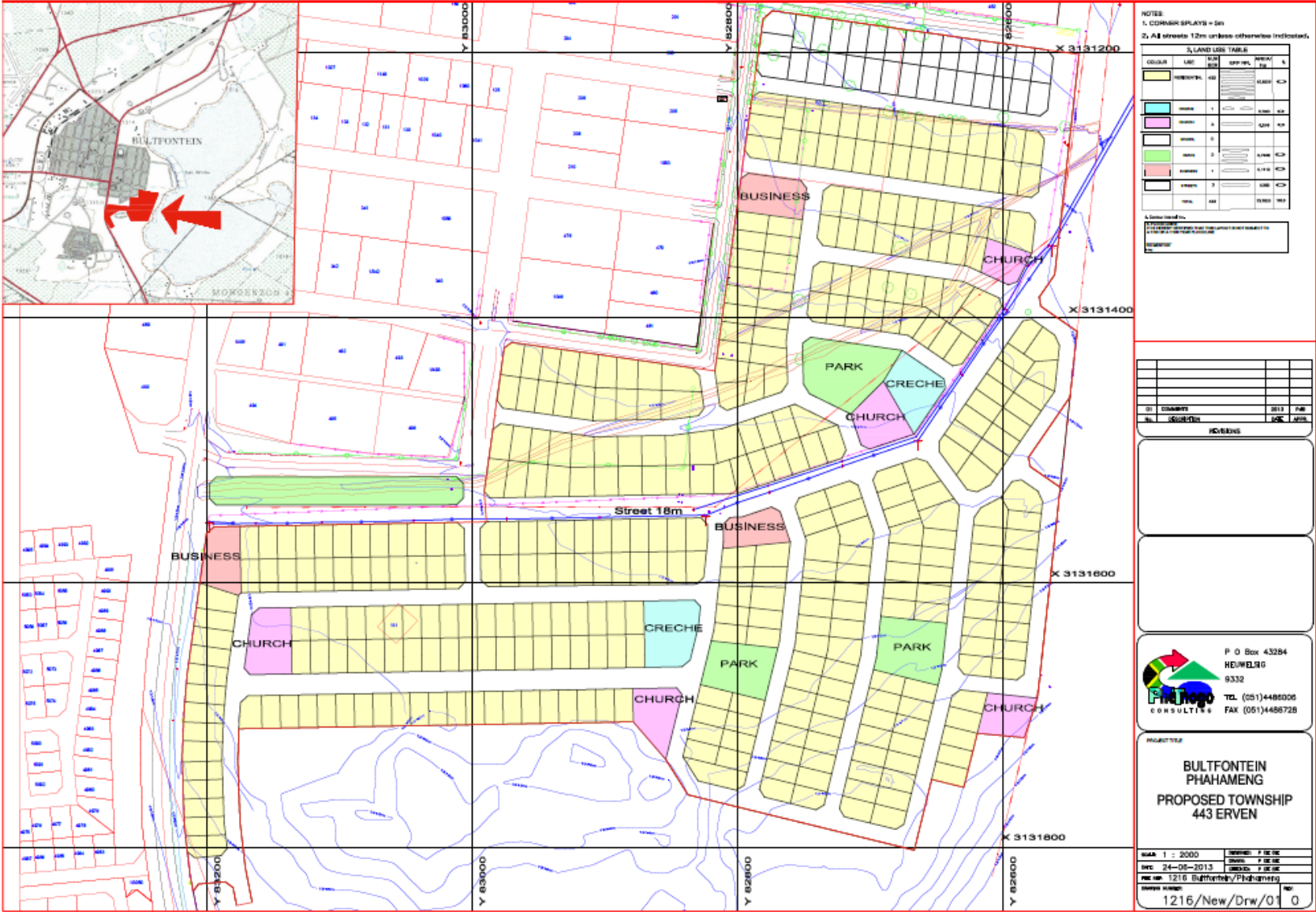
Intersection E		North			East			South			West		
		L	T	R	L	T	R	L	T	R	L	T	R
4	2018 AM Peak with development	B	B	B	A	A	A	B	B	B	A	A	A
8	2018 PM Peak with development	B	B	B	A	A	A	B	B	B	A	A	A

Levels of service will be high for all scenarios.

6.6 Other Intersections

All other intersections in the area are expected to continue to operate at high levels of service.

7. SITE DEVELOPMENT PLAN



The following aspects of the site development plan are of importance:

7.1 General Layout

The development will consist of a township with internal streets and separate erven and is in principle an extension of the existing residential area.

7.2 Access

Accesses to the development are from existing intersections and are mostly appropriately spaced. Sight distances at these positions are acceptable.

In summary, given the particulars of the area the accesses as proposed should operate acceptable.

7.3 Road Network

The following aspects concerning the road network are of importance:

a) General Layout

The layout makes provision for a relative standard grid pattern with reasonably spaced intersections. Most intersections intersect at right angles or close to 90°.

b) Road Reserves

Road reserves are 12m as a minimum, which are acceptable.

7.4 Other Road and Traffic Aspects

Other aspects of importance in developing the area are as follows:

a) Topography

The development area is relatively flat without steep areas.

b) Provision for Pedestrians

Although reasonable sidewalks are available, the lack of proper sidewalk surfacing result in pedestrians preferring to walk in the road as shown below.



Photo 9: Pedestrians walking on the roadway

In the lower order streets, sidewalks are even less pedestrian friendly.

c) Provision for Public Transport

Some provision should preferably be made in the final road design for lay-bys at the business sites although limited taxi operations were observed in the area.

d) Road - and Road Signs Condition

Road signs are in general in reasonable condition,

e) Road - and Road Signs Condition

Although the main roads are mostly in a reasonable condition, lower order roads are generally unsurfaced or in bad condition.



Photo 10: Gravel streets



Photo 11: Poor road surface

8. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions can be made from the study:

- a) The development is not expected to generate more than 108 trips during the peak hours.
- b) All analysed intersections are expected to continue to operate at high levels of service.
- c) The site development plan, with consideration of the aspects discussed in Chapter 7, is acceptable from a traffic point of view.

Based on the conclusions, it is recommended that the development be approved from a traffic point of view.

9. REFERENCES

1. **Manual for Traffic Impact Studies**, Department of Transport, Pretoria, 1995
2. **South African Trip Generation Rates**, Department of Transport, Pretoria, 1995
3. **ITE Trip Generation Rates, 6th Edition**, Institute of Transportation Engineers, Washington, 1998