

## Appendix D5: Traffic Impact Assessment



**ARCHWORXS**

ARCHITECTS | PROJECT MANAGERS

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# Transport Impact Assessment for Proposed Community Health Centre, Alexandria

J34202

DRAFT 1.0

*March 2015*

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# Transport Impact Assessment for Proposed Community Health Centre, Alexandria

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# 1 Introduction

GIBB Pty (Ltd) has been appointed by Archworx to undertake a Transport Impact Assessment (TIA) for the development of a Community Healthcare Centre (CHC) in the Kwanonkqubela Area in the town of Alexandria in the Eastern Cape.

The purpose of the development is to replace two existing clinics within Alexandria, one clinic being located in the township on the north eastern side of Alexandria and the other clinic being located in the township on the south eastern side of Alexandria (Kwanonkqubela Clinic).

The proposed CHC will serve the surrounding community, providing basic medical services, including short term hospitalisation, child care and counselling. A total number of 7 residential units will also be developed on site to provide accommodation to staff.

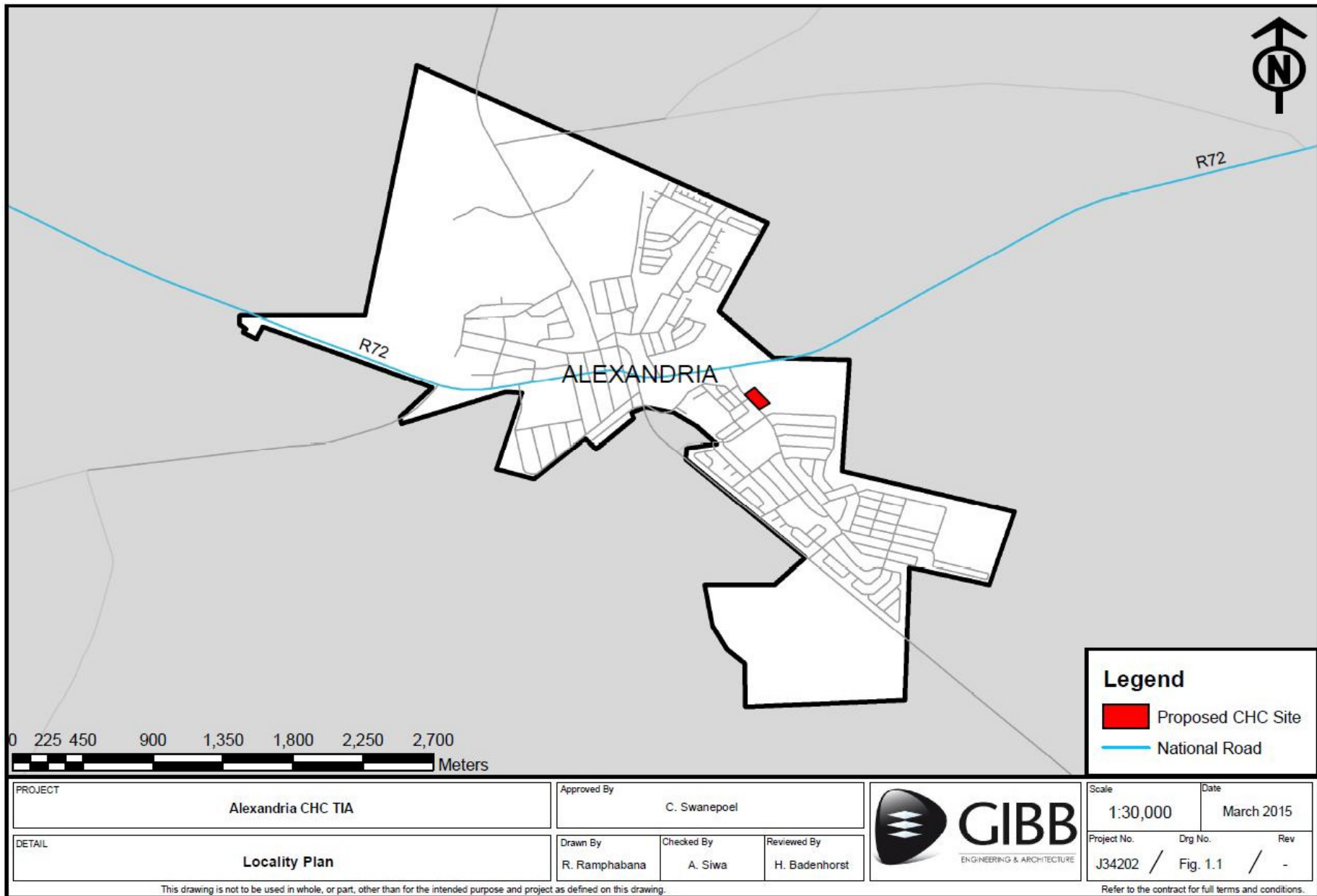
The proposed site (Erf 623) is currently undeveloped land. The locality of the site is shown in **Figure 1.1**. The proposed CHC will have a total Gross Leasable Area (GLA) of 4365m<sup>2</sup>, as shown in **Table 1**. The Site Development Plan (SDP) is shown in **Figure 1.2**.

**Table 1: Proposed CHC Composition**

Component	Size (m <sup>2</sup> ) GLA
Community Health Centre	3840
Staff Accommodation	525
<b>Total</b>	<b>4365</b>

The study area of this TIA consists of A Street, between the R72 and Khonza Street, and the R72, between A Street and the Alexandria town to the west, as shown in **Figure 1.3**.

The purpose of this TIA is to assess the traffic volumes generated by the proposed development and analyse the impact it may have on the surrounding road network. Due to the nature of the proposed development, consideration is also given to non-motorised transport (NMT) with particular focus on the pedestrian movement along A Street and access to the proposed CHC.



PROJECT  
**Alexandria CHC TIA**

Approved By  
 C. Swanepoel



Scale  
 1:30,000

Date  
 March 2015

DETAIL  
**Locality Plan**

Drawn By  
 R. Ramphabana

Checked By  
 A. Siwa

Reviewed By  
 H. Badenhorst

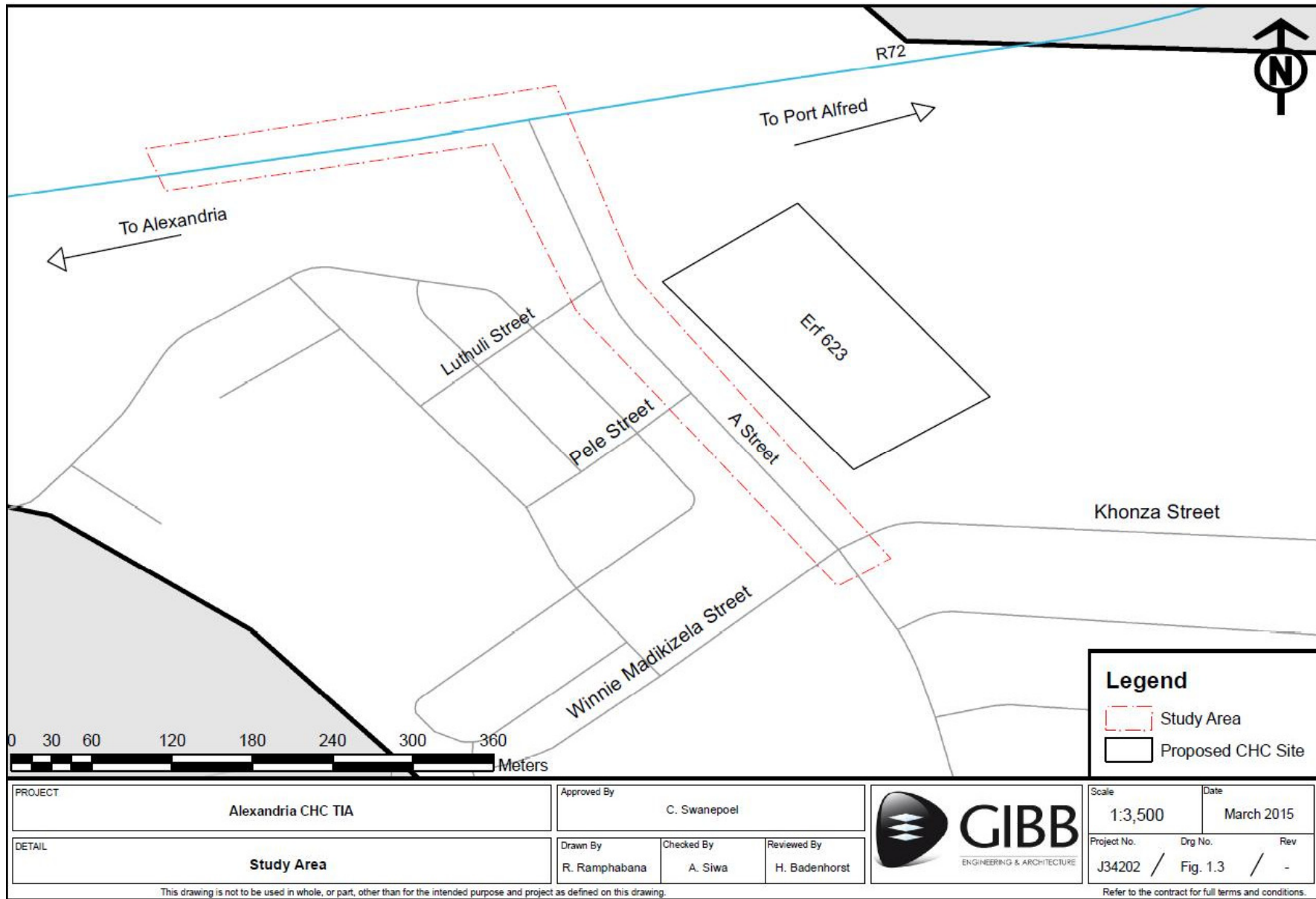
Project No. / Drg No. / Rev  
 J34202 / Fig. 1.1 / -

This drawing is not to be used in whole, or part, other than for the intended purpose and project as defined on this drawing.

Refer to the contract for full terms and conditions.







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## 2 Surrounding Road Network

### 2.1 Existing Road Network

The *Committee of Transport Officials' (COTO) South African Road Classification Manual (TRH 26, 2012)* was used to classify the roads within the study area. The surrounding road network is described as follows:

- The **R72** is a Provincial road of major importance, carrying a high volume of daily traffic between Port Elizabeth and East London. The R72 outside the study area has the characteristics of a rural highway over the majority of its length consisting of a two-lane undivided carriageway, which can be classified as a Major Arterial (Regional Arterial). However, the section of the R72 through the town of Alexandria has the characteristics of an urban road.

The **R72 within the study area** is a two-lane undivided carriageway and can be classified as a Class 4a Major Arterial Collector Road. According to TRH 26, "*Class 4a major collectors are found in areas with commercial, business, industrial, shopping and mixed-use residential developments*". The R72 road provides access to retail stores and surrounding residential areas along this section of road, and traffic calming measures in the form of rumble strips are present. The function and class of this road is further characterised by a speed limit of 60 km/h.

- **A Street** is a two-lane undivided carriageway and can be classified as a Class 4b Collector Road. The road leads to residential areas and serves public transport and residential traffic.

The intersections within the study area that will potentially be affected by the increase in the number of vehicular trips created by the CHC are the R72 / A Street, A Street/Pele Street and A Street/ Khonza Street intersections.

### 2.2 Future Road Network

SANRAL was consulted to determine whether any plans exist to upgrade the section of the R72 within the study area in the nearby future. According to SANRAL, no new roads or road upgrades are planned in the vicinity of the site for the medium term (up to 2020).

The Ndlambe Local Municipality (NLM) was consulted to determine the future transport related plans for A Street and other municipal roads within close proximity to the proposed development. According to the NLM, there are currently no new roads or upgrades planned for roads within the study area for the study horizon period (up to 2020).

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## 3 Background Traffic

### 3.1 2015 Background Traffic

Manual traffic counts were carried out on Tuesday 3<sup>rd</sup> February 2015 during the weekday morning (AM) peak period (6:30 to 08:15) and afternoon (PM) peak period (16:00 to 17:45) at the following intersections:

- R72 / A Street
- A Street / Pele Street
- A Street / Khonza Street

The results of the 2015 surveys showed the AM and PM peak hours to be between **07:00** and **08:00** and **16:30** and **17:30**, respectively. The 2015 background traffic volumes for the AM and PM peak hours are shown in **Figures 3.1** and **3.2**, respectively.

### 3.2 2020 Background Traffic

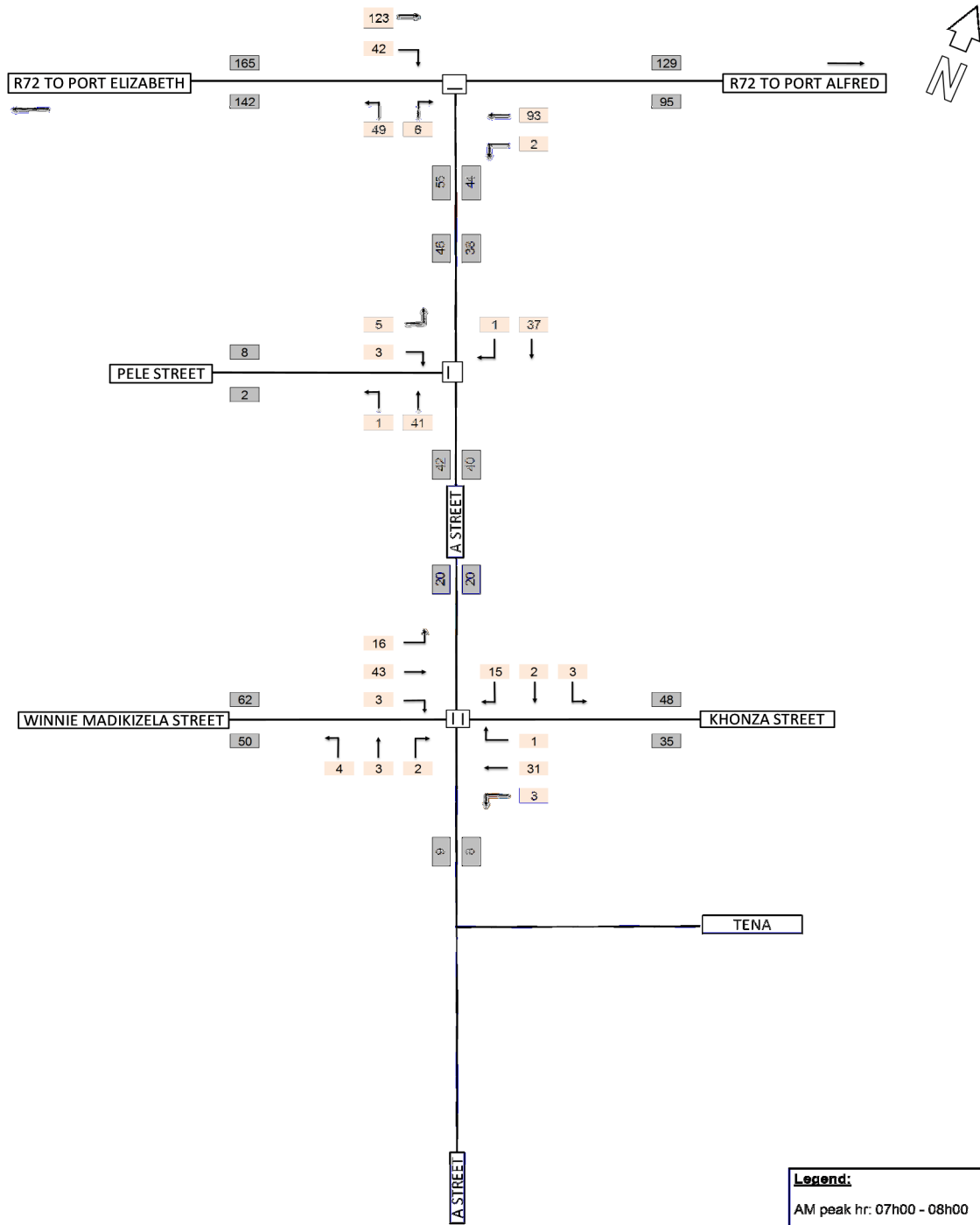
The Department of Transport's (DOT) *Manual for Traffic Impact Studies RR 93/635* (1995) recommends an assessment period of 5 years for developments generating between 150 and 2000 peak hour trips. The area surrounding the site is partially developed and traffic growth is not expected to increase significantly within the next 5 years.

Traffic counts carried out by Mr. Rodney Steinhofel for the Eastern Cape Department of Transport (ECDOT) were used to determine the anticipated traffic growth rate from 2015 to 2020, along with the existing traffic volumes observed on the existing road network. One count station (No. 2492) was identified with the relevant annual traffic counts within a close proximity to the site.



A comparison between the previous traffic counts done by the ECDOT for 2010 and 2013 was made to gain insight on the historical traffic growth. The findings of the comparison show an annual increase of 3% in the total traffic volumes along the R72. Given that no significant developments are planned for the near future in Alexandria, a growth rate of 3% per annum was applied to the 2015 traffic volumes to determine the 2020 background traffic volumes.


The 2020 AM and PM background traffic volumes are shown in **Figures 3.3** and **3.4**.

**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT  
2015 BACKGROUND TRAFFIC - WEEKDAY AM PEAK**

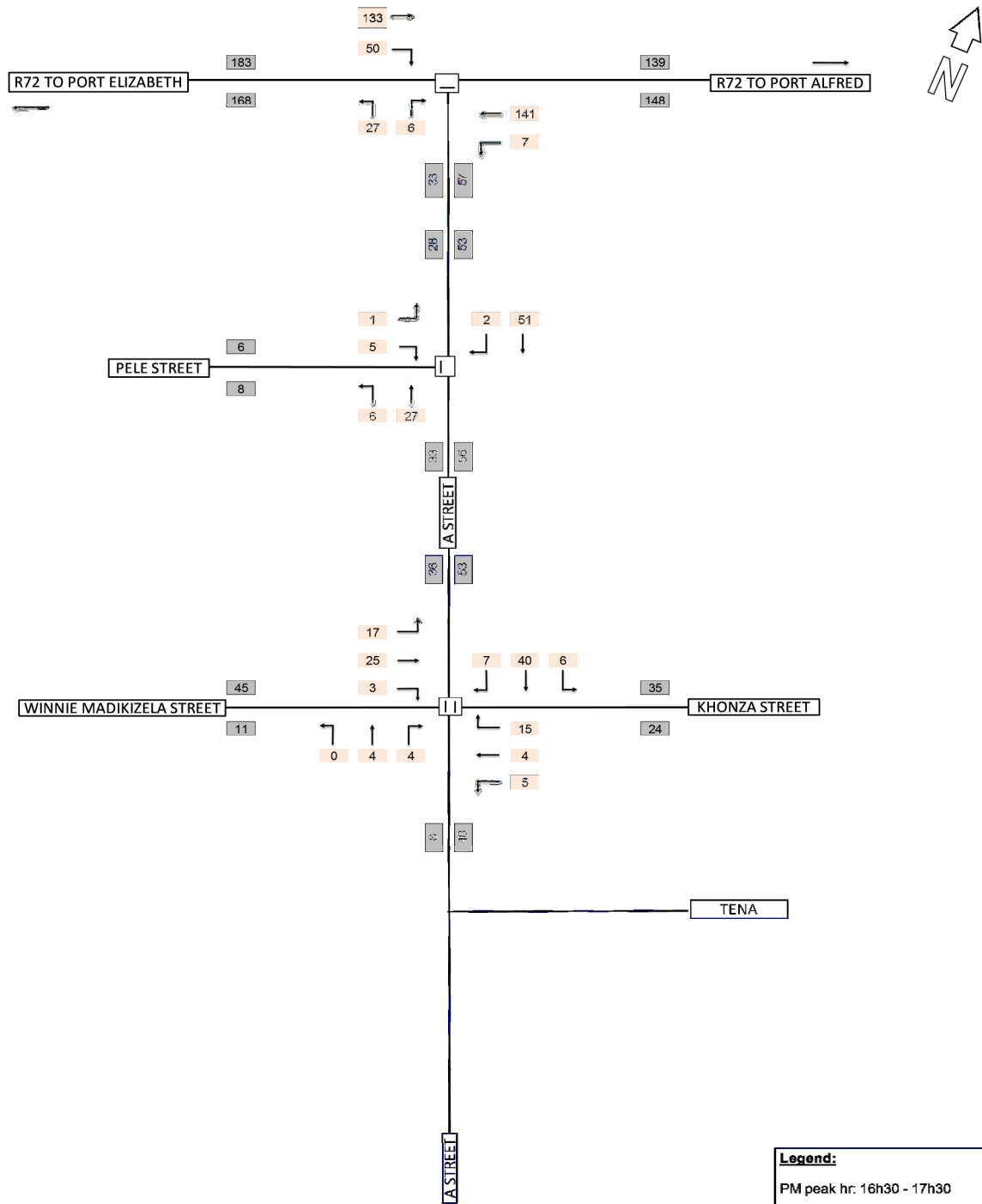


**Legend:**  
AM peak hr: 07h00 - 08h00



-  1 Way stop controlled intersection
-  2 Way stop controlled intersection

PROJECT <b>ALEXANDRIA COMMUNITY HEALTH CENTRE</b>							
DETAIL <b>2015 BACKGROUND TRAFFIC - WEEKDAY AM PEAK</b>							
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2015</b>	Project No. <b>J34202</b>	Drg No. <b>Fig. 3.1</b>	Rev. <b>-</b>


**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT  
2015 BACKGROUND TRAFFIC - WEEKDAY PM PEAK**



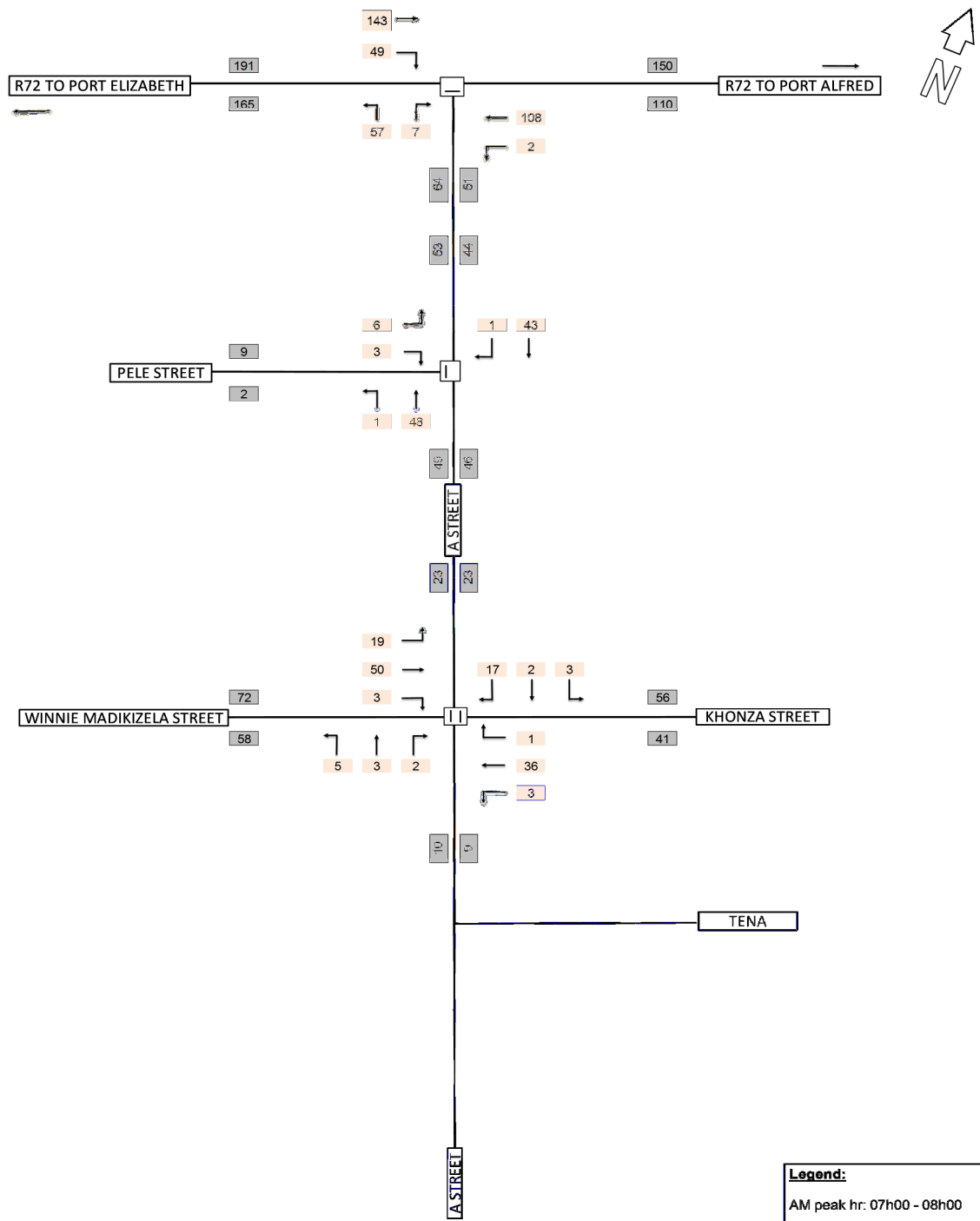
**Legend:**  
PM peak hr: 16h30 - 17h30

-  1 Way stop controlled intersection
-  2 Way stop controlled intersection



PROJECT <b>ALEXANDRIA COMMUNITY HEALTH CENTRE</b>				
DETAIL <b>2015 BACKGROUND TRAFFIC - WEEKDAY PM PEAK</b>				
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2015</b>


 <b>GIBB</b> <small>ENGINEERING &amp; ARCHITECTURE</small>	Project No. <b>J34202</b>	Drg No. <b>Fig. 3.2</b>	Rev. <b>-</b>
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**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT  
2020 BACKGROUND TRAFFIC - WEEKDAY AM PEAK**

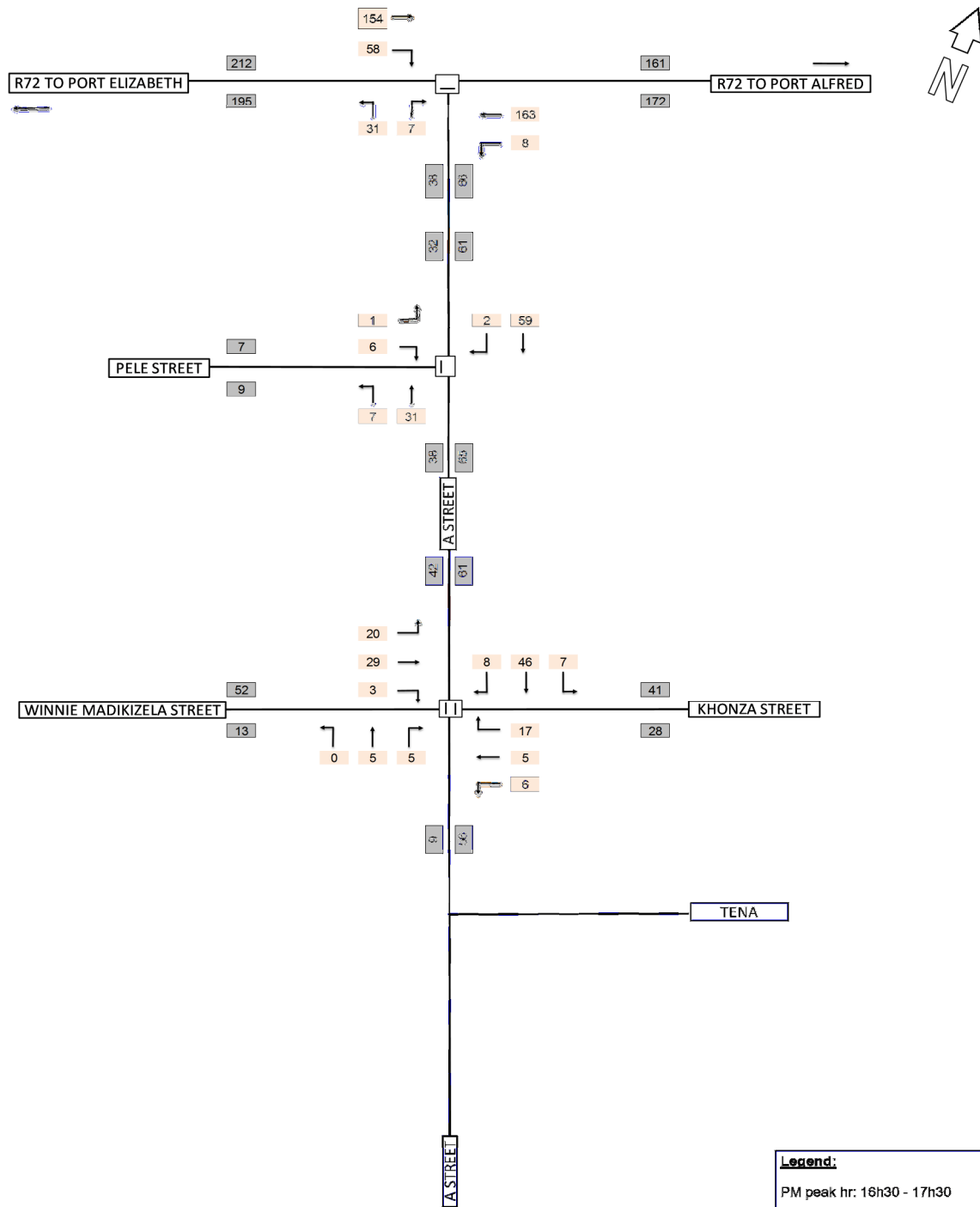


**Legend:**  
AM peak hr: 07h00 - 08h00

-  1 Way stop controlled intersection
-  2 Way stop controlled intersection

PROJECT <b>ALEXANDRIA COMMUNITY HEALTH CENTRE</b>							
DETAIL <b>2020 BACKGROUND TRAFFIC - WEEKDAY AM PEAK</b>							
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2015</b>	Project No. <b>J34202</b>	Drg No. <b>Fig. 3.3</b>	Rev. <b>-</b>

**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT  
2020 BACKGROUND TRAFFIC - WEEKDAY PM PEAK**



**Legend:**  
PM peak hr: 16h30 - 17h30

- 1 Way stop controlled intersection
- 2 Way stop controlled intersection

PROJECT <b>ALEXANDRIA COMMUNITY HEALTH CENTRE</b>				
DETAIL <b>2020 BACKGROUND TRAFFIC - WEEKDAY PM PEAK</b>				
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2016</b>

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ENGINEERING & ARCHITECTURE

Project No. <b>J34202</b>	Drg No. <b>Fig. 3.4</b>	Rev. <b>-</b>
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## 4 Access

The site is currently fenced off and is only accessible to pedestrians via A Street. In future, it is planned that pedestrians will continue to access the CHC via A Street, while vehicles will access the CHC via the existing A Street / Pele Street intersection, as shown in **Figure 4.1**.



**Figure 4.1 Proposed vehicle access to the CHC (A Street / Pele Street)**

### 4.1 Access Spacing

According to the *Department of Transport (DOT) Guidelines for the Geometric Design of Urban Arterial Roads* (UTG1, 1986), the minimum allowable access spacing along a road such as A Street is 100m.

The existing access spacing between the newly proposed vehicle access along A Street to the north and south is 100m and 148m, respectively, as shown in **Figure 4.2**. The available access spacing meets the minimum guideline requirement of 100m and is therefore considered to be acceptable.

### 4.2 Sight Distance Requirements

The *Department of Transport (DOT) Guidelines for the Geometric Design of Urban Arterial Roads* (UTG1, 1986), was used to determine the minimum required sight distances that must be provided at the proposed vehicle access. The minimum shoulder sight distance required for a stop-controlled intersection for a passenger car and a single unit truck (e.g. refuse truck) configuration along a road such as A Street is 120m, based on a 40km/h vehicle speed on A Street due to the presence of traffic calming measures (speed humps). The existing shoulder sight distance in the northerly and southerly direction is in excess of 120m and 150m, respectively. The available sight distances exceed the minimum requirements and are therefore considered to be acceptable.

It is recommended that a minimum shoulder sight distance of 80m be maintained at the new vehicle access during the construction stage of the CHC, by ensuring there are no objects (dirt bins, temporary road signs, etc.) present that can obstruct the sight distances of construction vehicles. The location of the proposed vehicle access to the CHC is shown in **Figure 4.2**.





Figure 4.2 Proposed vehicle access location

## 5 Trip Generation and Distribution

### 5.1 Trip Generation

The draft *South African Trip Data Manual* as published by the *Committee of Transport Official's* (COTO, 2010), was used to estimate the number of vehicle trips that would be generated by the proposed development. The COTO Manual was preferred over the *South African Trip Generation Rate Manual* (1995), as it made better provision for the characteristics of the study area.

The Department of Transport's guideline document *South African Trip Generation Rate Manual* (1995), which is normally used in Transport Impact Assessments to determine the peak hour vehicle trip generation of a development, does not contain a suitable vehicle trip generation rate for the designation and location of the proposed development surroundings, i.e. urban low income.

The use of the 'Medical Clinic' and 'Apartments and Flats' peak hour trip generation rates contained in the COTO Manual are considered appropriate for use in the trip generation calculations for the CHC. The number of vehicle trips estimated to be generated by the proposed development and the percentage directional split calculations for the AM and PM peak hours are shown in **Table 5.1**.

**Table 5.1: Estimated trips generated by the proposed development**

Land Use	Area (m <sup>2</sup> ) GLA / No. Units	Trip Rate (Trips/100m <sup>2</sup> )		Directional Split %				Total Vehicle Trips					
		AM Peak	PM Peak	AM Peak		PM Peak		AM Peak			PM Peak		
				In	Out	In	Out	In	Out	Trips	In	Out	Trips
Community Health Centre - Medical Clinic (COTO Manual Table 3.3, Ref. 630)	3840 m <sup>2</sup>	6	6	60%	40%	40%	60%	138	92	230	92	138	230
<i>LESS: 50% allowable reduction for low vehicle ownership (COTO Manual Table 3.2)</i>								69	46	115	46	69	115
Staff Accommodation - Apartments and Flats (COTO Manual Table 3.3, Ref 220)	7 Units	0.9	0.9	25%	75%	70%	30%	2	4	6	4	2	6
Total								71	50	121	50	71	121

The COTO Manual makes provision for trip generation adjustment factors (*South African Trip Data Manual, Table 3.2*) that are applicable to developments that have low vehicle ownership, such as the Kwanonkqubela area. Given that the proposed development will be located in a low income residential area, a 50% reduction can be applied to the number of peak hour trips generated by the development.

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The vehicle trips generated by the staff accommodation are considered to be internal trips and are unlikely to leave the development during the peak traffic hours, since staff members will in all likelihood walk to the CHC.

It is estimated that a total of 121 vehicle trips will be generated by the proposed development during the respective peak traffic hours.

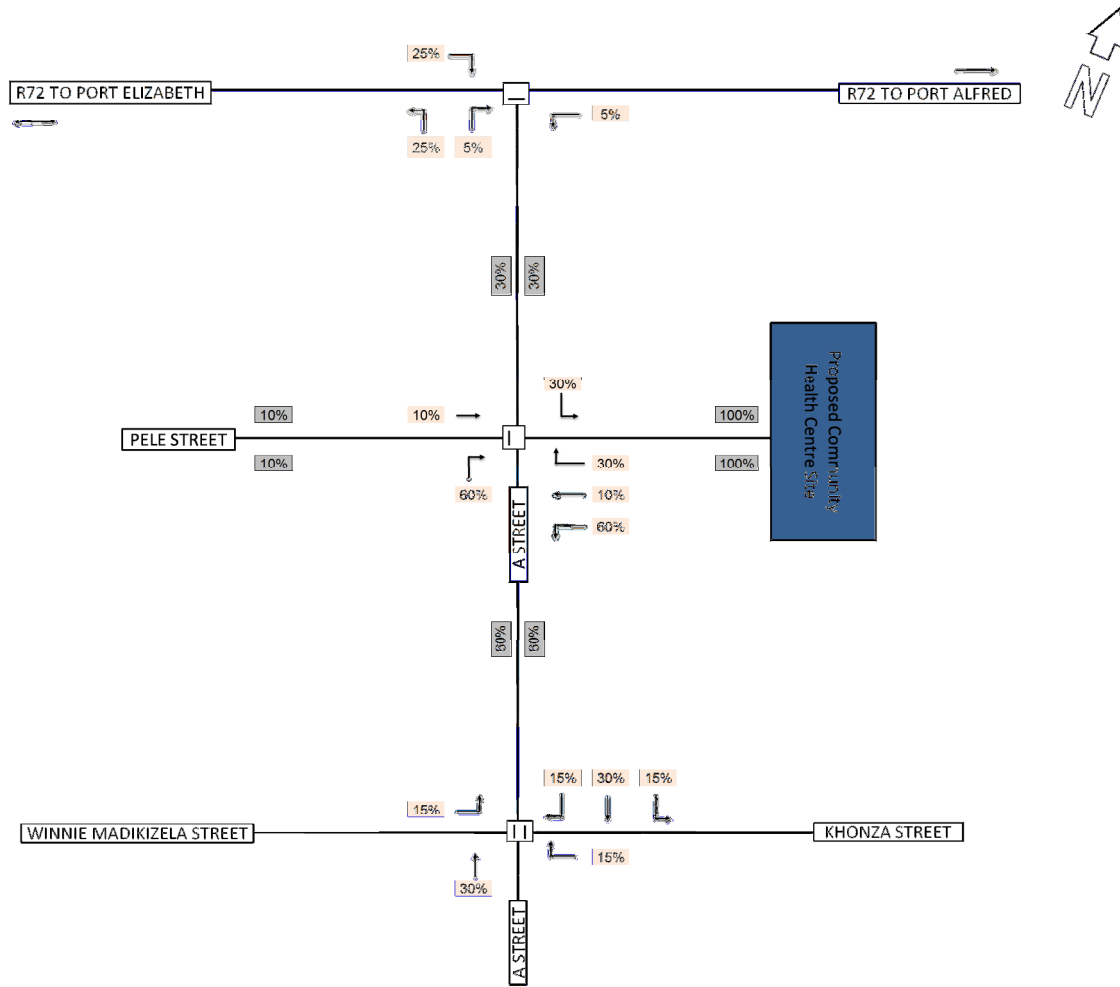
## 5.2 Trip Distribution

A directional split of 60:40 for the Medical Clinic component, and a 75:25 for the AM and a 30:70 for the PM of the Staff Accommodation component were applied to the CHC, as recommended by the draft *South African Trip Data Manual*. The majority of the new trips that will travel to the development is expected to originate within the Kwanonkqubela Area south of the development and in the Alexandria town. The new vehicle trips were therefore distributed proportionately along A Street and the R72, as shown in **Figure 5.1**.

The 2020 AM and PM peak hour total traffic scenarios, which incorporates the 2020 background traffic plus the 2020 vehicle trips generated by the proposed development are shown in **Figures 5.2** and **5.3** respectively.

**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT**

**2015 DEVELOPMENT TRAFFIC DISTRIBUTION - WEEKDAY AM AND PM PEAK**

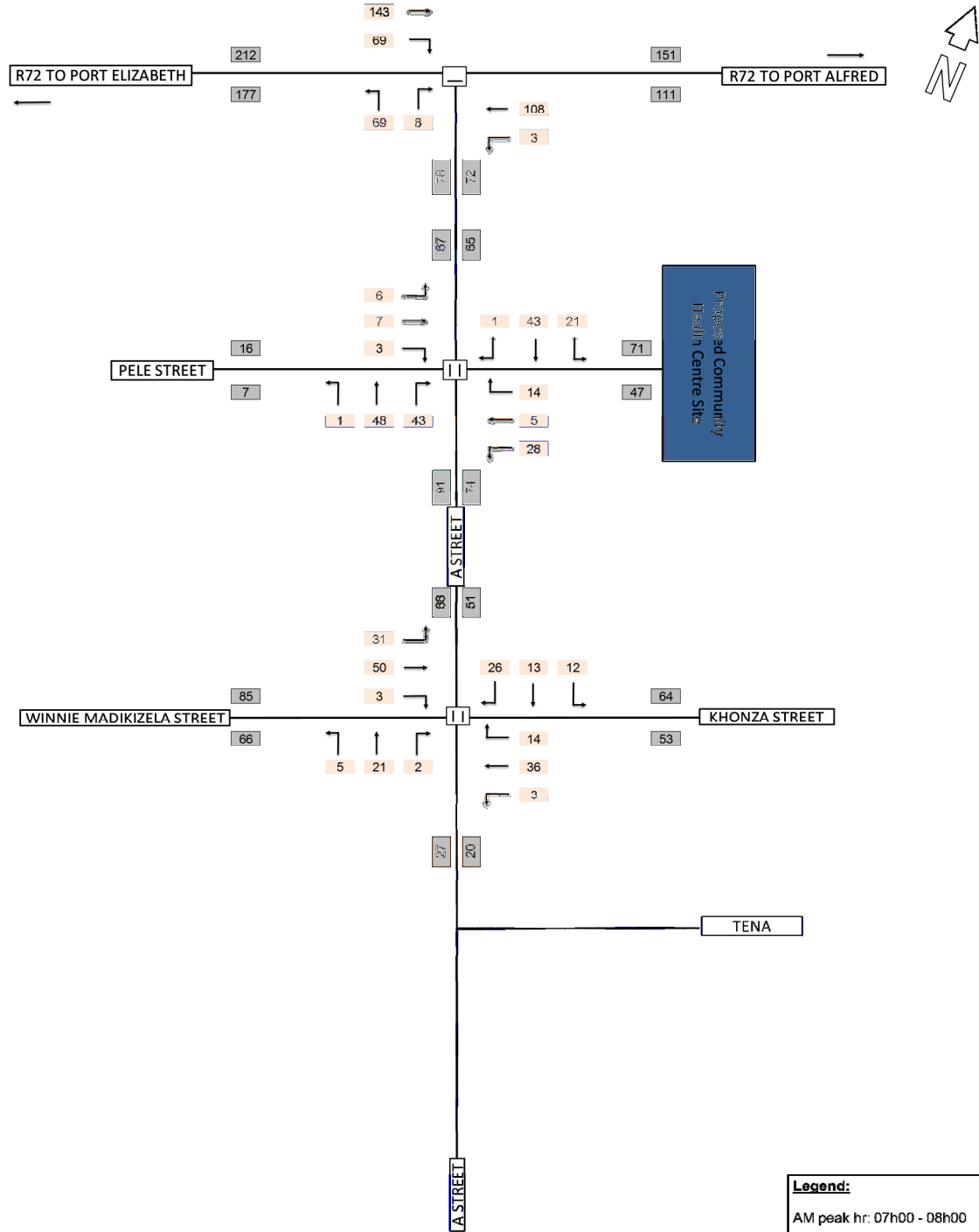


<b>Legend:</b>		
AM peak hr: 07h00 - 08h00 PM peak hr: 16h30 - 17h30		
	1 Way stop controlled intersection	
	2 Way stop controlled intersection	



PROJECT							
ALEXANDRIA COMMUNITY HEALTH CENTRE							
DETAIL							Project No. <b>J34202</b> Drg No. <b>Fig. 5.1</b> Rev. <b>-</b>
2015 DEVELOPMENT TRAFFIC DISTRIBUTION- WEEKDAY AM AND PM PEAK							
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2015</b>			

**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT**


**2020 TOTAL DEVELOPMENT TRAFFIC - WEEKDAY AM PEAK**



**Legend:**  
AM peak hr: 07h00 - 08h00

-  1 Way stop controlled intersection
-  2 Way stop controlled intersection

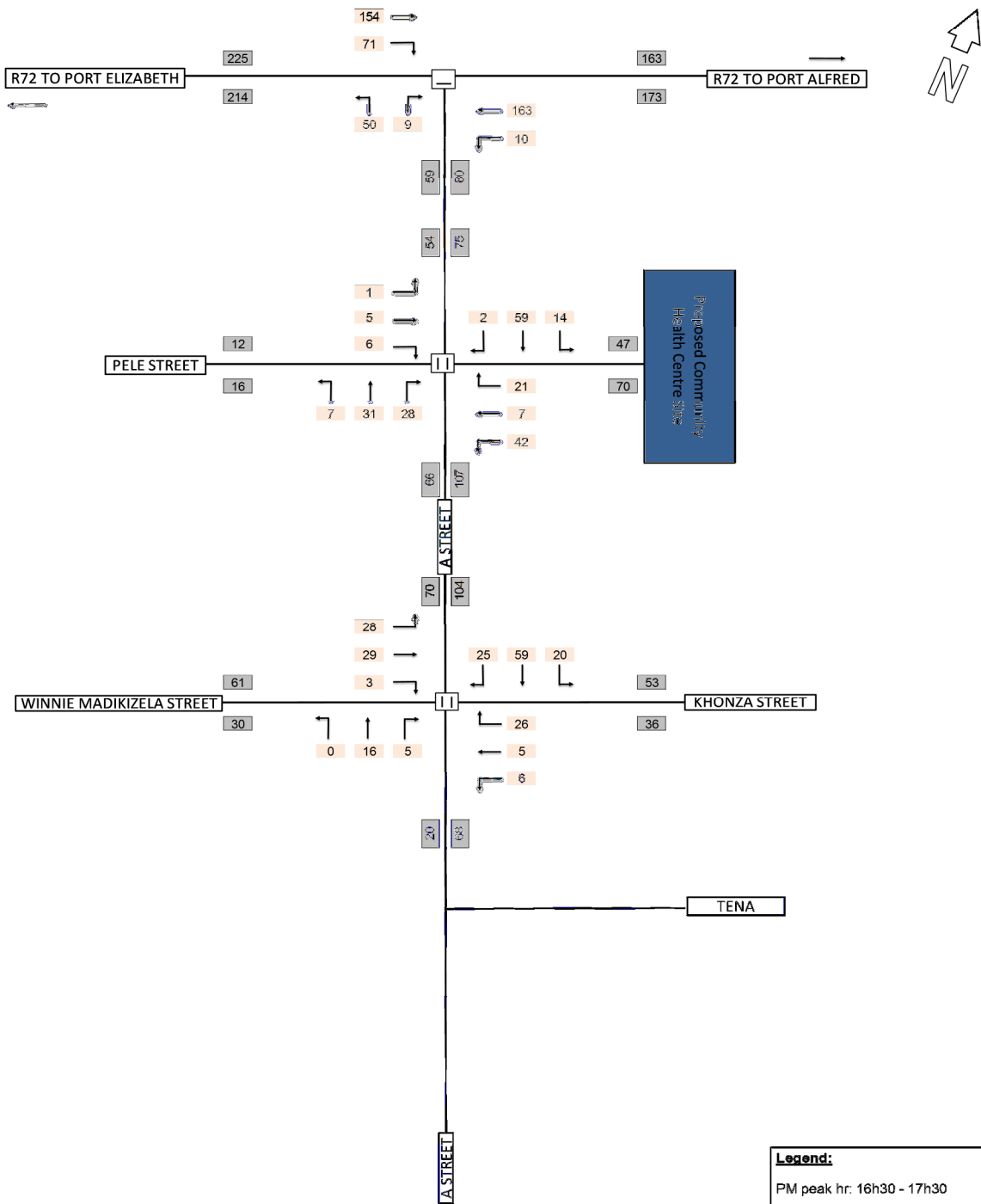
PROJECT <b>ALEXANDRIA COMMUNITY HEALTH CENTRE</b>				
DETAIL <b>2020 TOTAL DEVELOPMENT TRAFFIC - WEEKDAY AM PEAK</b>				
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2015</b>






Project No. **J34202**    Drg No. **Fig. 5.2**    Rev. **-**

**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT**

**2020 TOTAL DEVELOPMENT TRAFFIC - WEEKDAY PM PEAK**



**Legend:**  
 PM peak hr: 16h30 - 17h30  
 1 Way stop controlled intersection  
 2 Way stop controlled intersection

PROJECT <b>ALEXANDRIA COMMUNITY HEALTH CENTRE</b>							
DETAIL <b>2020 TOTAL DEVELOPMENT TRAFFIC - WEEKDAY PM PEAK</b>							
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2015</b>	Project No. <b>J34202</b>	Drg No. <b>Fig. 5.3</b>	Rev. <b>-</b>

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## 6 *Intersection Capacity Analysis*

The SIDRA INTERSECTION 6.0 software package was used to analyse the following intersections for the AM and PM peak hours:

- R72 / A Street
- A Street / Pele Street
- A Street / Khonza Street

The following scenarios were analysed:

- 2015 Background Traffic
- 2020 Total Traffic

The Level of Service (LOS) is a measure that is used to assess the operation of existing transportation infrastructure, as well as the effectiveness of proposed infrastructure improvements. LOS is categorised by the letters A to F (with A being the best and F being the worst) based on the average control delay experienced by vehicles on the section of roadway under investigation. The following is a description of the LOS represented by each letter from A to F:

A = Free Flow

B = Reasonable Free Flow

C = Stable Flow

D = Approaching Stable Flow

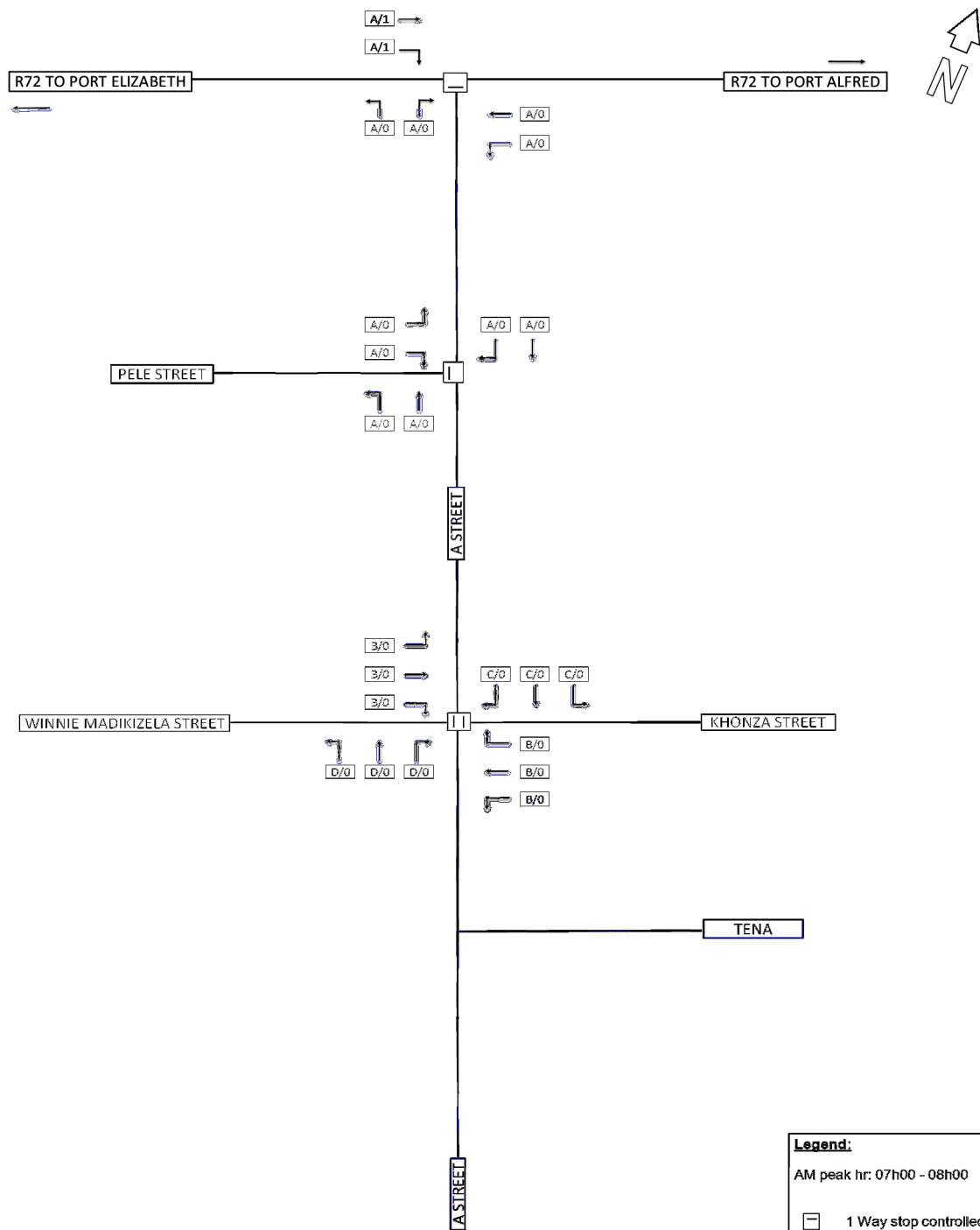
E = Unstable Flow

F = Forced or Breakdown Flow

The LOS and 95<sup>th</sup> percentile vehicle queues (measured in number of vehicles) are shown in **Figure 6.1** to **6.4** and are discussed hereafter. The SIDRA data output sheets have not been included in this TIA, but can be made available on request.

**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT**

**2015 BACKGROUND TRAFFIC - WEEKDAY AM PEAK - LEVEL OF SERVICE (LOS)**



PROJECT  
**ALEXANDRIA COMMUNITY HEALTH CENTRE**

DETAIL  
**2015 BACKGROUND TRAFFIC - WEEKDAY AM PEAK - LEVEL OF SERVICE (LOS)**

Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2015</b>
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**Legend:**  
AM peak hr: 07h00 - 08h00

- ☐ 1 Way stop controlled intersection
- ☐ 2 Way stop controlled intersection
- A/1 LOS/ Vehicle queue

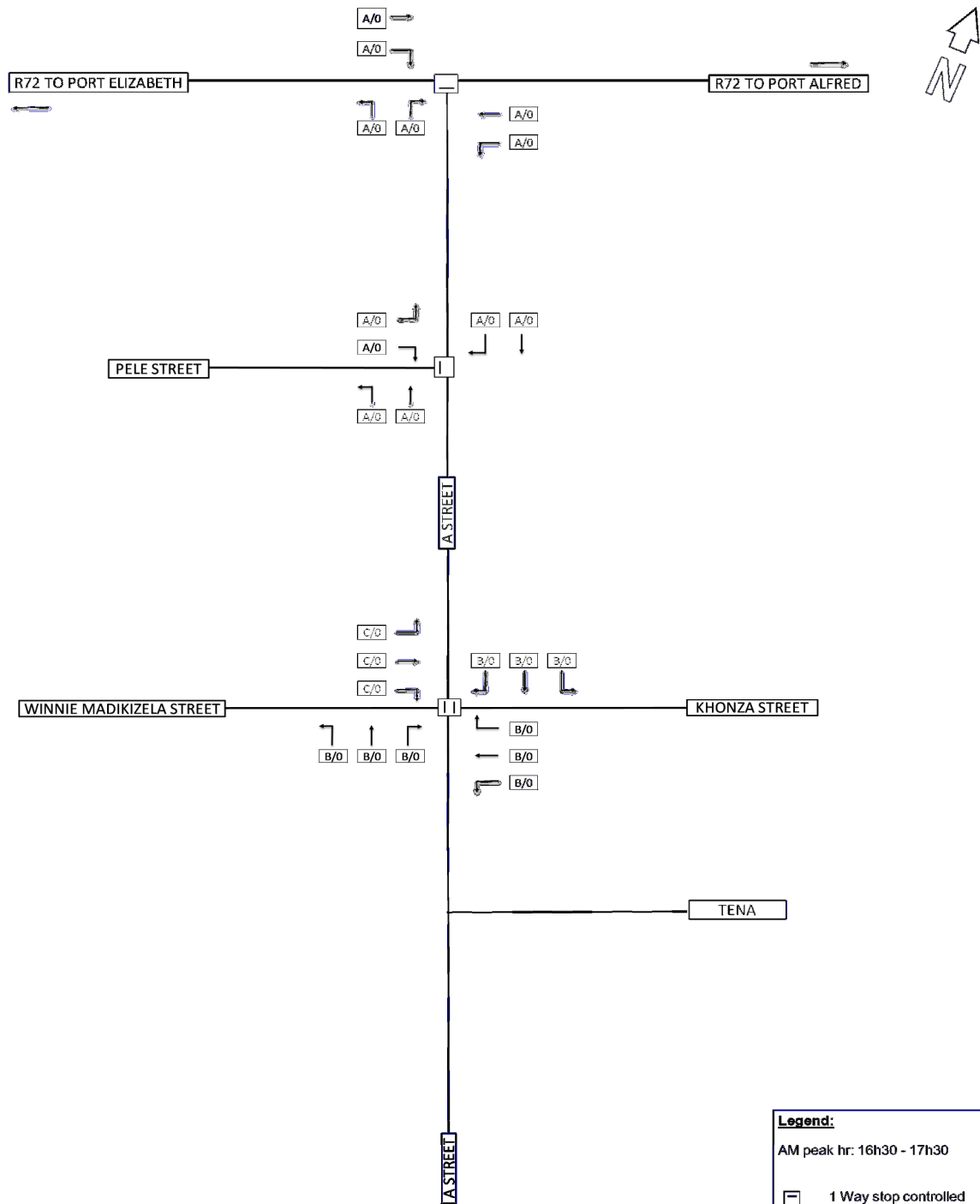


Project No. <b>J34202</b>	Drp No. <b>Fig. 6.1</b>	Rev. <b>-</b>
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**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT**

**2015 BACKGROUND TRAFFIC - WEEKDAY PM PEAK - LEVEL OF SERVICE (LOS)**



**Legend:**  
AM peak hr: 16h30 - 17h30

- 1 Way stop controlled intersection
- 2 Way stop controlled intersection
- LOS/ Vehicle queue

PROJECT  
**ALEXANDRIA COMMUNITY HEALTH CENTRE**

DETAIL  
**2015 BACKGROUND TRAFFIC - WEEKDAY PM PEAK - LEVEL OF SERVICE (LOS)**

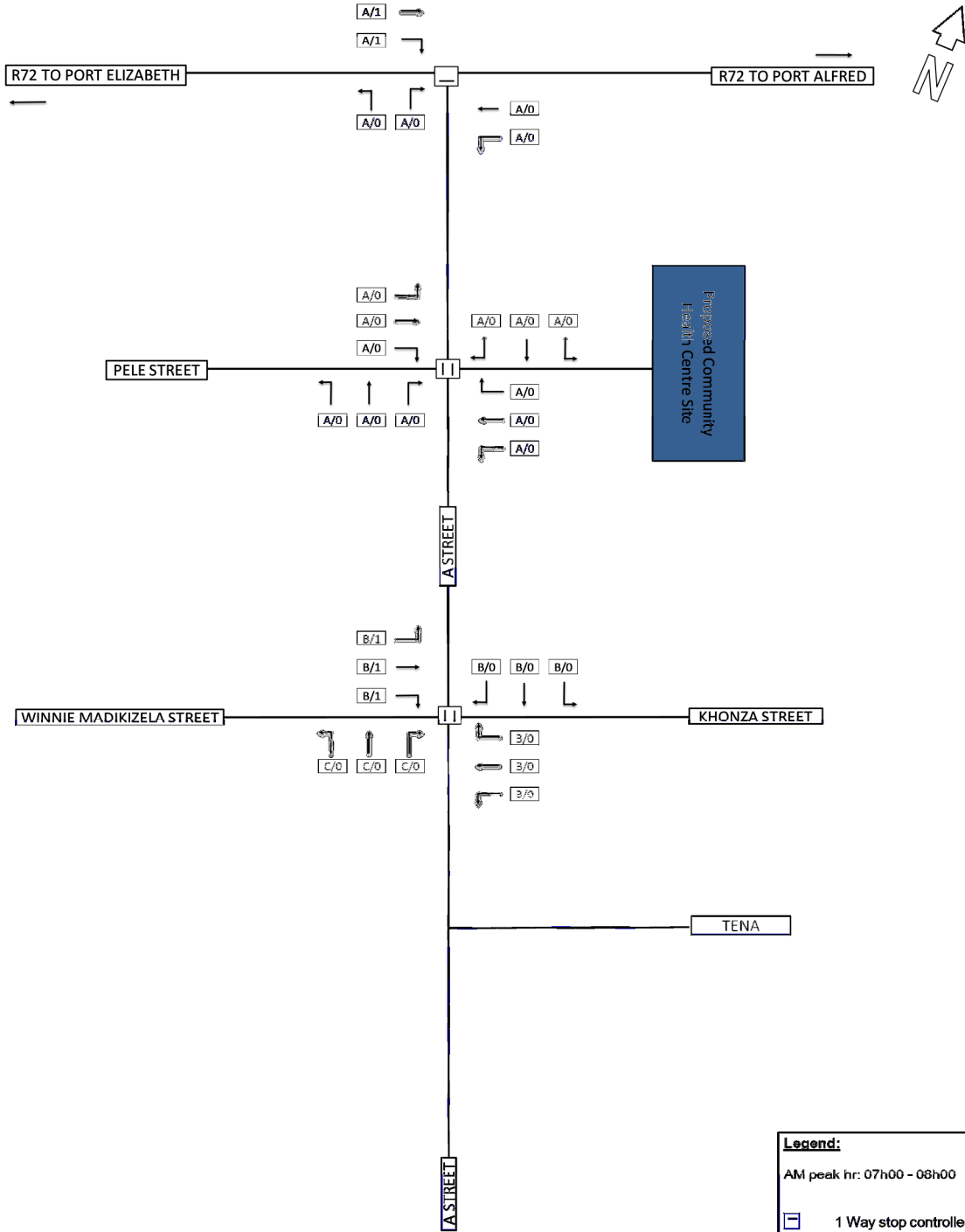


Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2016</b>
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Project No. <b>J34202</b>	Drg No. <b>Fig. 6.2</b>	Rev. <b>-</b>
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**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT**

**2020 TOTAL TRAFFIC - WEEKDAY AM PEAK - LEVEL OF SERVICE (LOS)**



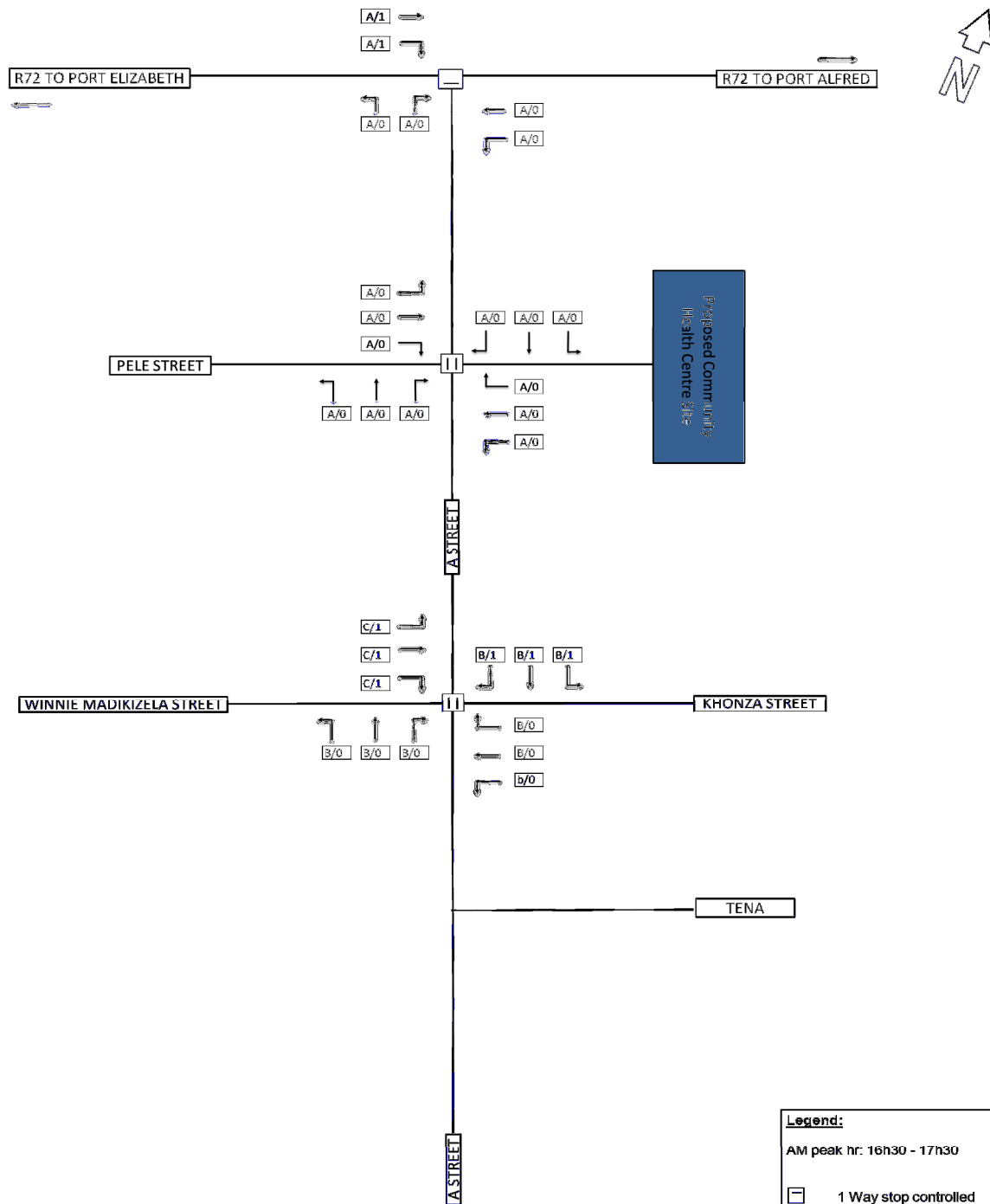
<b>Legend:</b>	
AM peak hr: 07h00 - 08h00	
	1 Way stop controlled intersection
	2 Way stop controlled intersection
	A/1 LOS/ Vehicle queue

PROJECT				
<b>ALEXANDRIA COMMUNITY HEALTH CENTRE</b>				
DETAIL				
<b>2020 TOTAL TRAFFIC - WEEKDAY AM PEAK - LEVEL OF SERVICE (LOS)</b>				
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2015</b>

	<b>GIBB</b> ENGINEERING & ARCHITECTURE	
		Project No. <b>J34202</b>

**ALEXANDRIA COMMUNITY HEALTH CENTRE  
TRANSPORT IMPACT ASSESSMENT**

**2020 TOTAL TRAFFIC - WEEKDAY PM PEAK - LEVEL OF SERVICE (LOS)**



**Legend:**  
 AM peak hr: 16h30 - 17h30

- 1 Way stop controlled intersection
- 2 Way stop controlled intersection
- A/1 LOS/ Vehicle queue

PROJECT <b>ALEXANDRIA COMMUNITY HEALTH CENTRE</b>							
DETAIL <b>2020 TOTAL TRAFFIC - WEEKDAY PM PEAK - LEVEL OF SERVICE (LOS)</b>							
Prepared By <b>R. Ramphabana</b>	Checked By <b>A. Siwa</b>	Reviewed By <b>H. Badenhorst</b>	Scale <b>N.T.S</b>	Date <b>March 2016</b>	Project No. <b>J34202</b>	Drg No. <b>Fig. 6.4</b>	Rev. <b>-</b>

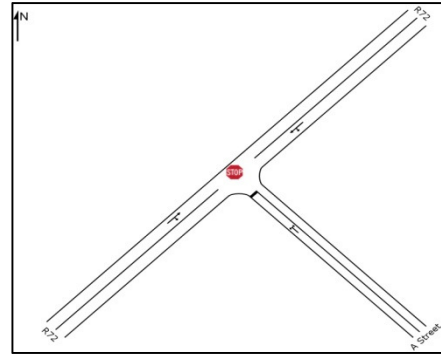
## 6.1 R72 / A Street Intersection

### 6.1.1 Existing Geometry

The existing geometry of the R72/ A Street (stop control) intersection is shown in **Figures 6.5** and **6.6**.



**Figures 6.5: Aerial view of intersection**



**Figures 6.6: Intersection geometry**

### 6.1.2 2015 Background Traffic

The intersection currently operates well during both the AM and PM peak hours at an overall intersection LOS A. The 95th percentile vehicle queues range from 0 to 1 vehicles.

### 6.1.3 2020 Total Traffic

The intersection will continue to operate at a LOS A during the AM and PM peak periods. The 95th percentile vehicle queues will continue to range from 0 to 1 vehicle, which is acceptable.

Due to the anticipated increase in the number of right turning vehicles into A Street from the R72, it is recommended that a minimum 3m wide right-turn lane be introduced at this intersection. The provision of a right-turn lane will provide increased safety for stationary vehicles waiting to turn right, thus reducing the risk of rear-end crashes taking place in this location. The R72 would have to be widened by approximately 3m on the northern side over a 50m distance in order to accommodate the right-turn lane with an opposing painted traffic island.

The provision of a separate right-turn lane will increase the safety of the existing and future eastbound traffic at this intersection, and is therefore considered to be an important upgrade feature. Given the far-reaching benefits of this upgrade, consideration should be given to the sharing of the upgrade cost between the developer of the CHC and the authority responsible for this section of the R72 (i.e. SANRAL).

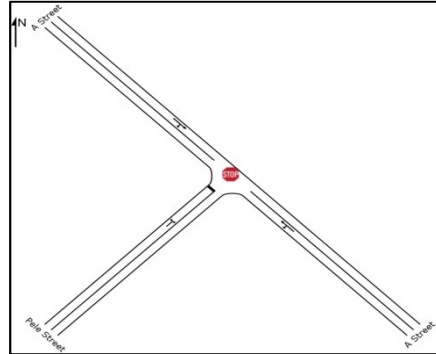
## 6.2 A Street / Pele Street Intersection

### 6.2.1 Existing Geometry

The existing geometry of the A Street / Pele Street (stop control) intersection is shown in **Figures 6.7** and **6.8**.



**Figures 6.7:** Aerial view of intersection



**Figures 6.8:** Intersection geometry

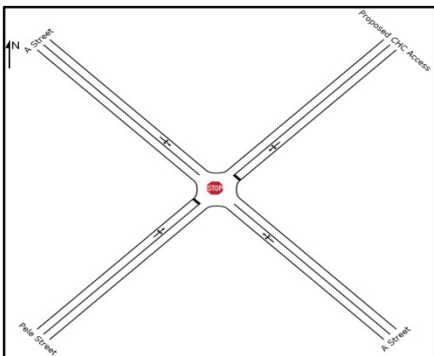
### 6.2.2 2015 Background Traffic

The intersection currently operates well during both the AM and PM peak hours at an overall intersection LOS A. There are no 95<sup>th</sup> percentile vehicle queues present.

### 6.2.3 2020 Total Traffic with proposed access

The intersection will continue to operate at a LOS A during the AM and PM peak periods. No 95<sup>th</sup> percentile vehicle queues are anticipated.

No additional geometric upgrades are required at this intersection, other than the proposed access to the CHC, which should also be Stop controlled.



**Figures 6.9:** Intersection geometry with proposed CHC access

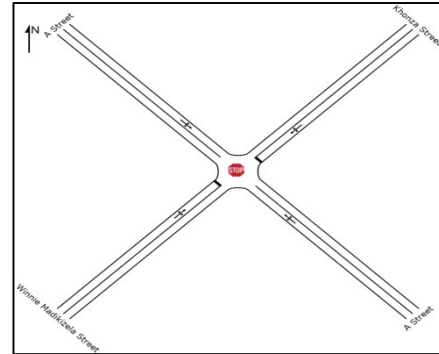
## 6.3 A Street / Khonza Street Intersection

### 6.3.1 Existing Geometry

The existing geometry of the A Street / Khonza Street (stop control) intersection is shown in **Figures 6.10** and **6.11**.



**Figures 6.10: Aerial view of intersection**



**Figures 6.11: Intersection geometry**

### 6.3.2 2015 Background Traffic

The intersection currently operates well during both the AM and PM peak hours at an overall intersection LOS D. There are no 95th percentile vehicle queues present.

### 6.3.3 2020 Total Traffic

The intersection will operate well during the AM and PM peak periods at LOS C, respectively. The 95<sup>th</sup> percentile vehicle queues will range from 0 to 1 vehicle, which is acceptable.

No additional geometric upgrades are required at this intersection.

## 7 Parking Requirements

The *Department of Transport's South African Parking Standards Manual* (Second Edition, 1985) was used to determine the number of parking bays required for the proposed development. The "most common" parking provision rates for 'Consulting Rooms' and 'Dwelling Unit: One Bedroom' land uses have been applied to the development, due to the low vehicle ownership and the use of public transport within the study area. The parking requirements for the development are summarised in **Table 7.1**.

**Table 7.1: Parking requirements for proposed development**

Component	Parking Provision Rate	Area (m <sup>2</sup> ) / No. Units	Parking Bays Required
Community Health Centre	1.7/ 100m <sup>2</sup>	3840m <sup>2</sup>	65
Staff Accommodation	1/unit	7 units	7
<b>Total</b>			<b>72</b>

The total number of parking bays required for the proposed CHC is 72 parking bays. According to the SDP (**Figure 1.2**) a total of 84 parking bays will be provided, resulting in a surplus of 12 parking bays. **Table 7.2** shows a breakdown of the proposed parking at the development.

**Table 7.2: Parking provision at proposed development**

Component	Parking Bays Provided
Community Health Centre	76
Staff Accommodation	8
<b>Total</b>	<b>84</b>

The internal circulation of the proposed parking area has been inspected and is considered to be functional. It is important that the parking aisle layouts be such that it allows motorists to turn around their vehicle at the end of an aisle, should no parking be available. Sufficient space should therefore be available to carry out a U-turn manoeuvre if a parking aisle is not open ended.

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## 8 Public Transport and Non-Motorised Transport

### 8.1 Public Transport

Public transport (PT) services (i.e. minibus taxis and buses) currently operate along the R72 and A Street. The PT services that operate along the R72 are predominantly long distance services, whilst the PT services along A Street are predominantly local services. Numerous informal PT stops are present along the R72 and A Street. Only one formal PT stop is present along A Street, on the northern side of the A Street / Khonza Street intersection, which is indicated by the presence of a pre-cast concrete bus shelter, as shown in **Figure 8.1**.



**Figure 8.1: Public transport stop with shelter near the A Street/Khonza Street intersection**

The verges of the R72 and A Street are currently used as informal pick-up / drop-off points by local PT services, predominantly during the AM and PM peak periods. The informal PT stops lack basic facilities such as shelters, loading platforms and street lighting, along with facilities for pedestrians to cross the adjacent roads.

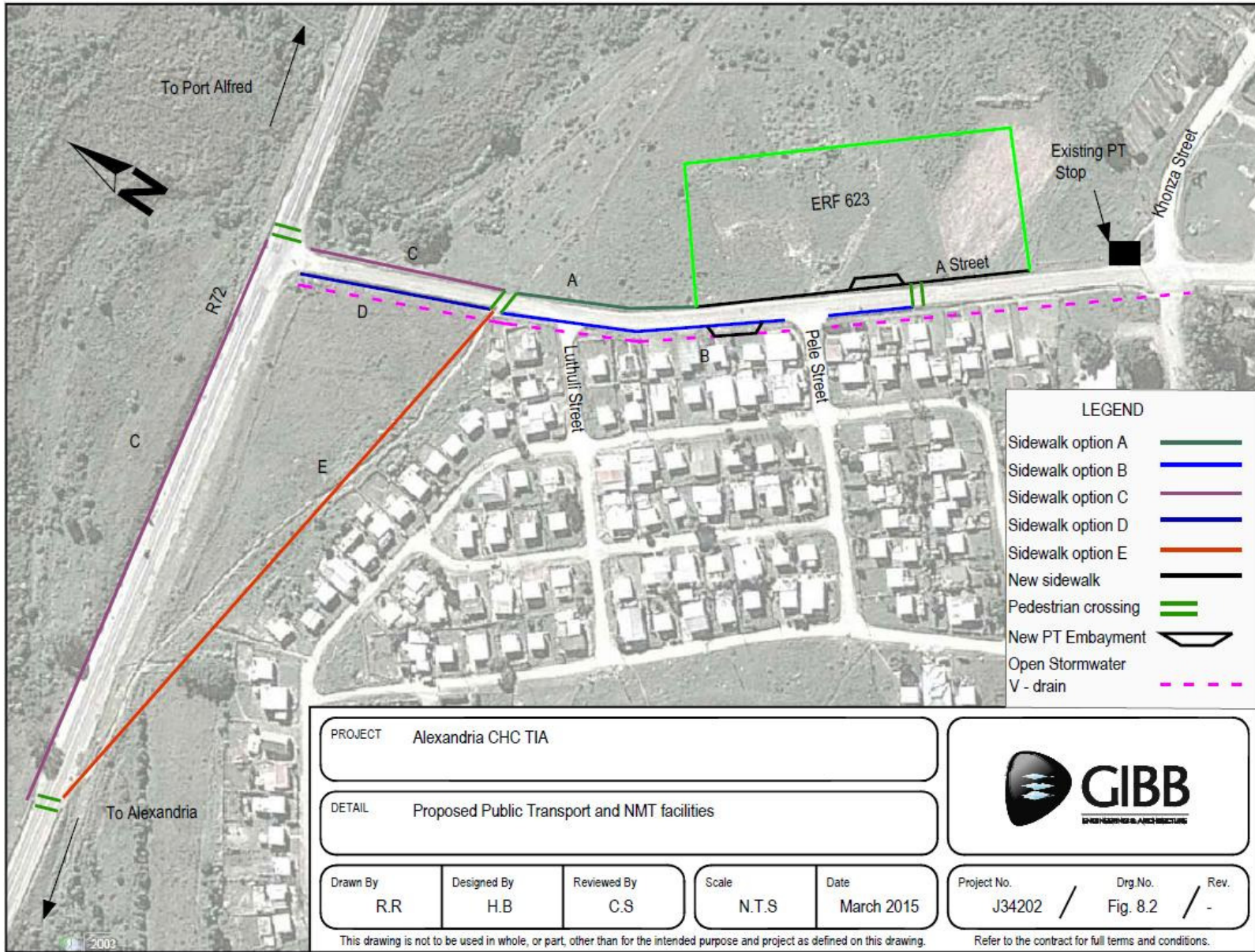
Speed humps are present along A Street and rumble strips are present on the R72 (on the approaches to the A Street intersection), which assist to control vehicle speeds and improve the safety of road users in the immediate area. Within the study area, the posted speed limit along the R72 is 60km/h and a 60km/h speed limit applies to A Street.

It is anticipated that the majority of visitors to the CHC will come from the adjacent low income residential areas (southeast of Alexandria town), as well as from the low income residential area located on the north eastern side of Alexandria town. The majority of these visitors are expected to travel to the CHC on foot or by public transport.

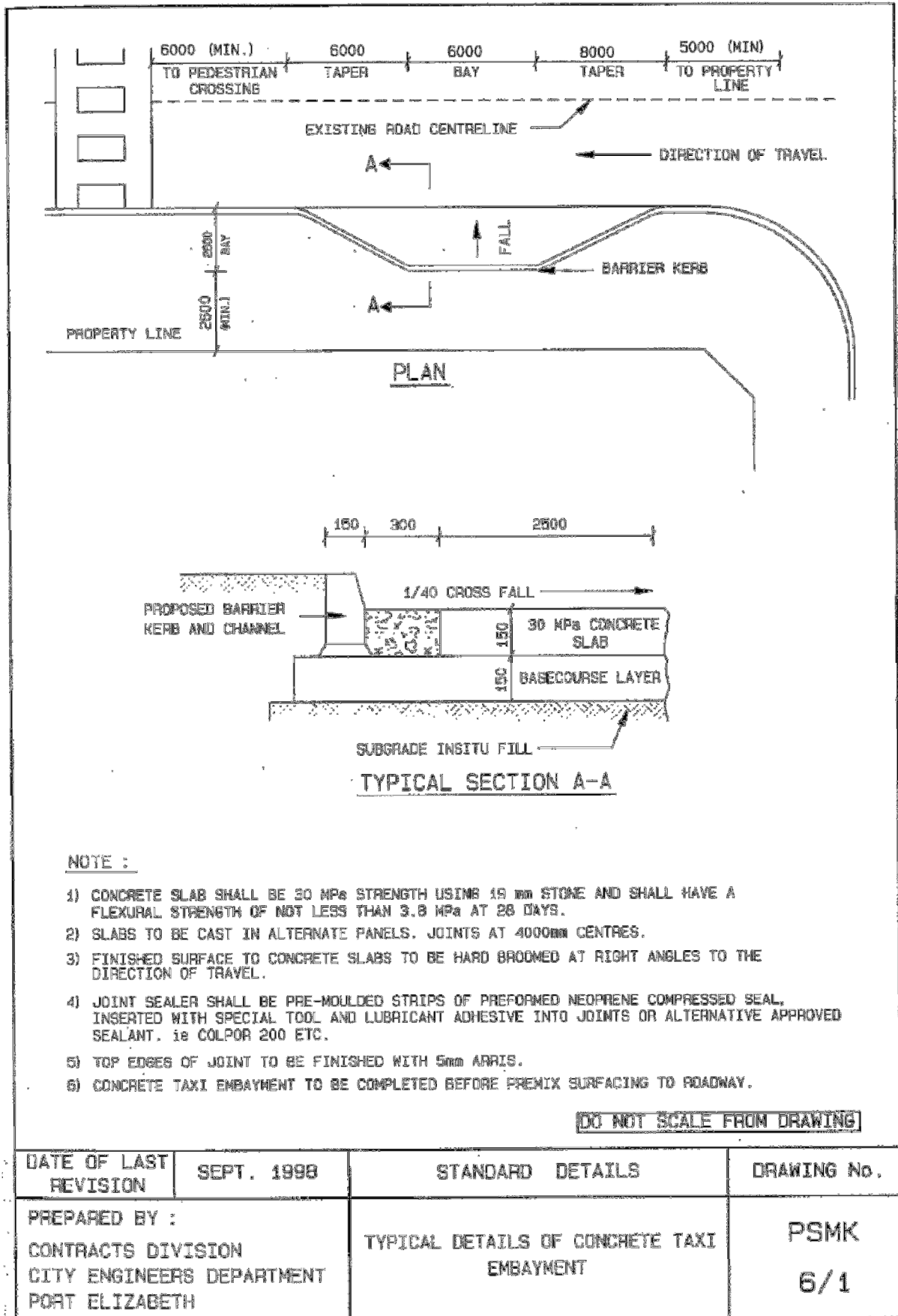
It is therefore proposed that two formal PT stops, inclusive of embayments (for one minibus taxi), loading platforms, shelters and street lighting, and a pedestrian crossing be introduced in A Street at the Pele Street intersection adjacent to the main access of the CHC, as shown in **Figure 8.2**. The typical detail of a concrete taxi embayment is shown in **Figure 8.3**.

The locations of the proposed public transport facilities (PT stops and pedestrian crossing) are shown in **Figure 8.2**.





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**Figure 8.3: Standard Detail of a Minibus Taxi Embayment**

(Source: City Engineer's Department, 2000)

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## 8.2 Non-Motorised Transport

Site observations revealed that a moderate number of pedestrians make use of A Street when travelling between Kwanonkqubela and Alexandria.

No surfaced sidewalks are present along the R72 or A Street to accommodate pedestrian movements. Pedestrians currently make use of the gravel road verges to walk on, although the presence and positioning of stormwater drains (open V-drains) along A Street limits the use of the road verges by pedestrians in some places.

It is recommended that a 1.5m wide surfaced sidewalk be provided on the eastern side of A Street, spanning the length of the western border (frontage) of the site, as shown in **Figure 8.2**.

Based on the pedestrian movements observed on site, a number of sidewalk options have been identified, along with the advantages and disadvantages of each option, as can be seen in **Figure 8.2** and described below:

**Option A** : Sidewalk along the eastern side of A Street, from Erf 623 to pedestrian crossing north of Luthuli Street.

*Advantages:*

- Sufficient space available for the construction of a 1.5m wide sidewalk.
- Pedestrians observed on site using gravel road verge.

*Disadvantage:*

- Sidewalk would not be situated on the side of the road where residential properties are located (western side).

**Option B** : Sidewalk along western side of A Street, from pedestrian crossing south of Pele Street to pedestrian crossing north of Luthuli Street.

*Advantages:*

- Pedestrians observed on site using road verge.
- Sidewalk would be situated on the side of the road where the residential properties are located (western side).

*Disadvantages:*

- Space constraints for the construction of a 1.5m wide sidewalk and PT embayment.
- The verge width on the western side of A Street is very limited (+- 1.5m), assuming that the adjacent property fence lines (property boundaries) are in the correct positions.
- An open stormwater V-drain runs along this side of the road.

**Option C** : Sidewalk along eastern side of A Street from pedestrian crossing north of Luthuli Street across new pedestrian crossing on R72, to pedestrian crossing outside of Alexandria town on the northern side of the R72.

*Advantages:*

- Sufficient space available for the construction of a 1.5m wide sidewalk.
- Pedestrians only required to make one road crossing (R72) when walking to/from the CHC and Alexandria town.
- Pedestrians observed on site using the road verge.

- Sidewalk would serve informal PT stops located at the R72 / A Street intersection.

*Disadvantages:*

- Not on the pedestrian desire line (shortest route) between A Street and Alexandria town.
- If Option C is selected as opposed to Option E, access to the piece of land on which Option E is located would have to be restricted (by means of fencing for example) to prevent the continued use of this informal route to Alexandria town.

**Option D :** Sidewalk along western side of A Street, from pedestrian crossing north of Luthuli Street to R72.

*Advantages:*

- Would provide continuation of sidewalk Option B along A Street to the R72.
- Sidewalk would serve informal PT stops located at the R72 / A Street intersection.

*Disadvantage:*

- Space constraints for the construction of a 1.5m wide sidewalk due to the presence of an open V-drain along the western side A Street.

**Option E :** Surfaced walkway (minimum 2m wide) across open piece of land from pedestrian crossing north of Luthuli Street (A Street) to pedestrian crossing outside of Alexandria town.

*Advantages:*

- Walkway will follow the existing pedestrian desire line between A Street and Alexandria town.
- Pedestrians separated from vehicular traffic, thus increased safety provided.
- Formalised pedestrian crossing to be provided on the R72 in the position where pedestrians currently cross the R72.

*Disadvantages:*

- Lighting to be provided along walkway to improve security at night.
- The land on which the walkway is proposed is owned by the NLM. The NLM would thus have to give permission for the walkway to be built on municipal land.
- The presence of a walkway on this piece of land may reduce the development potential of the land.

### 8.2.1 Recommendations

Following the consideration of available options, the following recommendations are made from three points of view:

#### **Traffic Engineering Viewpoint**

- The combination of option B and E is recommended. This route would follow the existing pedestrian desire lines and therefore meet the needs of pedestrians. A new pedestrian crossing would be required on A Street at the new CHC, and on the R72 near Alexandria town.

#### **Construction Viewpoint**

- The combination of option A and C is recommended. This route avoids the spatial constraints on the western side of A Street due to the presence of the open V-drain in

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the narrow road verge. A new pedestrian crossing would be required on the R72 at the A Street intersection.

**Overall Practical Viewpoint**

- The combination of option A and E is recommended. This route avoids the spatial constraints on the western side of A Street and follows the existing pedestrian desire line between A Street and Alexandria town along the shortest route. A new pedestrian crossing would be required in A Street, north of Luthuli Street, and on the R72 near Alexandria town.



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## 9 Conclusions

The following are therefore concluded:

- The proposed development will consist of a Community Health Centre located on Erf 632, in the town of Alexandria in the Eastern Cape.
- One access point is proposed for the development linking to the existing road network (A Street).
- The 2015 weekday AM and PM peak hours were identified as being **07:00 to 08:00** and **16:30 to 17:30**, respectively.
- A nominal traffic growth rate of 3% per annum has been applied to the existing (2015) traffic volumes in order to estimate the 2020 future traffic scenario.

### Access Spacing and Sight Distances

- Access to the development will be from the existing A Street / Pele Street intersection.
- The proposed access spacings satisfy the minimum spacing requirements for Class 4b urban collector road, such as A Street.
- The available shoulder sight distances at the access intersection satisfy the minimum sight distance requirements for a passenger car and single unit truck configuration.

### Trip Generation and Distribution

- The total number of AM and PM peak hour vehicle trips estimated to be generated by the proposed development is **121** vehicles. These new vehicles trips are expected to originate from the Alexandria town and within the Kwanonkubela settlement area.
- A 50% reduction factor has been applied to the number of vehicle trips generated by the CHC to cater for low vehicle ownership in this predominantly low income area.

### 2015 Background Traffic

- The existing intersections currently operate acceptably during the AM and PM peak hours.

### 2020 Future Traffic

- The R72 / A Street intersection will continue to operate acceptably during the AM and PM peak hours, but geometric upgrades are recommended for safety reasons.
- The A Street / Khanzo Street intersection will continue to operate acceptably during the AM and PM peak hours, and no geometric upgrades are required.
- The A Street / Pele Street / Access to CHC intersection is expected to operate acceptably during the AM and PM peak hours, and no additional upgrades other than the new access layout are required.

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### **Parking Requirements**

- The Site Development Plan (SDP) indicates that 84 parking bays will be provided, which is more than the 72 parking bays required for the development as a minimum.

### **Public Transport and Non-Motorised Transport**

- Informal public transport stops are present along the R72 and A Street and only one public transport stop has a shelter for waiting passengers.
- Traffic calming measures (rumble strips and speed humps) are present along the R72 and A Street.
- There are currently no formalised pedestrian sidewalks present along the R72 and A Street within the study area. Pedestrians currently make use of informal paths and the gravel road verges of A Street and the R72.
- There are no formal pedestrian crossings present on the R 72 and A Street within the study area.

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## 10 Recommendations

The following is therefore recommended:

- The A Street / Pele Street / Access to CHC intersection should operate as a two-way controlled stop intersection, with A Street having the right of way. Adequate provision should be made for pedestrians and mobility impaired people at this intersection through the provision of dropped kerbs with pedestrian ramps.
- A minimum shoulder sight distance of 120m should be maintained at the new vehicle access to the CHC during construction, by ensuring there are no objects (dirt bins, temporary road signs, etc.) present that can obstruct the sight distances available to the drivers of construction vehicles.
- Due to the anticipated increase in the number of right turning vehicles into A Street from the R72, it is recommended that a minimum 3m wide right-turn lane be introduced at this intersection. It will provide increased safety for stationary vehicles waiting to turn right. Consideration should be given to the sharing of the upgrade cost between the developer of the CHC and the authority responsible for this section of the R72 (i.e. SANRAL).
- Two formal public transport (minibus taxi) embayments should be provided in A Street at the main access to the CHC.
- A minimum of 72 parking bays should be provided within the proposed development.
- A 1,5m wide surfaced sidewalk should be provided along the western border (frontage) of the proposed site, adjacent to A Street. Additional sidewalks and pedestrian crossings should be provided to the north of the site to improve the pedestrian link between the CHC and the Alexandria town.
- Street lighting should be provided at the two new public transport stops in A Street and along the proposed pedestrian route to/from Alexandria town, to improve the safety of pedestrians at night.



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## 11 References

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