



Our Reference : 44100762 CB_L01
Your Reference : 14/3/2/1/R46-84

April 24, 2019

JOHANNESBURG ROADS AGENCY
Traffic Engineering and Analysis Division
66 Pixley ka Isaka Seme (Sauer) Street
Johannesburg
2001

Attention: Ms. Esther Schmidt (Traffic Engineering & Analysis)

Subject: Traffic Impact Assessment: Proposed Township Establishment on Riverside View Extension 84 – Response to JRA Comments

1. BACKGROUND

Our traffic impact assessment (TIA) dated 10 October 2018, your letter with reference 14/3/2/1/R46-84 dated 22 February 2019 (copy attached hereto as **Annexure A**) as well as our meeting of 11 April 2019 refers.

The relevant outstanding matters, as pointed out in the letter and our meeting are addressed in this addendum report. This addendum report must be read in conjunction with the original report attached hereto as **Annexure B**.

2. RESPONSE TO ITEM 1 OF YOUR LETTER

2.1 Positions of accesses

The proposed township will be served by three accesses as indicated on the amended township layout (see **Annexure C**) and are detailed below:

(a) Access off View Road

The access is situated on the western boundary of the property, approximately 150m south of the intersection of Porcupine Park Avenue and View Road directly opposite the Eskom substation site access.

(b) Second access off View Road

The access is situated on the western boundary of the property, approximately 300m south of the intersection of Porcupine Park Avenue and View Road directly opposite the existing Eskom substation site access.

(c) Southern access

This access will be an internal link road from the existing Steyn City. This is considered the main access to the township as a large number of trip generated by the proposed development are expected to originate from within Steyn City and will make use of this access.

The purpose of this access is also to facilitate integration of the township and the bigger Steyn City, which will furthermore alleviate the pressures on the external road network.

2.2 Right of way servitudes – Erf 2 and Erf 23 Riverglen

Riverside View Extension 84 will consist of three erven. The two developable erven (i.e. Erf 1 and 2) are separated by a private open space (Erf 3) protecting the flood line area as indicated on the township layout. In the meeting JRA requested clarity on the proposed servitudes to protect access to Erf 2 and the southern access over Erf 23 Riverglen.

These accesses will be protected by general right of way servitudes, to be defined in the town planning application and conditions of establishment for the proposed township. Alternatively, the various erven and/or townships should be notorially tied to protect such access.

3. RESPONSE TO ITEM 2 OF YOUR LETTER

It is agreed that the access arrangements for a school differs from an office development. The Site Development Plan (SDP) for a possible school has not yet been finalized. A Site Traffic Assessment (STA) will be undertaken during the SDP submission stage. The STA will include amongst other aspects; capacity analysis of the proposed accesses, queueing analysis, vehicle swept paths for passenger vehicles and emergency vehicles, parking layout and drop-off zones, pedestrian facilities and safety etc. as required by JRA.

A conceptual layout plan of the proposed school is included in **Annexure D** to assist in providing final comments on the TIA.

4. RESPONSE TO ITEM 3 OF YOUR LETTER

The extent of the two land-uses was compared against each other to determine an equivalent trip generation which can be expected for a private school versus offices. This was done with due consideration of the directional split and total traffic generation. The following table has reference.

Table 1: Development Generated Trips

LAND-USES	EXTENT	AM PEAK			PM PEAK		
		In	Out	Total	In	Out	Total
Offices	78 089m ² GLA	1115	197	1312	262	1050	1312
School	493 Pupils	197	197	398	74	74	148

From the above, it can be concluded that the analysis done would be sufficient to consider a private school development of say 500 pupils. The town planning application and conditions of establishment for the township should reflect these restrictions (i.e. either offices of 78 089m² GLA OR a private school with 500 learners).

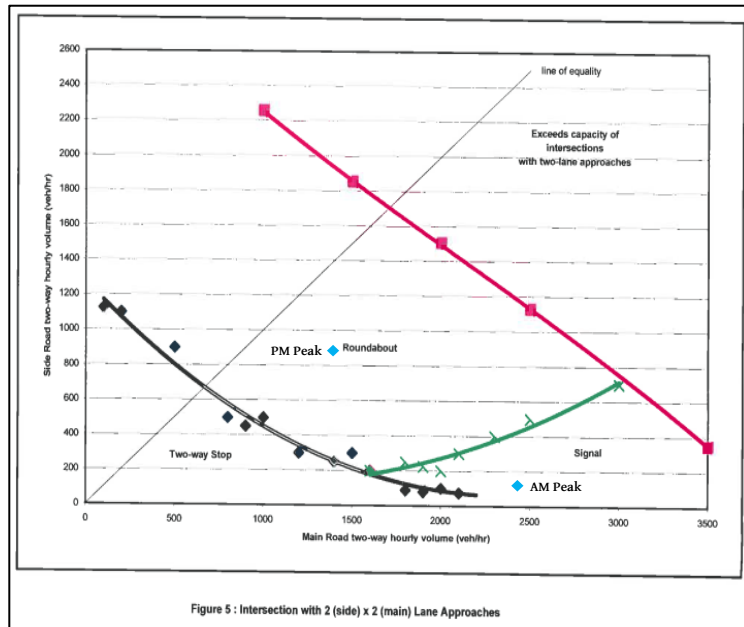
5. RESPONSE TO ITEM 4 OF YOUR LETTER

JRA questioned the capacity analysis of the roundabout intersection of Porcupine Park Avenue and View Road. Given the high number of traffic volumes of conflicting movements at the roundabout, JRA requested a further review of whether the roundabout will operate at acceptable levels of service.

5.1 Re-assessment of roundabout

The GDRT Guidelines for Roundabouts on Provincial Roads in Gauteng (BB12) document was used to determine the performance of the roundabout intersection. The main road (Porcupine Park Avenue) carries 2471 and 1473 peak hour traffic volumes during the AM and PM peak hour respectively. The side road (View Road) carries 157 and 841 peak hour trips during the AM and PM peak hour respectively.

According to the guideline document, a traffic signal is preferred instead of a roundabout when the traffic volumes are unbalanced and 80% or more of the traffic is on the main road. The traffic volumes on the main road are 94% during the AM peak hour and 64% during the PM peak hour. The traffic volumes are plotted on the graph below.



Graph 1: Roundabout Performance

According to the above graph, the roundabout is performing at acceptable levels of service during the PM peak hour and unacceptable levels of service during the AM peak hour.

5.2 Traffic signal

The roundabout intersection was re-analysed with a traffic signal configuration. The traffic volumes as depicted on Figure 4 of the original TIA were used as input. Detailed SIDRA results are attached in **Annexure E**. Capacity analysis results are indicated on **Table 2** below.

**Table 2: Capacity Analysis: 2027 Peak Hour Background (Incl. Latent) Plus Development Traffic – Porcupine Park Road and View Road
Control: Signalized**

APPROACH		AM PEAK HOUR			PM PEAK HOUR			COMMENTS
		V/C	DELAYS (SEC)	LOS	V/C	DELAYS (SEC)	LOS	
SOUTH	LEFT	0.298	40.3	D	0.246	17.2	B	Acceptable operating conditions expected during the AM and PM peak hours with overall v/c ratio of below 1 and acceptable delays.
	THROUGH	0.298	34.7	C	0.246	11.6	B	
	RIGHT	0.750	44.0	D	0.872	35.2	D	
	APPROACH	0.750	42.8	D	0.872	30.4	C	
EAST	LEFT	0.495	9.5	A	0.870	41.0	D	
	THROUGH	0.331	4.0	A	0.870	35.4	D	
	RIGHT	0.331	9.6	A	0.870	41.0	D	
	APPROACH	0.495	7.4	A	0.870	36.2	D	
NORTH	LEFT	0.112	39.6	D	0.021	16.8	B	
	THROUGH	0.112	34.0	C	0.021	11.3	B	
	RIGHT	0.112	39.6	D	0.021	16.9	B	
	APPROACH	0.112	37.8	D	0.021	15.0	B	
WEST	LEFT	0.832	15.0	B	0.537	28.9	C	
	THROUGH	0.832	9.4	A	0.537	23.3	C	
	RIGHT	0.877	43.0	D	0.546	49.0	D	
	APPROACH	0.877	15.1	B	0.546	27.0	C	
ALL VEHICLES		0.877	13.8	B	0.872	32.4	C	

The proposed intersection layout is indicated on **Figure 1** below

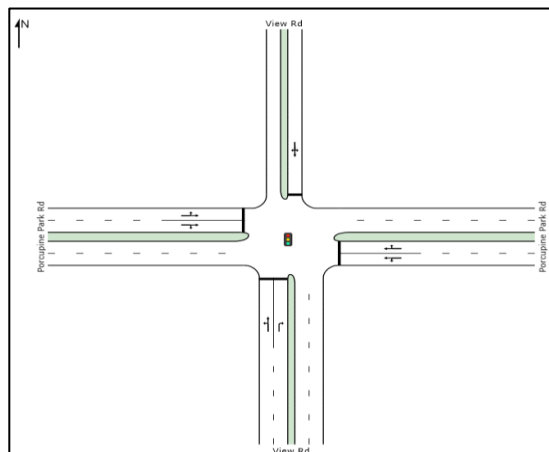


Figure 1: Proposed intersection layout

The capacity analysis results of the remaining intersections considered in the original TIA were not raised as concern and were therefore not reconsidered.

6. CONCLUSIONS

It is considered that the proposed township can be supported from a traffic engineering viewpoint, provided that the recommendations made in this addendum report are implemented. A Site Traffic Assessment will be undertaken during the SDP submission stage.

Should you need more information please do not hesitate to contact the undersigned.

Yours sincerely,



Herbert Phahlane (Pr Tech Eng)

Director: Traffic and Transportation

E-mail Address: Herbert.Phahlane@wsp.com

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Annexure A

JRA Letter Ref: 14/3/2/1/R46-84 dated 22 February 2019



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N Chinyowa

WSP
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Date: 22 February 2019

Email: mercia.prinsloo@wsp.com

Attention: Mercia Prinsloo

Sir/ Madam,

RIVERSIDE VIEW EXTENSION 84: TRAFFIC IMPACT ASSESSMENT

Your letter and Traffic Impact Statement dated 24 October 2018 refers.

The report was assessed by the JRA Traffic Engineering and Analysis Section, and the following comments are offered:

This Traffic Impact Assessment is in support of a private school with zoning "special" that allows for a basket of rights. The worst-case trip scenario was analysed to ensure that the road upgrades will serve the proposed land use application.

The department is unable to support the development from a traffic point of view for the following reasons:

1. Reference is made to the township layout for the positions of the proposed accesses. No clear access position on View Avenue is indicated on the township layout; the proposed right of way servitude over the flood line providing access to erf 2 is unclear and appears to intersect with Porcupine Avenue; the proposed southern access is also not shown. No proof of a servitude over Erf 23 Riverglen is provided in support of this southern access; no access layouts are provided etc.
2. It should be noted that the access arrangements for a school is vastly different than that for an office environment and the suitability of the site to serve the access requirements associated with a school was not tested.
3. The report provides no indication of the anticipated learner numbers associated with the proposed school scenario and it is therefore difficult to determine if the office rights are the worst-case trip scenario.
4. The department finds no analysis of any of the proposed access arrangements and questions the analysis of the external road network. The consultant is requested to arrange a meeting with this department to clarify the analysis associated with the proposed development.

Chairman: S Tshabalala,
Executive Directors: Managing Director - G Mbatha, Chief Financial Officer - Vacant
Non-Executive Directors: T Magerman, S Thunzi, A Torres, X Mnyani, T Kutumela, A Mokoena, L Mayedwa
Company Secretary: P Majola

Registration No. 2000/028993/07

All road upgrades to be undertaken by the developer or his representatives, the cost thereof, will not be refunded back to the developer by the Johannesburg Roads Agency (JRA) or the City of Johannesburg (CoJ) unless these upgrades were discussed and agreed upon in writing by both parties upfront, before any construction commences. The mere fact that the detail design drawings or Traffic Impact Studies have been approved, does not bind the JRA or the CoJ to any agreement. It is the responsibility of the developer or his representative to always stay up to date with the latest guidelines and Standards. This is especially applicable to Universal Design (UD) principals. JRA Development Control references the following national and municipal standards for minimum compliance, and will require developments conform to them in planning, design and construction, whether included in the original approved drawings or not. These are:

- *Minimum requirements for the preparation of integrated transport plans: 29 July 2016 (CoJ CITP) Published under the NLTA. Act No.5 of 2009. Requires the application of minimum standards on UD to transport and public space.*
- *Building Regulations and Building Standards Act 1977, as amended 2008*
- *SANS 10400 Part S: 2011 - Facilities for Persons with Disabilities*
- *National Technical Requirements 1 (NTR1) – Pedestrian Crossings, 2016 (Specification of Tactiles SANS 784: 2008)*
- *JRA standard book of Drawings – 2015 including 2017 UA Update*


Failing to eliminate obstacles that unfairly limit or restrict persons with disabilities from enjoying equal opportunities or failing to take steps to accommodate the needs of such persons can result in litigation.

All road upgrades to be undertaken by the developer or his representatives, the cost thereof, will not be refunded back to the developer by the Johannesburg Roads Agency (JRA) or the City of Johannesburg (CoJ) unless these upgrades were discussed and agreed upon in writing by both parties upfront, before any construction commences. The mere fact that the detail design drawings or Traffic Impact Studies have been approved, does not bind the JRA or the CoJ to any agreement.

It should also be noted that if any upgrades are undertaken by the developer to any roads or storm-water on behalf of CoJ or the JRA, the developer will be entitled to an off-set against their external engineering services contributions as per section 49(4) of SPLUMA, provided these services are required to be upgraded to resolve background capacity problems, and not as a result of his/her impact of the development. These upgrades are to be discussed with the officials of the JRA and agreement in writing is to be obtained from the JRA to the off-set of such contributions, before any construction commences on site.

If the amount for the upgrade/construction exceeds the contributions payable, the balance thereof will not be refunded to the developer and the construction is then carried out at the developers own cost.

Should you require any further clarity and to arrange a meeting please contact Mrs. Esther Schmidt on (011) 298-5230.


pp Manager: Development Control

nc/mm

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Tel: (011) 298-5043



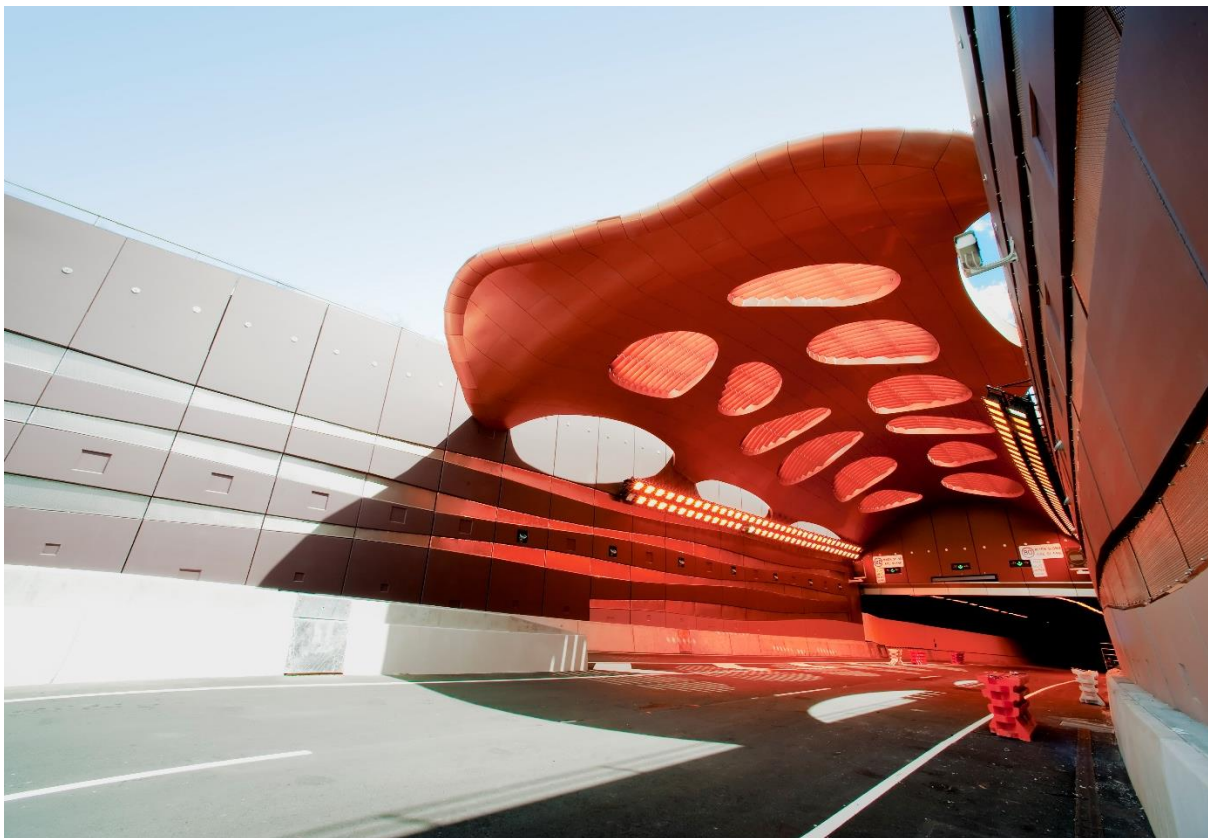
Annexure B

Original TIA dated 10 October 2018

METRUM PROJECT MANAGEMENT (PTY) LTD

PROPOSED TOWNSHIP ESTABLISHMENT ON RIVERSIDE VIEW EXTENSION 84 TRAFFIC IMPACT ASSESSMENT

10 OCTOBER 2018





PROPOSED TOWNSHIP ESTABLISHMENT ON RIVERSIDE VIEW EXTENSION 84 TRAFFIC IMPACT ASSESSMENT

METRUM PROJECT MANAGEMENT (PTY)
LTD

ISSUE 1




PROJECT NO.: OUR REF. NO. 44100762-001
DATE: OCTOBER 2018

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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks				
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Signature				
Checked by	Herbert Phahlane Traffic and Transportation Director			
Signature				
Authorised by	Herbert Phahlane Traffic and Transportation Director			
Signature				
Project number	44100736			
Report number	1			

SIGNATURES

PREPARED BY

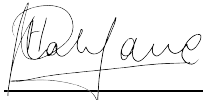


Mercia Prinsloo, Traffic and Transportation Engineer

Miss

ECSA Candidate: 2018200394

REVIEWED BY



Herbert Phahlane, Traffic and Transportation Director

Mr

Certification

I, Herbert Phahlane, certify that I am a professional Traffic Engineering Technologist 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), and I take full responsibility for the content, including all calculations, conclusions and recommendations made herein.

Signatory:



Date: October 2018 ECSA no: 2016 700 19

This report was prepared by WSP for the account of Metrum Project Management (Pty) Ltd, in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP's best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

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1 INTRODUCTION

1.1 BACKGROUND

WSP has been appointed to undertake a Traffic Impact Assessment for the proposed township establishment on Riverside View X84 located north of Steyn City, Gauteng. The site is located to the west of William Nicol Drive and south of Diepsloot, Gauteng. The site locality is illustrated on **Figure 1**.

The developer, Steyn City Properties (Pty) Ltd, wishes to establish a township on Riverside View X84 and apply for “Special” zoning rights with the intention to develop a private school which will be supportive of the existing Steyn City School situated within Steyn City next to the Cedar Road gate. However, the zoning allows for a basket of rights and the most relevant land-use will be included as part of the analysis.

1.2 CONSULTATION WITH JRA

On Friday 17 August, Mercia Prinsloo from WSP met with Esther Schmidt from the JRA to discuss the proposed development and the history of developments surrounding Riverside View Extension 84. The purpose of this meeting was to agree on the methodology for the traffic report required in support of the township establishment. The following was agreed:

Five (5) intersections in the area surrounding the development will be taken into consideration. The zoning applied for on the township is “Special”. As is the case with most traffic impact studies, the land-use rights that will generate a “worst-case” trip scenario will be used to ensure that the road upgrades proposed will serve any land-use forming part of the “Special” zoning.

A flood line exists on the township and effectively divides the township into two erven. A copy of the township layout plan is provided in **Appendix A-1**. Erf 1 gains access off View Road to which also forms the western boundary of the site. Erf 2 will be situated east of the flood line and will require access over Erf 1 and the flood line. Ms. Esther Schmidt mentioned that the proposed land-use rights on Erf 2 will not be supported without sufficient access to the erf.

Given the above, access to Erf 2 will be by means of a 16 meter right of way servitude over Erf 1, crossing the flood line. PRISM Environmental Management Services have been appointed to finalise the necessary documentation as part of the application to provide access over the flood line.

The client has also requested that access to the property be provided from within Steyn City through the southern boundary of the site. Ms. Esther Schmidt mentioned that JRA has no objection to this proposal if the correct legal steps are followed in terms of registering a servitude or portion of road from Steyn City, over Riverglen Erf 23, into the proposed township.

It was also agreed that the Johannesburg North Vissum Model will be used to determine the ultimate future background traffic volumes which include the latent rights in the area of which the entire Steyn City development forms part of. Given the current limited road network and construction in the area, conducting traffic counts at the intersections are deemed inaccurate and will not be a true representation of the traffic flow patterns.

The purpose of this traffic impact assessment is to illustrate the proposed development impact on the surrounding road network and possible mitigation of the anticipated traffic impact. This report also evaluates and comments on the proposed site access, non-motorised and public transport aspects.

2 SURROUNDING ROAD NETWORK AND STUDY AREA

2.1 SURROUNDING ROAD NETWORK

The following roads in the vicinity of the proposed development are regarded as relevant to this study and are discussed in detail below:

- **Porcupine Park Road:** Approximately 50% of this road stretching from William Nicol Drive in the east to Runnymead Avenue to the west has been constructed and consists of two lanes per directions. When this Class 3 Road is completed along with William Nicol Drive, this road will serve as a major east-west link road in the area and will serve the Valumax development, the proposed development on Riverside View X54 and the future northern access to Steyn City. The extension of this road up to Runnymead Avenue was considered as part of the dedicated network for the Vissum Model.
- **Riversands Road (Rose Road):** This is a Class 3 road to the east of William Nicol Drive which has only been constructed up to Riversands Boulevard to serve the Riversands development. The road consists of two lanes per direction.
- **Runnymead Avenue:** WSP is currently responsible for the design and construction of Runnymead Avenue which will connect Porcupine Road with Cedear Road to the south. This Class 3 Road is planned to consist of one lane per direction and was also taken into account as part of the dedicated network in the Vissum model as part of the distribution of traffic.
- **William Nicol Drive:** The upgrading of William Nicol Drive between Erling Road and Summit Road is currently underway. This Class 2 dual carriageway road will form a major part of the road network in the area, serving most of the north-south traffic. The upgrading of this road was considered as part of the dedicated network for the Vissum Model.

The design of the interchange of William Nicol Drive and Porcupine Park Rd and Riversands Road (Rose Rd) has been finalised. The layout of the interchange is visible on the Township layout plan.

2.2 DETERMINATION OF THE STUDY AREA

In determining the site area, the South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual (TMH 16 volume 2, version 1.0, 2012) was consulted.

TMH 16 also states that judgement should be used in selecting the intersections considered and therefore specific elements like extent of the development were also considered. A larger development will by its nature require a wider study area to be considered while for a smaller development the opposite will be true.

Given the number of trips this development will generate, the nature of the development and after consultation with Ms. Esther Schmidt (JRA) it was decided that the key intersections as mentioned below would be sufficient for analyses.

- Riversands Blvd / Riversands Rd (Rose Rd)
- Riversand Blvd / Erling Road
- Runnymead Ave / Cedar Rd
- Porcupine park Rd / View Rd

These intersections are indicated in red on **Figure 1**.

3 SITE ACCESS

3.1 SITE ACCESS

Accesses proposed for Extension 84 are indicated on the township layout plan in **Appendix A-1** and briefly described in the subsections to follow. Access control will be implemented, however, the location, layout and size of the access control areas are yet to be determined and are linked to the land-uses on site. This must be finalised along with SDP approval.

3.1.1 ACCESS OFF VIEW ROAD

This access is situated on the western boundary of the site in View Road, 150 meters south of the intersection of Porcupine Park Avenue and View Road. The access will be built opposite the existing northern bell mouth to the ESKOM substation site.

3.1.2 SECOND ACCESS OFF VIEW ROAD

This access is also situated on the western boundary of the site in View Road, 300 meters south of the intersection of Porcupine Park Avenue and View Road and 150 meters from the northern access to the site. The access will be built opposite the southern existing bell mouth to the ESKOM substation site.

3.1.3 ACCESS FROM STEYN CITY

This access will be an internal link road from Steyn City, over Erf 23, Riverglen, into the proposed development (Riverside View X84). A large portion of the trips generated by the proposed development are expected to originate from within Steyn City and will make use of this access.

4 TRAFFIC VOLUME DATA

Various road links and intersections in the area are either in the detailed design phase or are still under construction. The same applies to land-uses in the area. There are a significant number of rezoning/township establishment applications in the area which are all at different stages of development. For these reasons, the existing road network changes often. Conducting traffic counts and analysing the status quo in terms of network volumes and configurations will not be useful.

Therefore, the Johannesburg North Vissum Model, modelled by Tolplan, was used to determine the future background traffic volumes which include the latent rights in the area, of which Steyn City (Phase 1 and 2) forms part. The dedicated network for this development, over and above the existing road network, included the completion of the following road links:

- Porcupine Park Avenue (From William Nicol Drive to Runnymede Avenue.)
- Runnymede Avenue (From Porcupine Park Avenue to Cedar Road)
- William Nicol Drive (From Erling Road to Summit Road)

The trip distribution model for the AM traffic, as received from Tolplan, is attached in **Appendix A-2**.

The traffic volumes for the ultimate future scenario in 2027, without the proposed development trips, at the following intersections were extracted from the model for analysis using SIDRA 7 intersection analysis software:

- Riversands Blvd / Riversands Rd (Rose Rd)
- Riversand Blvd / Erling Road
- Runnymede Ave / Cedar Rd
- Porcupine park Rd / View Rd

The manual for Traffic Impact Studies requires that a five-year horizon be considered for developments that generate more than 50 trips. However, analysing the future 2027 year is considered sufficient for the area and a conservative approach.

These background traffic volumes are summarised in **Figure 2**.

5 DEVELOPMENT TRIP GENERATION

5.1 TRIP GENERATION

Although the zoning and land-use rights allow for a basket of rights, the worst-case scenario in terms of trip generation will be considered.

5.2 TRIP SUMMARY

From the land-uses listed in **Section 1.3** of this report, the offices at a maximum of 78 089m² GLA were determined to be the worst-case trip generator.

The COTO TMH 17 (South African Trip Data Manual) was used to determine the trips generated by the development. Although the trip generation is based on only one land-use, the developer intends to develop a combination of the land-uses to effectively create a mixed-use development. There are also various mixed-use developments in close proximity to the site. Therefore, the mixed-use trip adjustment factor was applied.

Table 1 is a summary of the expected trip generation for the development.

Table 1 – Estimated Development Trips

DESCRIPTION	IN	OUT	TOTAL
Extension 84 (78 089 m² GLA)			
AM Peak Hour	1115	197	1312
PM Peak Hour	262	1050	1312

5.3 TRIP DISTRIBUTION AND ASSIGNMENT

As part of the Johannesburg North model, Peak Flow Bundles are generated to estimate the flow patterns to and from certain developments. The Flow bundle attached in **Appendix A-2** was used as a guideline when distributing the development trips onto the road network.

Assumptions with respect to the expected trip distribution were also based on the location of the site access in relation to the surrounding road network; the existing traffic volumes, travel patterns as well as the land use nature of the proposed development.

Ultimately, the expected 2027 peak hour traffic volumes plus the development trips are shown on **Figure 4**.

6 TRAFFIC IMPACT AND CAPACITY ANALYSES

6.1 SUMMARY

Capacity analysis of the relevant intersections were done using SIDRA 7 intersection analysis software. The purpose of the analysis is to determine the Levels of Service (LOS), volume / capacity ratios (v/c) and delays at each intersection for the scenario discussed below. Capacity analysis was undertaken for the weekday AM and PM peak hours.

- **Scenario 1:** 2027 future background peak hour traffic volumes (*Figure 2*);
- **Scenario 2:** 2027 background peak hour traffic volumes plus development traffic (*Figure 4*)

As mentioned in Section 4 of this report, the status quo (2018 volumes and intersection layouts) do not form part of the analysis as the current road network and volumes are changing often and will only normalise once William Nicol Drive has been constructed and land parcels in the area have been developed to its land-use potential.

6.2 ROAD UPGRADES REQUIRED

The results of the SIDRA capacity analysis for the key intersections and accesses are discussed in the following subsections with the detailed SIDRA outputs enclosed as **Appendix A-4**.

6.2.1 RIVERSANDS ROAD (ROSE ROAD) / RIVERSANDS BOULEVARD

This intersection is controlled by a two-lane, 65m diameter traffic circle. This traffic circle was constructed in 2015 as part of the Riversands Development road upgrades. All four approaches at the intersection have two lanes per direction. This intersection currently operates at acceptable levels of service in the morning and afternoon peak periods and will continue to operate acceptably with the future 2027 traffic volumes and the proposed development trips.

No upgrades are required at this intersection.

6.2.2 PORCUPINE PARK AVENUE / VIEW ROAD

This intersection is controlled by a two-lane, 40m diameter traffic circle. This traffic circle was constructed in 2017 as part of the Valumax Development road upgrades. Three approaches at the intersection have two lanes per direction and the northern approach has one-lane per direction. This intersection currently operates at acceptable levels of service in the morning and afternoon peak periods and will continue to operate acceptably with the future 2027 traffic volumes and the proposed development trips.

No upgrades are required at this intersection.

6.2.3 RIVERSANDS BOULEVARD / ERLING ROAD

This is a priority controlled T-intersection and all three approaches are stop-controlled. During the future 2027 traffic volume scenario, the intersection performance deteriorates and significant upgrades are required.

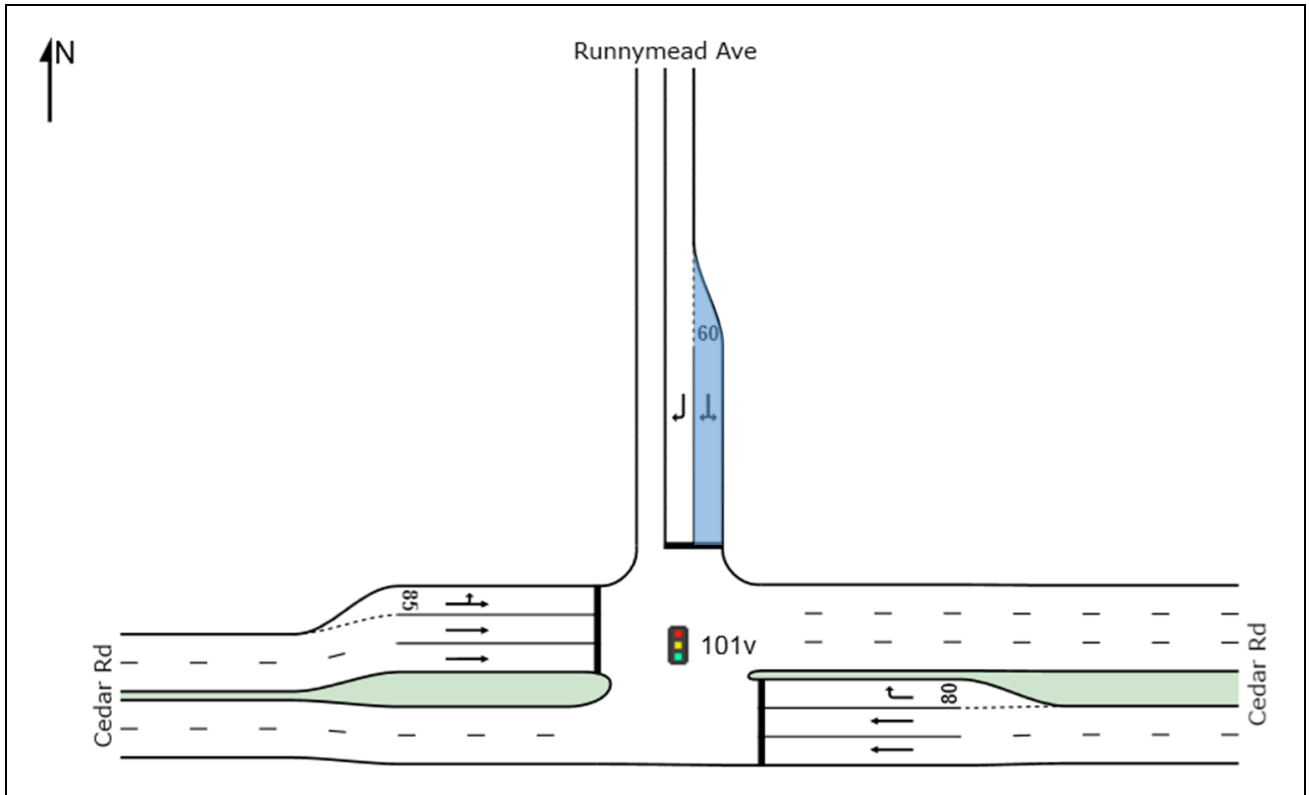
As part of the K56 construction project, upgrades at this intersection was proposed and the layout indicated in **Appendix A-3** has been developed. As part of the K56 project, this intersection will be signalised and an additional through lane will be added to the eastern approach.

With these upgrades in place, the intersection operates acceptably during both analysed scenarios and no additional upgrades are required.

6.2.4 RUNNYMEAD AVENUE / CEDER ROAD

This intersection is currently a priority controlled T-Intersection with the traffic along Cedar Road having right of way. The northern approach currently experiences heavy delays in the peak hours. The Runnymede Road Extension project is currently underway with construction expected to start in the first quarter of 2019.

This intersection will form part of the Runnymede Project upgrades and will be upgraded to a traffic signal with the addition of a short shared left and right-turn lane on the northern approach. The proposed layout is indicated below.



After the implementation of the traffic signal and the upgrades indicated above, the intersection operates acceptably during all analysed scenarios and no further upgrades are proposed.

7 NON-MOTORISED AND PUBLIC TRANSPORT

7.1 EXISTING AND PROPOSED PUBLIC TRANSPORT FACILITIES

The proposed township is situated in a rapidly developing area. With the implementation of the Steyn City northern contractor's gate, pedestrian walkways were built along View Road. These walkways situated on the western boundary of the site are deemed sufficient as the eastern boundary of the site consists of William Nicol Drive where pedestrian movement is not warranted.

Public transport lay-bys along Porcupine Park Road at its intersection with Yellowwood Boulevard were also built as part of the Valumax Development. These lay-bys are within walking distance from the development and will serve the development well.

Currently, there are no Rea Vaya BRT or Gautrain bus routes in the area and the tenants/employees/residents/scholars of the proposed development are dependent on Minibus taxis and the Johannesburg Metro Bus service as a mode of public transport.

8 CONCLUSIONS AND RECOMMENDATIONS

Based on this traffic impact study, the following concluding remarks are relevant:

- The study forms part of a township establishment application for Riverside View X84.
- A basket of rights under the “Special” zoning is proposed and a 78 089m² office development is considered as a worst case scenario from a trip generation point of view.
- Three access points to the township are proposed of which one access point serves as a link between Steyn City and Riverside View X84.
- Following the trip distribution and detailed capacity analysis, intersection upgrades are proposed and covered in detail in **Section 6** of this report.
- Public transport recommendations were also made as part of this report and captured in **Section 7**.

It is recommended that the proposed township application be supported from a traffic engineering perspective.

9 REFERENCES

- TMH 17 Volume 1, South African Trip Data Manual, Version 1.01, Committee of Transport Officials (COTO) September 2013.
- Highway Capacity Manual, Transportation Research Board, National Research Council Washington D.C., 2010.
- Manual for Traffic Impact Studies, Department of Transport, January 1995.
- South African Trip Generation Rates, RR 92/228, Department of Transport, 1995.
- City of Johannesburg Town Planning Scheme

FIGURES

FIGURES

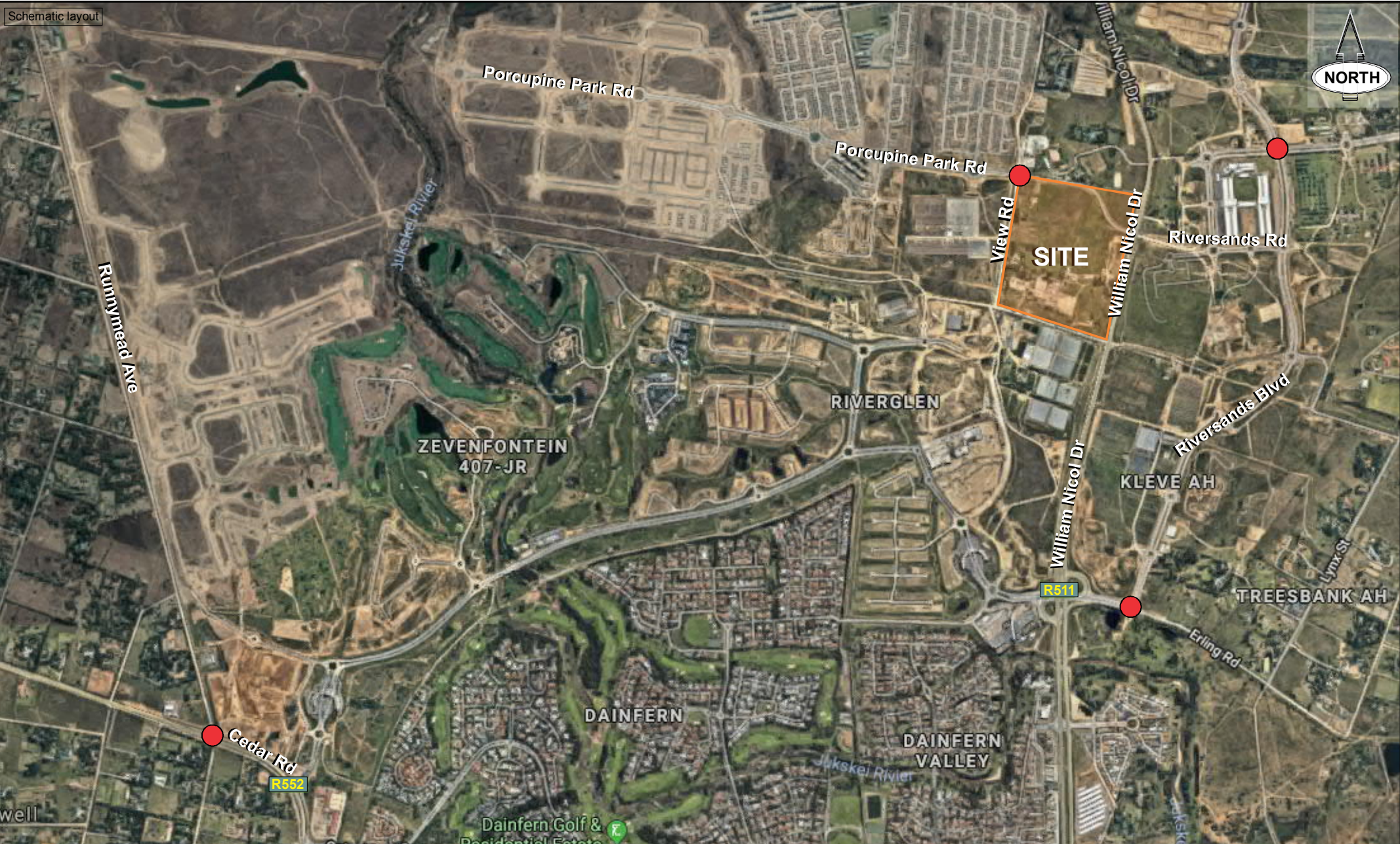
FIGURE 1 - LOCALITY PLAN

FIGURE 2 – FUTURE 2027 BACKGROUND TRAFFIC VOLUMES

FIGURE 3 – DEVELOPMENT TRIP DISTRIBUTION

FIGURE 4 – TOTAL FUTURE 2027 BACKGROUND TRAFFIC PLUS DEVELOPMENT TRAFFIC VOLUMES

Schematic layout



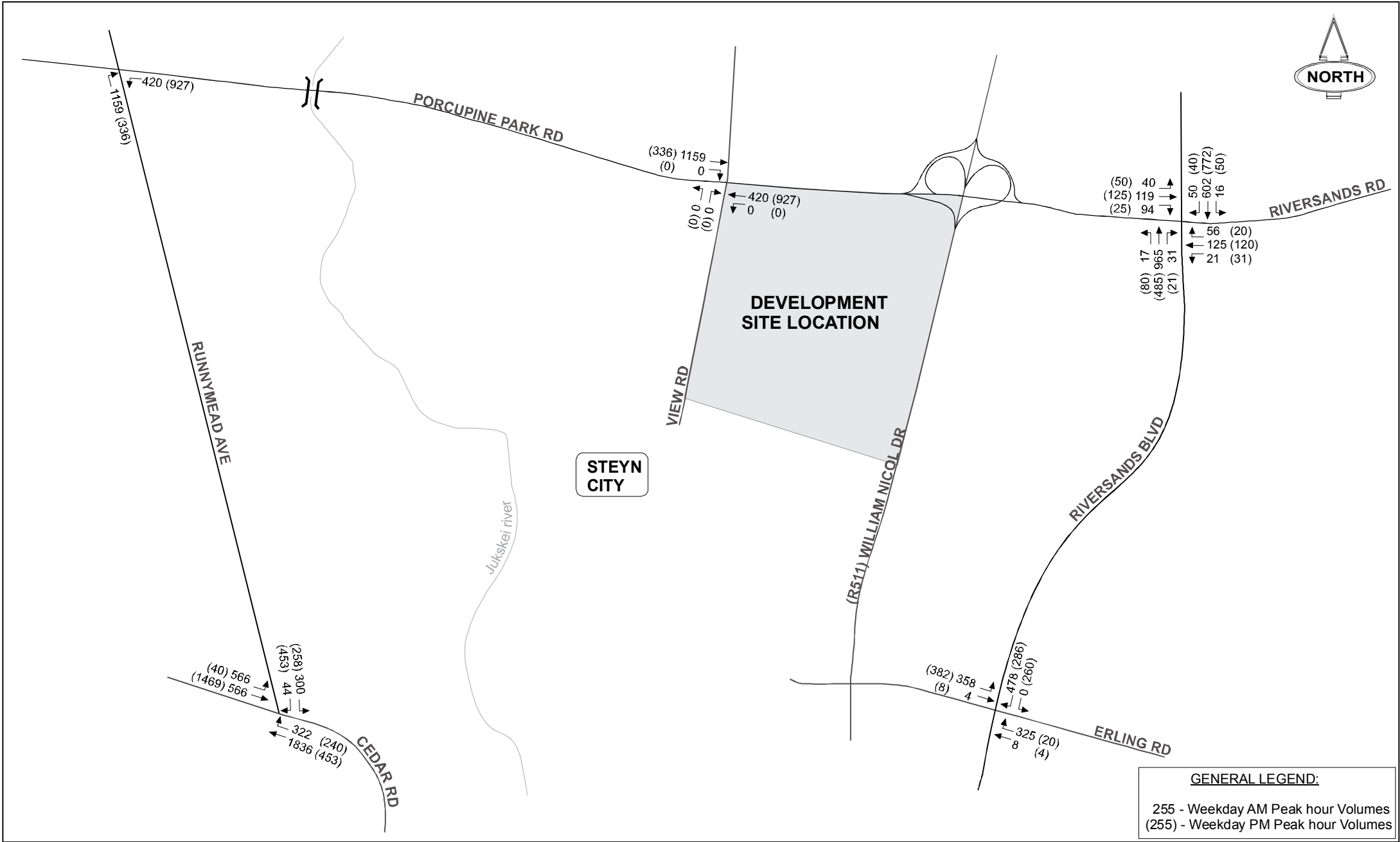
44100817_Riverside View Ext. 84_1



Project: **RIVERSIDE VIEW EXT 84**

Figure Description: **SITE AND INTERSECTION LOCALITY PLAN**

No. **1**



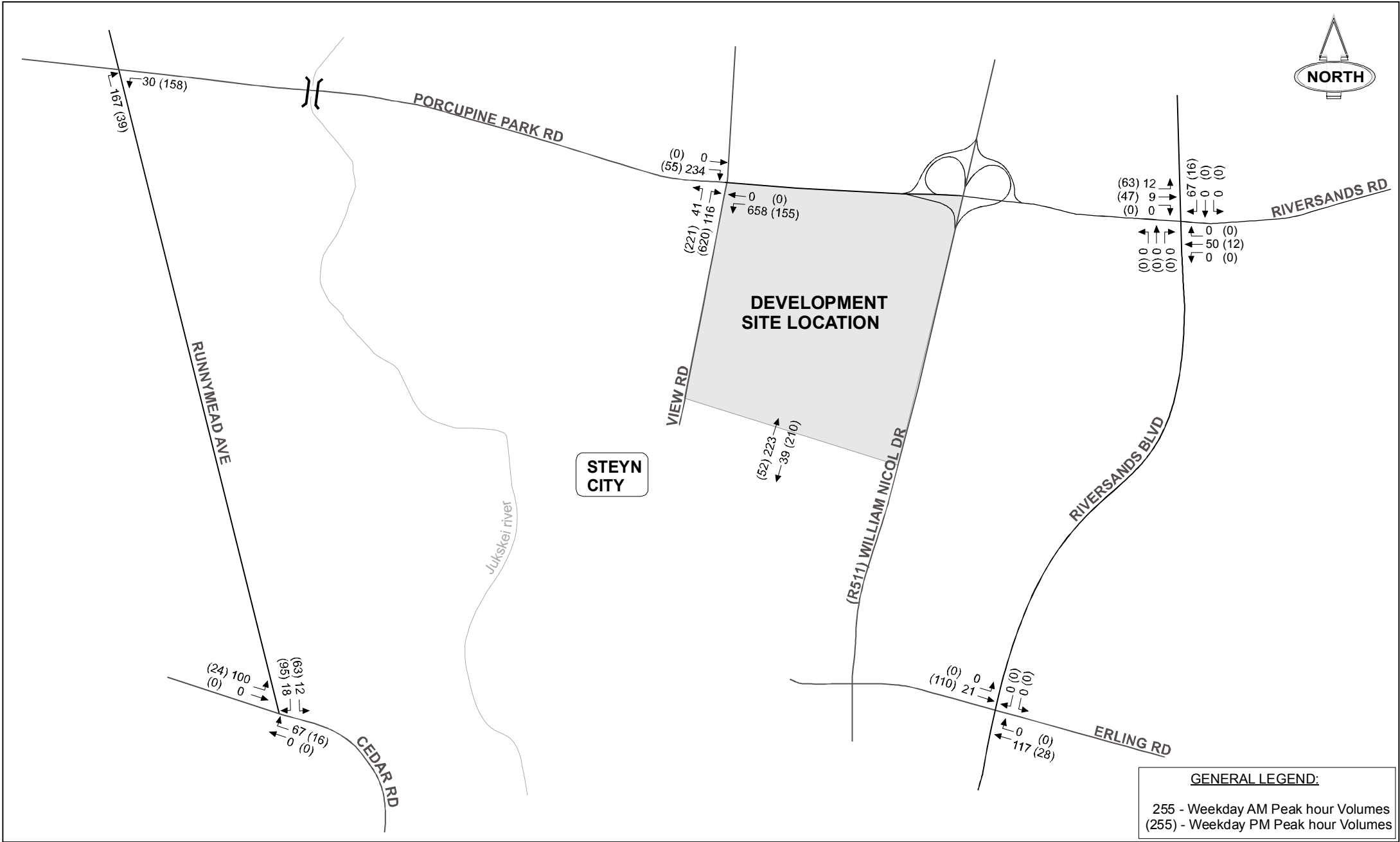
Riverside View Ext 84_2



Project: **RIVERSIDE VIEW EXT 84**

Figure Description: **2027 BACKGROUND TRAFFIC VOLUMES**

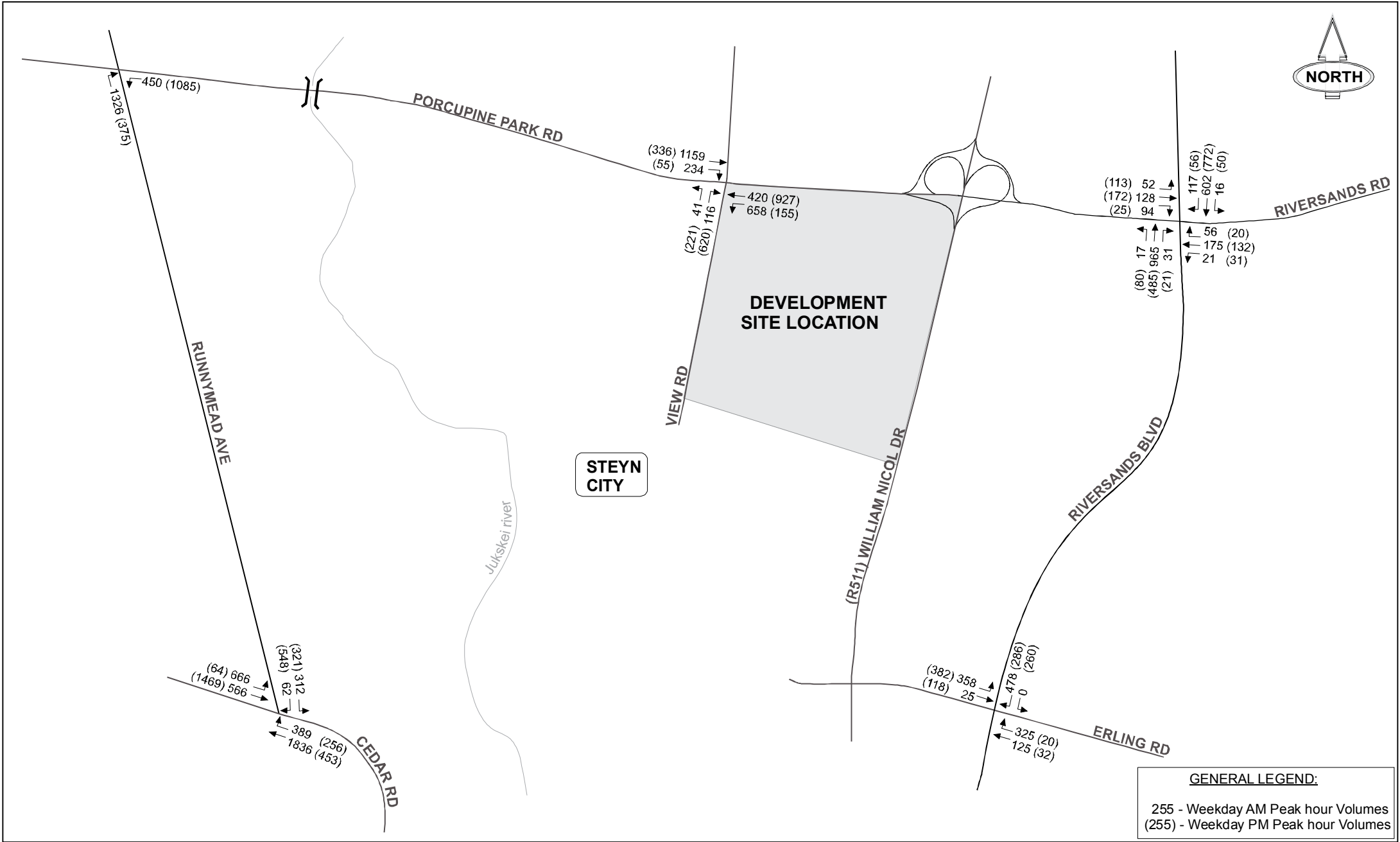
No: **2**



Project: **RIVERSIDE VIEW EXT 84**

Figure Description: **DEVELOPMENT TRIP DISTRIBUTION**

No: **3**



Riverside View Ext 84_4



Project: **RIVERSIDE VIEW EXT 84**

Figure Description: **TOTAL 2027 BACKGROUND TRAFFIC PLUS DEVELOPMENT TRIPS**

No: **4**

APPENDICES

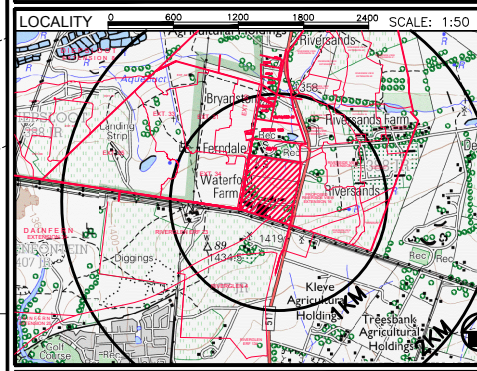


APPENDIX

A-1 TOWNSHIP LAYOUT

**PROPOSED TOWNSHIP
RIVERSIDE VIEW EXTENSION 84
PROPOSAL**

SITUATED ON PORTION 124 AND 185 OF THE FARM DIEPSLOOT 388 JR.
LOCAL AUTHORITY : CITY OF JOHANNESBURG
TOWN PLANNING SCHEME: PERI-URBAN TPS 1975
REGION: FOURWAYS
GEODETICAL SYSTEM : WG 29



LAND USE TABLE

ZONING PERI-URBAN TPS	PROPOSED LAND USE	ERF NUMBERS	No. OF STANDS	AREA OF STREETS	% OF AREA
SPECIAL	SPECIAL FOR PLACE OF INSTRUCTIONS, RESIDENTIAL BUILDINGS AND OFFICES INCLUDING ANCILLARY USES SUCH AS RESTAURANTS AND SHOPS.	1, 2	2	19,2355	65,72
P.O.S.	P.O.S.	3	1	5,1071	17,45
STREETS	WILLIAM NICOL ROAD			3,6990	12,63
	STREET			1,2278	4,20
TOTAL			3	29,2694	100%

GENERAL NOTES

THE FIGURE ABCDA REPRESENTS OUTSIDE BOUNDARY OF THE PROPOSED TOWNSHIP RIVERSIDE VIEW EXTENSION 84 (PROPOSAL), BEING APPROXIMATELY 29,2694ha IN EXTENT.

- OUTSIDE BOUNDARY OF TOWNSHIP
- GEOTECHNICAL ZONES
- 1:50 YEARS FLOODLINE
- 1:100 YEARS FLOODLINE
- LINE OF NO ACCESS
- FARM PORTIONS
- 32m WETLAND BUFFER
- WETLAND
- RESTRICTED AREA (5,0465ha)
- TEST PITS 1 TO 5 = REPORT 1107
- TEST PITS 1 TO 10 = REPORT 1040

REVISIONS

NO.	DESCRIPTION	D: DRAFT	C: CIRCULATED	A: APPROVED
D1	ADD WETLAND AND WETLAND 32m BUFFER LINES.			C. Mason 21.04.2017
D2	PROPOSED POWERLINE SERVITUDE ADDED.			C. Mason 2017.05.11
D3	AMEND UNDETERMINED ERF TO SPECIAL.			C. Mason 2017.09.13
D4	AMEND PART SPECIAL ERF 1 TO SPECIAL AND P.O.S.			C. Mason 2018.01.22
D5	GEOLOGICAL ZONES TRACE FROM PENDO PLAN.			C. Mason 2018.06.06
D6	AMEND PRIVATE STREET TO STREET.			C. Mason 2018.08.15

CLIENT: STEYN CITY PROPERTIES PTY (Ltd)

TOWN PLANNER: S. KRIEK Pr. PLN: A/734/1993

SCALE: 1:2 500

DRAWING REF: Riverside84_Lay D6/2018.08.15

CLIENT REF No:

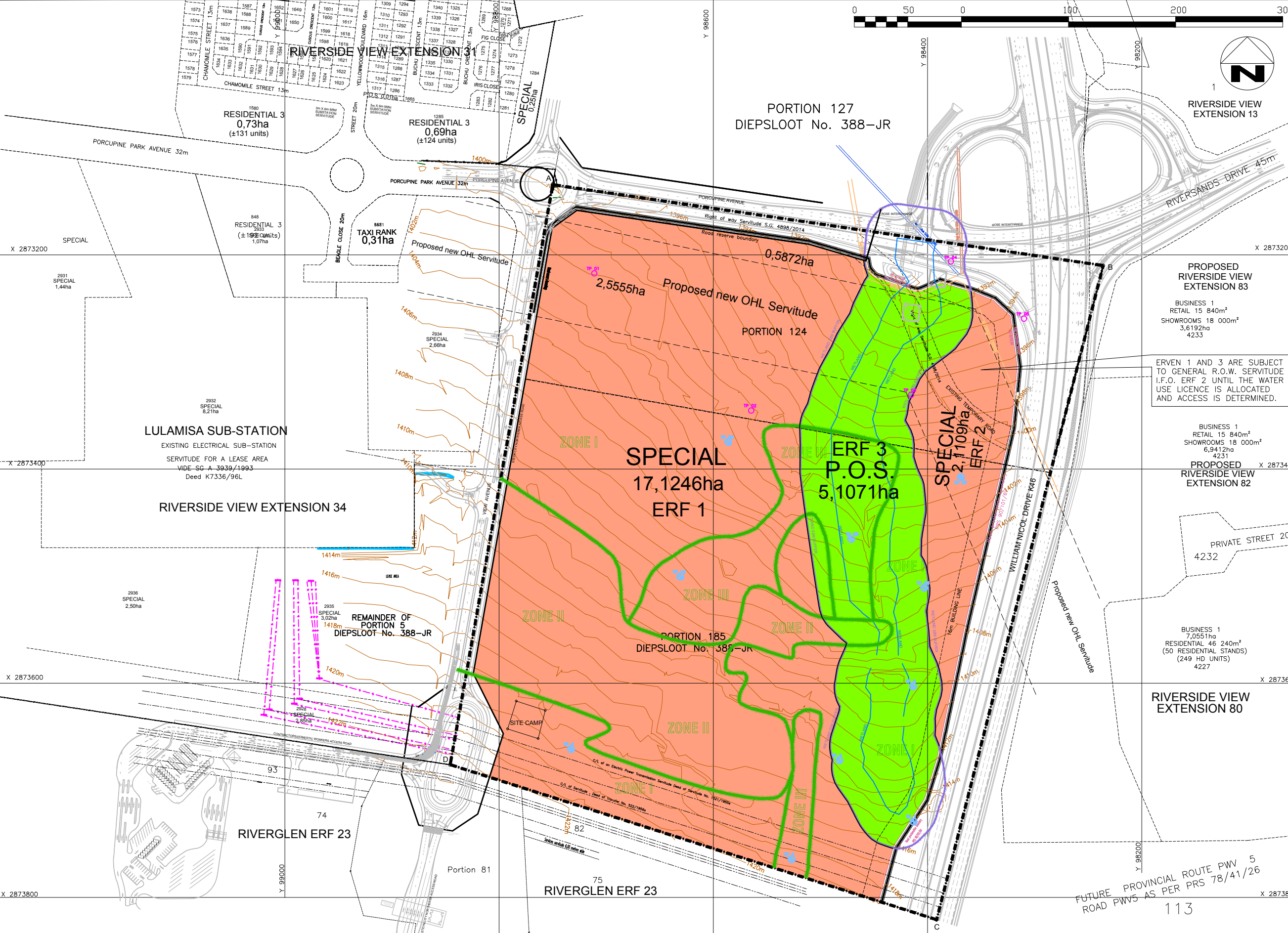
DRAWING STATUS: DRAFT

URBAN DYNAMICS

ATHOLL TOWERS
139 PATRICIA ROAD, 4th FLOOR
SANDOWN, SANDTON
2031
P.O. BOX 291803
MELVILLE
2109
TEL: (+27 11) 482-4131
TEL: (+27 11) 482-9959
E-MAIL: einfo@urbandynamics.co.za



PORTION 127
DIEPSLOOT No. 388-JR



PROPOSED RIVERSIDE VIEW EXTENSION 83

BUSINESS 1
RETAIL 15 840m²
SHOWROOMS 18 000m²
4233

ERVEN 1 AND 3 ARE SUBJECT TO GENERAL R.O.W. SERVITUDE I.F.O. ERF 2 UNTIL THE WATER USE LICENCE IS ALLOCATED AND ACCESS IS DETERMINED.

PROPOSED RIVERSIDE VIEW EXTENSION 82

BUSINESS 1
RETAIL 15 840m²
SHOWROOMS 18 000m²
6,9412ha
4231

PROPOSED RIVERSIDE VIEW EXTENSION 80

BUSINESS 1
7,0551ha
RESIDENTIAL 46 240m²
(50 RESIDENTIAL STANDS)
(249 HD UNITS)
4227

GEOTECHNICAL ZONES

Zone	Site Class	ESTIMATED SOIL MOVEMENT	Geological Constraint	Foundation Design and Building Procedures
I	SI-CI	10-20 mm	Compressible/ Collapsible soil	Modified normal or soil raft.
II	P	Unknown	Fills & cut platforms	Site specific
III	P	10-20 mm	Shallow groundwater	Modified normal or soil raft. Drainage precautions

NOTE:
IT IS HEREBY CERTIFIED THAT THE TOWNSHIP LAYOUT PLAN IS IN ACCORDANCE WITH THE PROVISIONS AND RECOMMENDATIONS SET OUT IN THE GEOTECHNICAL INVESTIGATION FOR THE PROPOSED TOWNSHIP.

11 June 2018

Name: JLVAN ROOY Signature

GENERAL NOTES

CONTOURS
The contours on this plan are in accordance with the stipulations of Regulation 18(1)(a)(1) of the Town Planning and Townships Ordinance, O.S. 13 of 1986. The contours on this plan were obtained from 31-7-2018 date

DIMENSION AND SIZES
1. All dimensions shown on the plan are approximate, scaled in meters and subject to final survey.
2. Township layout Sketch Plan. Only calculated survey drawing to be used for Engineering Design and Construction purposes.

FLOODWATER
It is hereby certified that in accordance with section 144 of the national water act (Act 36 of 1998) the township is not affected by a 1:100 year floodline.

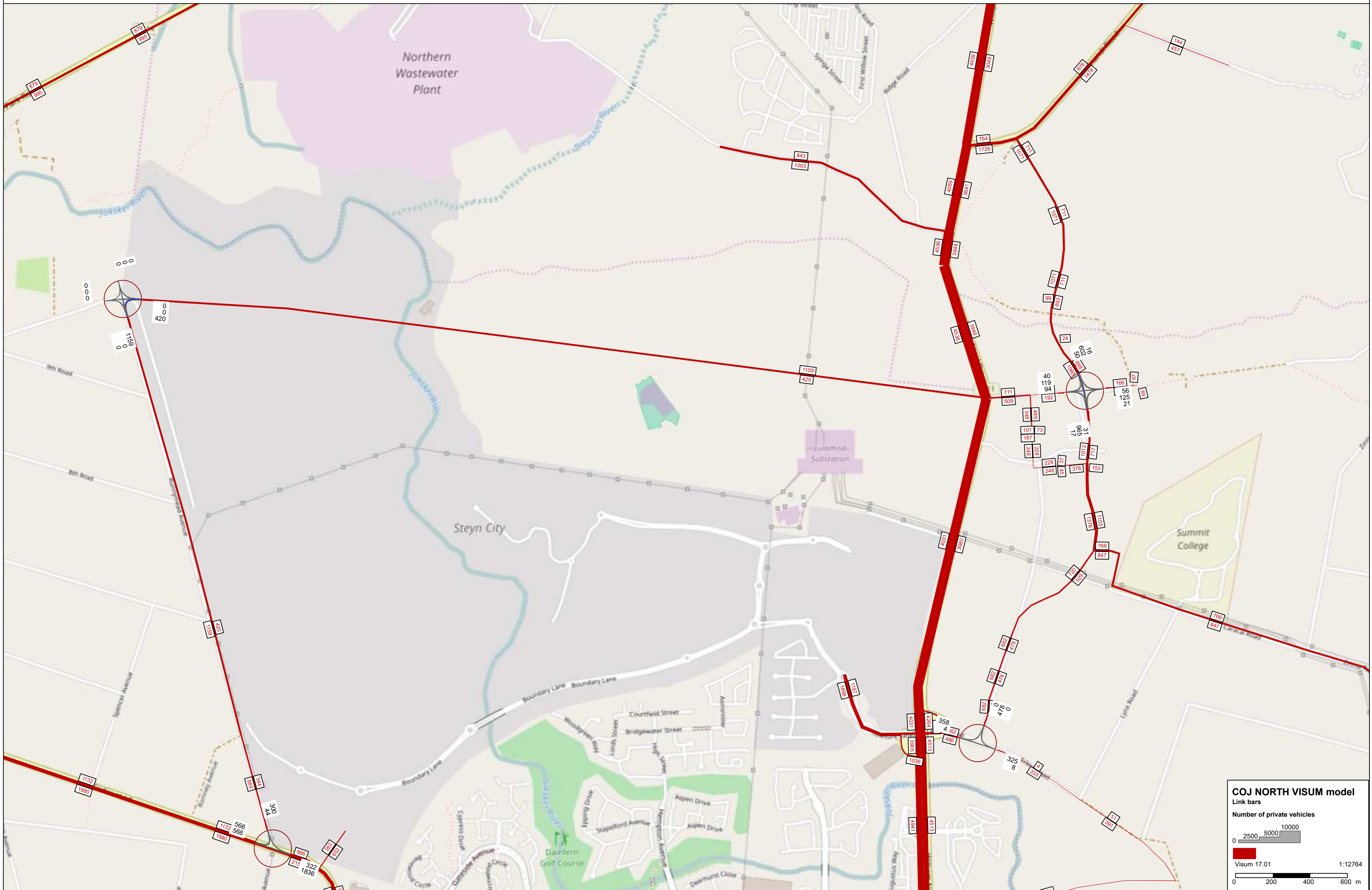
CONSULTING ENGINEER
31-7-2018 date

Kevin Melhuish Professional Land Surveyor

APPENDIX

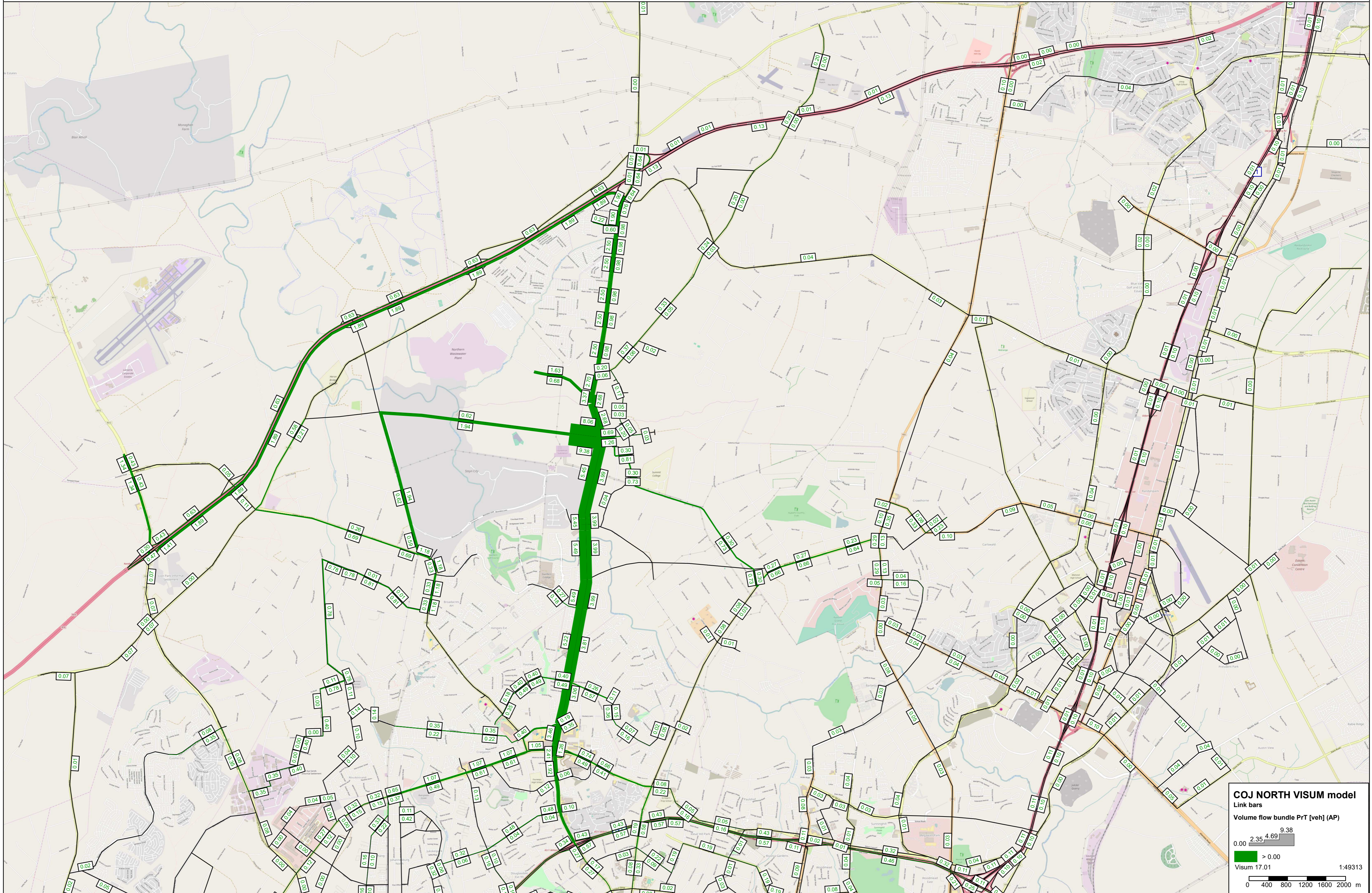
A-2 TOLPLAN VISSUM MODEL OUTPUTS

CITY OF JOHANNESBURG NORTH VISUM MODEL



COJ NORTH VISUM model
 Link bars
 Number of private vehicles
 0 2500 5000 10000
 Visum 17.01 1:12764
 0 200 400 600 m

CITY OF JOHANNESBURG NORTH VISUM MODEL



COJ NORTH VISUM model
Link bars
Volume flow bundle PrT [veh] (AP)
0.00 2.35 4.69 9.38
Visum 17.01
1:49313
0 400 800 1200 1600 2000 m

APPENDIX

A-3 *ERLING RD / RIVERSANDS BLVD PROPOSED UPGRADES*

LEGEND

- NEW ROAD SURFACE - ASPHALT
- NEW ROAD SURFACE - 60mm PAVERS
- CONCRETE STORMWATER CHANNEL
- NEW ROAD SURFACE - DRYLAC
- NEW ROAD RESERVE BOUNDARY
- ERP BOUNDARIES / ROAD RESERVE
- BENCHMARKS / REFERENCE POINTS
- EXISTING GROUND ELEVATIONS
- EXISTING FENCE-LINE
- EXISTING WALL
- EXISTING GUARDRAIL
- EXISTING ROAD SIGN
- EXISTING SIGN BOARD
- EXISTING DISTANCE MARKER
- EXISTING REFUSE BIN
- EXISTING TRAFFIC SIGNAL
- EXISTING STREET LIGHT POLE
- EXISTING ELECTRICAL MAST/POLE
- EXISTING ELEC. LINE
- EXISTING ELEC. OVERHEAD LINE
- EXISTING ELEC. MANHOLE
- EXISTING ELEC. BOX/TRANSFORMER
- EXISTING SEWER PIPE
- EXISTING SEWER MANHOLE
- EXISTING SEWER CLEANING EYE
- EXISTING STORMWATER PIPE
- EXISTING STORMWATER MANHOLE
- EXISTING WATER PIPE
- EXISTING WATER END CAP
- EXISTING WATER VALVE
- EXISTING WATER METER
- EXISTING TELKOM CABLE
- EXISTING TELKOM MANHOLE
- EXISTING TELEPHONE POLE

GENERAL NOTES

THIS DRAWING IS NOT TO BE SCALED. USE FIGURED DIMENSIONS ONLY. ANY DISCREPANCIES OR QUERIES RELATED TO THIS DRAWING TO BE REFERRED TO THE ENGINEER FOR CLARIFICATION BEFORE WORK IS COMMENCED. NO ALTERATIONS OR AMENDMENTS SHALL BE MADE TO THIS DRAWING WITHOUT REFERENCE TO THE ENGINEERS.

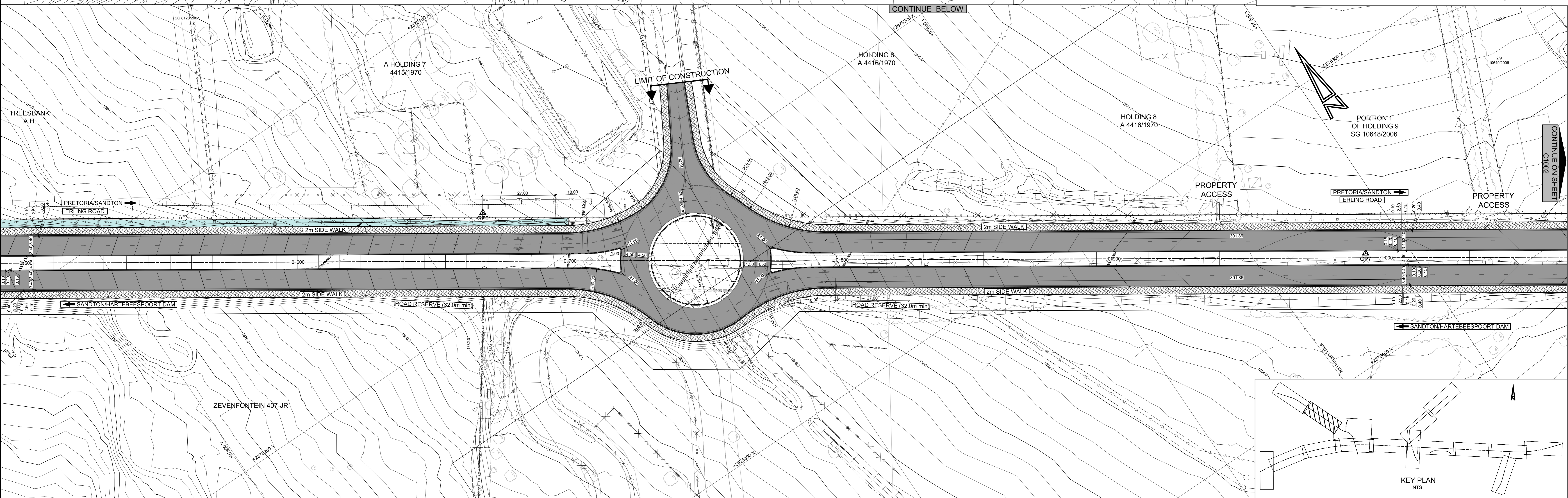
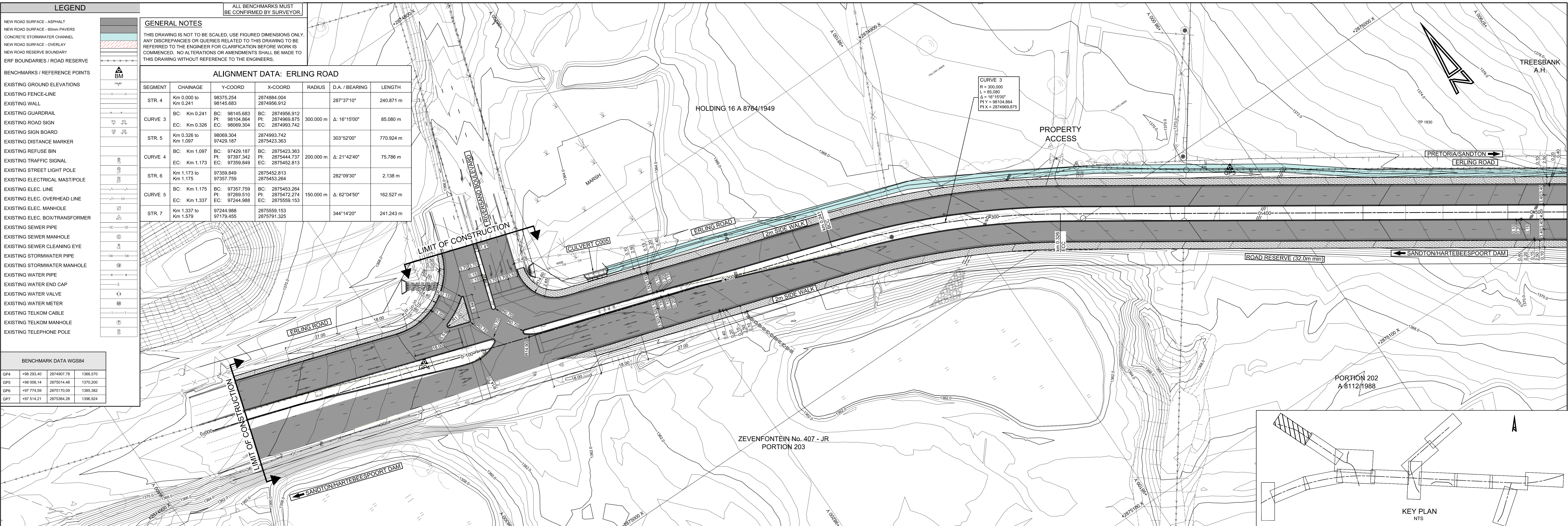
ALL BENCHMARKS MUST BE CONFIRMED BY SURVEYOR

ALIGNMENT DATA: ERLING ROAD

SEGMENT	CHAINAGE	Y-COORD	X-COORD	RADIUS	D.A. / BEARING	LENGTH
STR. 4	Km 0.000 to Km 0.241	98375.254 98145.993	2874884.004 2874956.912		287°37'10"	240.871 m
CURVE 3	BC: Km 0.241 EC: Km 0.326	BC: 98145.683 PI: 98104.864 EC: 98069.304	BC: 2874956.912 PI: 2874969.875 EC: 2874993.742	300.000 m	Δ: 16°15'00"	85.080 m
STR. 5	Km 0.326 to Km 1.097	98069.304 97429.187	2874993.742 2875423.363		303°52'00"	770.924 m
CURVE 4	BC: Km 1.097 EC: Km 1.173	BC: 97429.187 PI: 97397.342 EC: 97359.849	BC: 2875423.363 PI: 2875444.737 EC: 2875452.813	200.000 m	Δ: 21°42'40"	75.786 m
STR. 6	Km 1.173 to Km 1.175	97359.849 97357.759	2875452.813 2875453.264		282°09'30"	2.138 m
CURVE 5	BC: Km 1.175 EC: Km 1.337	BC: 97357.759 PI: 97269.510 EC: 97244.988	BC: 2875453.264 PI: 2875472.274 EC: 2875559.153	150.000 m	Δ: 62°04'50"	162.527 m
STR. 7	Km 1.337 to Km 1.679	97244.988 97178.455	2875559.153 2875791.325		344°14'20"	241.243 m

BENCHMARK DATA WGS84

GPX	Easting	Northing	Height
GP1	+48 293.40	2874897.78	1366.570
GP2	+48 306.14	2875114.48	1376.209
GP3	+47 774.59	2875170.09	1365.382
GP7	+47 514.21	2875364.28	1366.824



WSP
WSP Group Africa (Pty) Ltd
Commercial Civils
314 Glenwood Road, Lynnwood Park, Pretoria, 0081
Private Suite 287, Private Bag 2025, Lynnwood Ridge, 0040
Tel: +27(0)12 762 1200 Fax: +27(0)12 762 1301 www.wsp.com

DESIGNED	IS KRAFFT	2018-09-25
DRAWN	ICRC	2018-09-25
CHECKED	B. WHITE	2018-09-25
SERVICES CHECKED		
GEOTECHNICAL INVESTIGATION		
SURVEYING		
APPROVED	B. WHITE	2018-09-25
PREL. ENG. NO.	20130354	DATE: 2018-09-25

Joburg
JOHANNESBURG
ROADS AGENCY
TELL : (011) 298-5000
FAX : (011) 298-5188

Construction of K56 between K46 (William Nicol Rd) and P71-1 (Main Rd) (4.40 km) and the Extension of Erling Rd between Dorothy Road and K56 (1.3 km).
GEOMETRIC LAYOUT PLAN (SHEET 1 OF 3)

SCALE	APPROVALS		APPROVED	DATE	DRAWING No.
	A	FOR APPROVAL			
1:500					FILE No.
					CONTRACT No.

14095 C1001 A

APPENDIX

A-4 DETAILED SIDRA ANALYSIS RESULTS

Riversands Boulevard / Riversands Road (Rose Road)

MOVEMENT SUMMARY

 **Site: 101 [2027 AM + Lat + Dev]**

Intersection of Riverside Blvd and Riverside Road (Rose Rd)
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total	HV				Vehicles	Distance			
		veh/h	%								
South: Riverside Blvd											
1	L2	18	3.0	0.389	3.0	LOS A	1.6	11.2	0.35	0.31	57.0
2	T1	1016	3.0	0.389	3.3	LOS A	1.6	11.2	0.37	0.33	60.0
3	R2	33	3.0	0.389	10.5	LOS B	1.5	10.7	0.38	0.36	61.9
Approach		1066	3.0	0.389	3.5	LOS A	1.6	11.2	0.37	0.34	60.0
East: Riverside Road (Rose Rd)											
4	L2	22	3.0	0.106	3.3	LOS A	0.4	2.8	0.44	0.35	56.5
5	T1	184	3.0	0.106	3.6	LOS A	0.4	2.8	0.44	0.42	58.9
6	R2	59	3.0	0.106	11.0	LOS B	0.3	2.4	0.44	0.58	59.1
Approach		265	3.0	0.106	5.2	LOS A	0.4	2.8	0.44	0.45	58.8
North: Riverside Blvd											
7	L2	17	3.0	0.278	2.7	LOS A	1.1	7.6	0.30	0.29	57.3
8	T1	634	3.0	0.278	3.0	LOS A	1.1	7.6	0.30	0.35	59.9
9	R2	123	3.0	0.278	10.2	LOS B	1.0	7.3	0.31	0.45	60.7
Approach		774	3.0	0.278	4.1	LOS A	1.1	7.6	0.31	0.36	60.0
West: Riverside Road (Rose Rd)											
10	L2	55	3.0	0.129	3.8	LOS A	0.6	4.0	0.56	0.41	55.9
11	T1	135	3.0	0.129	4.0	LOS A	0.6	4.0	0.56	0.47	58.3
12	R2	99	3.0	0.129	11.5	LOS B	0.5	3.4	0.53	0.71	57.1
Approach		288	3.0	0.129	6.5	LOS A	0.6	4.0	0.55	0.54	57.4
All Vehicles		2394	3.0	0.389	4.2	LOS A	1.6	11.2	0.38	0.38	59.5

MOVEMENT SUMMARY

 **Site: 101 [2027 PM + Lat + Dev]**

Intersection of Riverside Blvd and Riverside Road (Rose Rd)
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total	HV				Vehicles	Distance			
		veh/h	%								
South: Riverside Blvd											
1	L2	84	3.0	0.216	2.7	LOS A	0.7	5.3	0.24	0.29	57.7
2	T1	511	3.0	0.216	2.9	LOS A	0.7	5.3	0.25	0.31	60.8
3	R2	22	3.0	0.216	10.1	LOS B	0.7	5.2	0.26	0.33	62.6
Approach		617	3.0	0.216	3.1	LOS A	0.7	5.3	0.25	0.31	60.4
East: Riverside Road (Rose Rd)											
4	L2	33	3.0	0.077	3.3	LOS A	0.3	2.0	0.44	0.36	56.6
5	T1	139	3.0	0.077	3.7	LOS A	0.3	2.0	0.44	0.42	59.2
6	R2	21	3.0	0.077	11.0	LOS B	0.2	1.8	0.44	0.48	60.5
Approach		193	3.0	0.077	4.4	LOS A	0.3	2.0	0.44	0.41	58.9
North: Riverside Blvd											
7	L2	53	3.0	0.325	2.7	LOS A	1.2	8.9	0.27	0.29	57.5
8	T1	813	3.0	0.325	3.0	LOS A	1.2	8.9	0.28	0.32	60.4
9	R2	59	3.0	0.325	10.2	LOS B	1.2	8.6	0.29	0.36	62.0
Approach		924	3.0	0.325	3.4	LOS A	1.2	8.9	0.28	0.32	60.3
West: Riverside Road (Rose Rd)											
10	L2	119	3.0	0.122	3.0	LOS A	0.4	2.7	0.33	0.34	57.4
11	T1	181	3.0	0.122	3.3	LOS A	0.4	2.7	0.35	0.39	59.8
12	R2	26	3.0	0.122	10.5	LOS B	0.4	2.6	0.35	0.42	61.4
Approach		326	3.0	0.122	3.8	LOS A	0.4	2.7	0.34	0.37	59.1
All Vehicles		2060	3.0	0.325	3.5	LOS A	1.2	8.9	0.30	0.33	60.0

Riversands Boulevard / Erling Road

MOVEMENT SUMMARY

 **Site: 101v [2027 AM + Lat + Dev - K56 Upgrades]**

Intersection of Riverside Boulevard and Erling Road

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles	Distance			
		veh/h	%								
East: Erling Road											
5	T1	132	3.0	0.062	9.7	LOS A	1.3	9.4	0.48	0.38	51.8
6	R2	342	3.0	0.440	18.3	LOS B	8.9	63.6	0.63	0.76	45.3
Approach		474	3.0	0.440	15.9	LOS B	8.9	63.6	0.59	0.66	46.9
North: Riverside Blvd											
7	L2	1	3.0	0.002	28.0	LOS C	0.0	0.2	0.70	0.60	40.3
9	R2	503	3.0	0.445	32.6	LOS C	8.9	64.1	0.85	0.80	38.5
Approach		504	3.0	0.445	32.5	LOS C	8.9	64.1	0.85	0.80	38.5
West: Erling Road											
10	L2	377	3.0	0.351	8.8	LOS A	4.9	35.4	0.40	0.68	51.7
11	T1	26	3.0	0.012	9.4	LOS A	0.3	1.8	0.46	0.33	52.0
Approach		403	3.0	0.351	8.8	LOS A	4.9	35.4	0.41	0.66	51.7
All Vehicles		1381	3.0	0.445	19.9	LOS B	8.9	64.1	0.63	0.71	44.6

MOVEMENT SUMMARY

 **Site: 101v [2027 PM + Lat + Dev- K56 Upgrades]**

Intersection of Riverside Boulevard and Erling Road

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles	Distance			
		veh/h	%								
East: Erling Road											
5	T1	34	3.0	0.057	35.3	LOS D	0.6	4.6	0.88	0.62	38.0
6	R2	21	3.0	0.105	43.9	LOS D	0.8	6.1	0.91	0.71	34.4
Approach		55	3.0	0.105	38.6	LOS D	0.8	6.1	0.89	0.65	36.6
North: Riverside Blvd											
7	L2	274	3.0	0.212	10.3	LOS B	4.0	28.9	0.36	0.68	50.1
9	R2	301	3.0	0.116	9.9	LOS A	2.0	14.6	0.33	0.65	50.5
Approach		575	3.0	0.212	10.1	LOS B	4.0	28.9	0.35	0.67	50.3
West: Erling Road											
10	L2	402	3.0	0.258	6.3	LOS A	1.9	13.3	0.20	0.61	53.5
11	T1	124	3.0	0.209	36.6	LOS D	2.4	17.5	0.91	0.69	37.5
Approach		526	3.0	0.258	13.5	LOS B	2.4	17.5	0.37	0.63	48.6
All Vehicles		1156	3.0	0.258	13.0	LOS B	4.0	28.9	0.38	0.65	48.7

Porcupine Park Avenue / View Road

MOVEMENT SUMMARY

 **Site: 101 [2027 AM + Lat + Dev]**

Intersection of View Road and Porcupine Park Road
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total	HV				Vehicles	Distance			
		veh/h	%								
South: View Rd											
1	L2	43	3.0	0.052	5.3	LOS A	0.2	1.7	0.51	0.56	55.1
2	T1	5	3.0	0.109	4.4	LOS A	0.6	4.2	0.51	0.67	52.8
3	R2	122	3.0	0.109	11.0	LOS B	0.6	4.2	0.51	0.67	53.5
Approach		171	3.0	0.109	9.3	LOS A	0.6	4.2	0.51	0.64	53.8
East: Porcupine Park Rd											
4	L2	693	3.0	0.509	4.4	LOS A	3.6	25.6	0.52	0.54	55.1
5	T1	442	3.0	0.398	4.2	LOS A	2.4	17.0	0.48	0.43	56.9
6	R2	5	3.0	0.398	10.8	LOS B	2.4	17.0	0.48	0.43	57.6
Approach		1140	3.0	0.509	4.4	LOS A	3.6	25.6	0.50	0.50	55.8
North: View Rd											
7	L2	5	3.0	0.025	6.9	LOS A	0.1	0.8	0.69	0.74	52.6
8	T1	5	3.0	0.025	6.8	LOS A	0.1	0.8	0.69	0.74	54.5
9	R2	5	3.0	0.025	13.3	LOS B	0.1	0.8	0.69	0.74	55.2
Approach		16	3.0	0.025	9.0	LOS A	0.1	0.8	0.69	0.74	54.1
West: Porcupine Park Rd											
10	L2	5	3.0	0.522	3.8	LOS A	3.9	27.8	0.39	0.35	55.3
11	T1	1220	3.0	0.522	3.5	LOS A	3.9	27.8	0.40	0.40	56.9
12	R2	246	3.0	0.522	10.2	LOS B	3.8	27.2	0.41	0.48	56.7
Approach		1472	3.0	0.522	4.7	LOS A	3.9	27.8	0.40	0.41	56.9
All Vehicles		2798	3.0	0.522	4.9	LOS A	3.9	27.8	0.45	0.46	56.2

MOVEMENT SUMMARY

 **Site: 101 [2027 PM + Lat + Dev]**

Intersection of View Road and Porcupine Park Road
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total	HV				Vehicles	Distance			
		veh/h	%								
South: View Rd											
1	L2	233	3.0	0.314	6.7	LOS A	1.3	9.7	0.64	0.78	54.3
2	T1	5	3.0	0.621	7.2	LOS A	4.4	31.8	0.74	0.99	51.5
3	R2	653	3.0	0.621	13.8	LOS B	4.4	31.8	0.74	0.99	52.1
Approach		891	3.0	0.621	11.9	LOS B	4.4	31.8	0.72	0.94	52.6
East: Porcupine Park Rd											
4	L2	163	3.0	0.384	3.5	LOS A	2.6	18.6	0.25	0.34	56.2
5	T1	976	3.0	0.384	3.2	LOS A	2.6	18.6	0.25	0.33	58.3
6	R2	5	3.0	0.384	9.8	LOS A	2.5	18.2	0.26	0.32	59.1
Approach		1144	3.0	0.384	3.2	LOS A	2.6	18.6	0.25	0.33	58.0
North: View Rd											
7	L2	5	3.0	0.024	6.5	LOS A	0.1	0.8	0.68	0.69	52.8
8	T1	5	3.0	0.024	6.4	LOS A	0.1	0.8	0.68	0.69	54.7
9	R2	5	3.0	0.024	13.0	LOS B	0.1	0.8	0.68	0.69	55.4
Approach		16	3.0	0.024	8.6	LOS A	0.1	0.8	0.68	0.69	54.2
West: Porcupine Park Rd											
10	L2	5	3.0	0.242	5.7	LOS A	1.6	11.4	0.72	0.54	53.5
11	T1	354	3.0	0.242	5.6	LOS A	1.6	11.4	0.72	0.59	55.2
12	R2	58	3.0	0.242	12.5	LOS B	1.5	10.4	0.72	0.67	55.2
Approach		417	3.0	0.242	6.6	LOS A	1.6	11.4	0.72	0.60	55.1
All Vehicles		2467	3.0	0.621	7.0	LOS A	4.4	31.8	0.50	0.60	55.4

Runnymede Avenue / Cedar Road

MOVEMENT SUMMARY

 **Site: 101v [2027 AM + Lat - Upgrade + Dev]**

Intersection of Cedar Road and Runnymede Avenue

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles	Distance			
		veh/h	%								
East: Cedar Rd											
5	T1	1933	3.0	0.804	9.8	LOS A	33.7	241.8	0.66	0.62	51.7
6	R2	409	3.0	0.811	45.2	LOS D	16.3	117.3	1.00	1.08	34.0
Approach		2342	3.0	0.811	16.0	LOS B	33.7	241.8	0.72	0.70	47.3
North: Runnymede Ave											
7	L2	328	3.0	0.956	66.0	LOS E	18.7	134.0	1.00	1.04	28.4
9	R2	65	3.0	0.190	39.3	LOS D	2.5	17.7	0.88	0.75	35.9
Approach		394	3.0	0.956	61.6	LOS E	18.7	134.0	0.98	0.99	29.4
West: Cedar Rd											
10	L2	701	3.0	0.979	61.3	LOS E	40.7	291.9	0.98	1.06	29.5
11	T1	596	3.0	0.351	18.9	LOS B	8.8	63.4	0.72	0.62	45.8
Approach		1297	3.0	0.979	41.8	LOS D	40.7	291.9	0.86	0.86	35.2
All Vehicles		4033	3.0	0.979	28.8	LOS C	40.7	291.9	0.79	0.78	40.5

MOVEMENT SUMMARY

 **Site: 101v [2027 PM + Lat - Upgrade + Dev]**

Intersection of Cedar Road and Runnymede Avenue

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

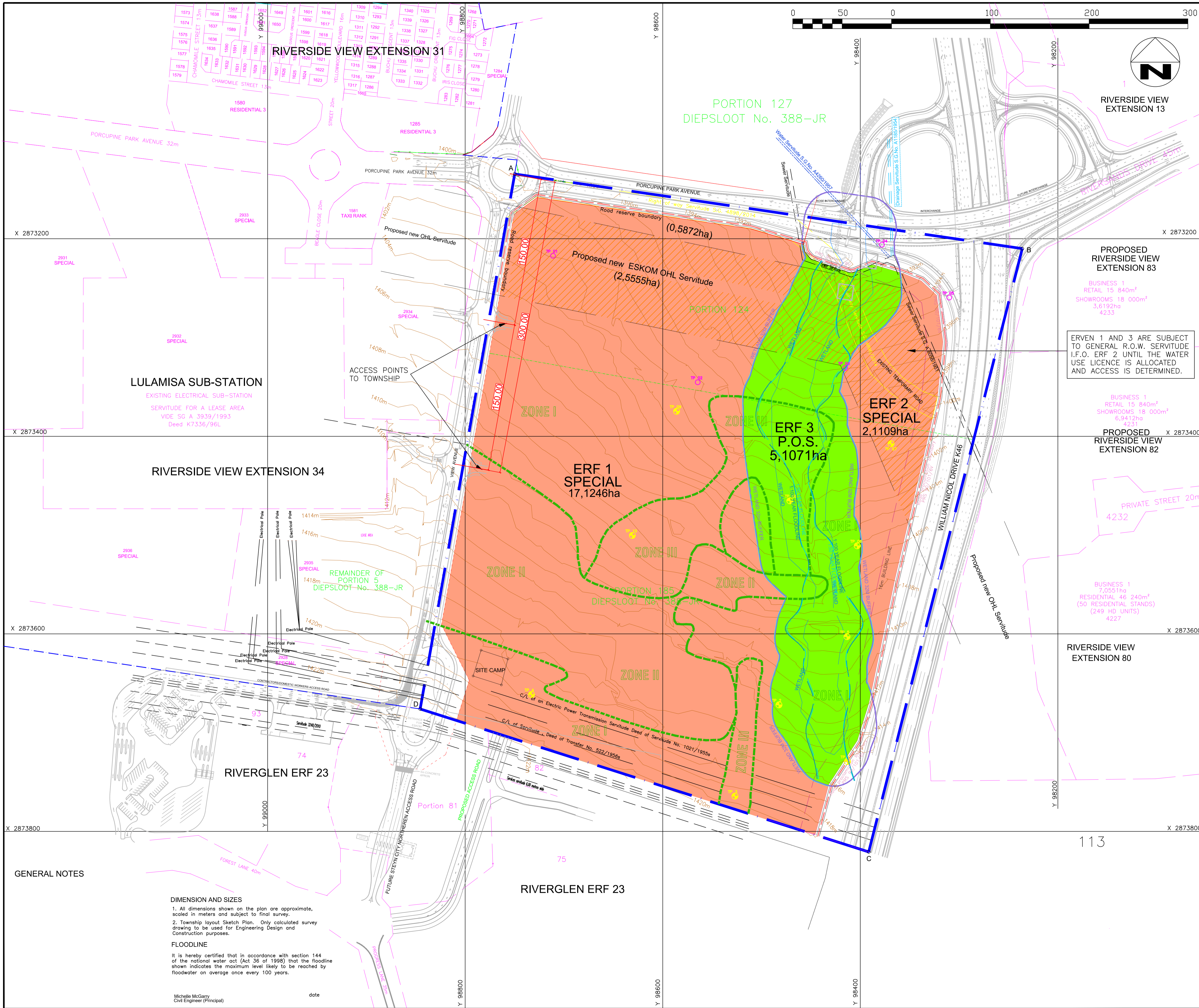
Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total	HV				Vehicles	Distance			
		veh/h	%								
East: Cedar Rd											
5	T1	477	3.0	0.239	12.5	LOS B	5.7	40.6	0.58	0.49	49.8
6	R2	269	3.0	0.814	50.3	LOS D	11.6	83.4	1.00	1.06	32.5
Approach		746	3.0	0.814	26.2	LOS C	11.6	83.4	0.73	0.70	41.7
North: Runnymede Ave											
7	L2	338	3.0	0.898	47.9	LOS D	22.2	159.5	0.94	0.97	33.0
9	R2	577	3.0	0.898	47.9	LOS D	22.2	159.5	0.94	0.97	33.1
Approach		915	3.0	0.898	47.9	LOS D	22.2	159.5	0.94	0.97	33.1
West: Cedar Rd											
10	L2	67	3.0	0.907	50.1	LOS D	24.9	179.1	0.98	1.06	33.8
11	T1	1546	3.0	0.907	44.7	LOS D	28.8	206.7	0.99	1.07	34.5
Approach		1614	3.0	0.907	44.9	LOS D	28.8	206.7	0.99	1.07	34.5
All Vehicles		3275	3.0	0.907	41.5	LOS D	28.8	206.7	0.92	0.96	35.5



Annexure C

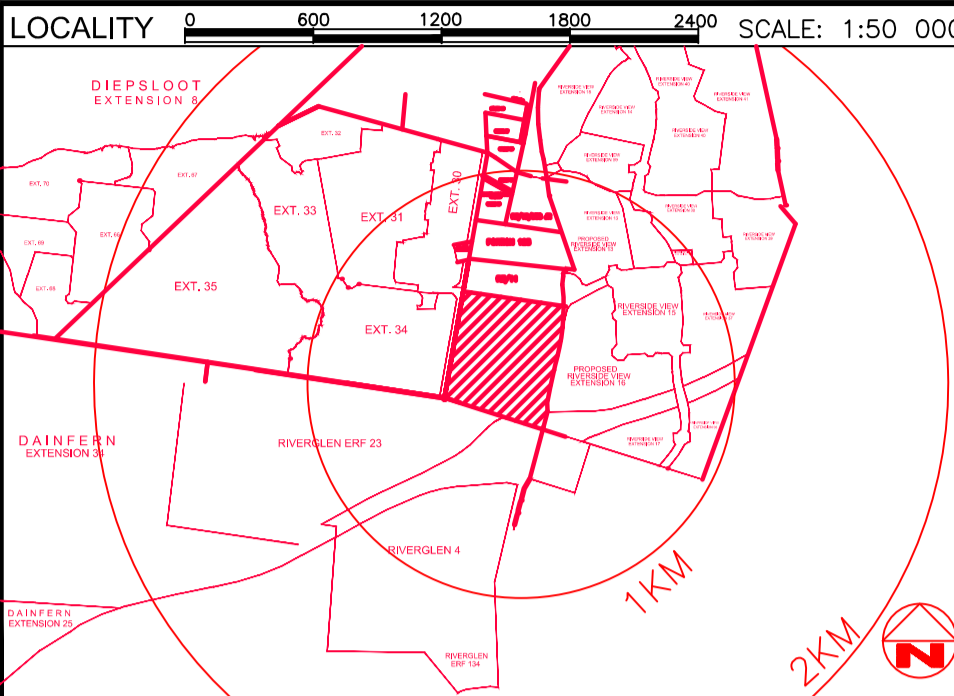
Amended Township Layout



PROPOSED TOWNSHIP
RIVERSIDE VIEW EXTENSION 84
 PROPOSAL

SITUATED ON PORTION 124 AND 185 OF THE FARM DIEPSLOOT 388 JR.

LOCAL AUTHORITY : CITY OF JOHANNESBURG
 TOWN PLANNING SCHEME: PERI-URBAN TPS 1975
 REGION: FOURWAYS
 GEODETICAL SYSTEM : WG 29



LAND USE TABLE

ZONING PERI-URBAN TPS	PROPOSED LAND USE	ERF NUMBERS	No. OF STANDS	AREA OF STANDS	% OF AREA
SPECIAL	SPECIAL FOR PLACE OF RESTRICTION, RESIDENTIAL DWELLING UNITS, STORAGE, OFFICES, INCLUDING ANCILLARY USES SUCH AS RESTAURANTS AND SHOPS	1, 2	2	19,2355	65,72
P.O.S.	P.O.S.	3	1	5,1071	17,45
STREETS	WILLIAM NICOL ROAD			3,6990	12,63
	STREET			1,2278	4,20
TOTAL			3	29,2694	100%

PROPOSED RIVERSIDE VIEW EXTENSION 83

BUSINESS 1
 RETAIL 15 840m²
 SHOWROOMS 18 000m²
 4233

ERVEN 1 AND 3 ARE SUBJECT TO GENERAL R.O.W. SERVITUDE I.F.O. ERF 2 UNTIL THE WATER USE LICENCE IS ALLOCATED AND ACCESS IS DETERMINED.

BUSINESS 1
 RETAIL 15 840m²
 SHOWROOMS 18 000m²
 4233

PROPOSED RIVERSIDE VIEW EXTENSION 82

- GENERAL NOTES**
- THE FIGURE ABCDA REPRESENTS OUTSIDE BOUNDARY OF THE PROPOSED TOWNSHIP RIVERSIDE VIEW EXTENSION 84 (PROPOSAL), BEING APPROXIMATELY 29,2694ha IN EXTENT.
- OUTSIDE BOUNDARY OF TOWNSHIP
 - GEOTECHNICAL ZONES
 - 1:50 YEARS FLOODLINE
 - 1:100 YEARS FLOODLINE
 - LINE OF NO ACCESS
 - FARM PORTIONS
 - 32m WETLAND BUFFER
 - WETLAND
 - PROPOSED NEW ESKOM OHL SERVITUDE
 - TEST PITS 1 TO 5 = REPORT 1107
 - TEST PITS 1 TO 10 = REPORT 1040

REVISIONS

	D: DRAFT	C: CIRCULATED	A: APPROVED
D1	ADD WETLAND AND WETLAND 32m BUFFER LINES.	C. Mason	21.04.2017
D2	PROPOSED POWERLINE SERVITUDE ADDED.	C. Mason	2017.05.11
D3	AMEND UNDETERMINED ERF TO SPECIAL.	C. Mason	2017.09.13
D4	AMEND PART SPECIAL ERF 1 TO SPECIAL AND P.O.S.	C. Mason	2018.01.22
D5	GEOLOGICAL ZONES TRACE FROM PENDO PLAN.	C. Mason	2018.06.06
D6	AMEND PRIVATE STREET TO STREET.	C. Mason	2018.08.15
D7	AMENDED THE CONDITIONS OF "SPECIAL" IN LAND USE TABLE	J. Pienaar	2018.08.28
D8	AMENDED ROAD	N. Lekhele	2018.09.13
D9	ADDED 1:50 & 1:100 YEAR FLOODLINE and AMENDED FLOODLINE NOTE ACCORDINGLY	J.Pienaar	2018.10.22

CLIENT: **STEYN CITY PROPERTIES PTY (Ltd)**

TOWN PLANNER: S. KRIEK Pr. PLN: A/734/1993

SCALE: **1:2 500**

DRAWING REF: **Riverside84_Lay D9/2018.10.22**

DRAWING STATUS: **DRAFT**

GENERAL NOTES

DIMENSION AND SIZES

- All dimensions shown on the plan are approximate, scaled in meters and subject to final survey.
- Township layout Sketch Plan. Only calculated survey drawing to be used for Engineering Design and Construction purposes.

FLOODLINE

It is hereby certified that in accordance with section 144 of the national water act (Act 36 of 1998) that the floodline shown indicates the maximum level likely to be reached by floodwater on average once every 100 years.

Michelle McGarry
 Civil Engineer (Principal)

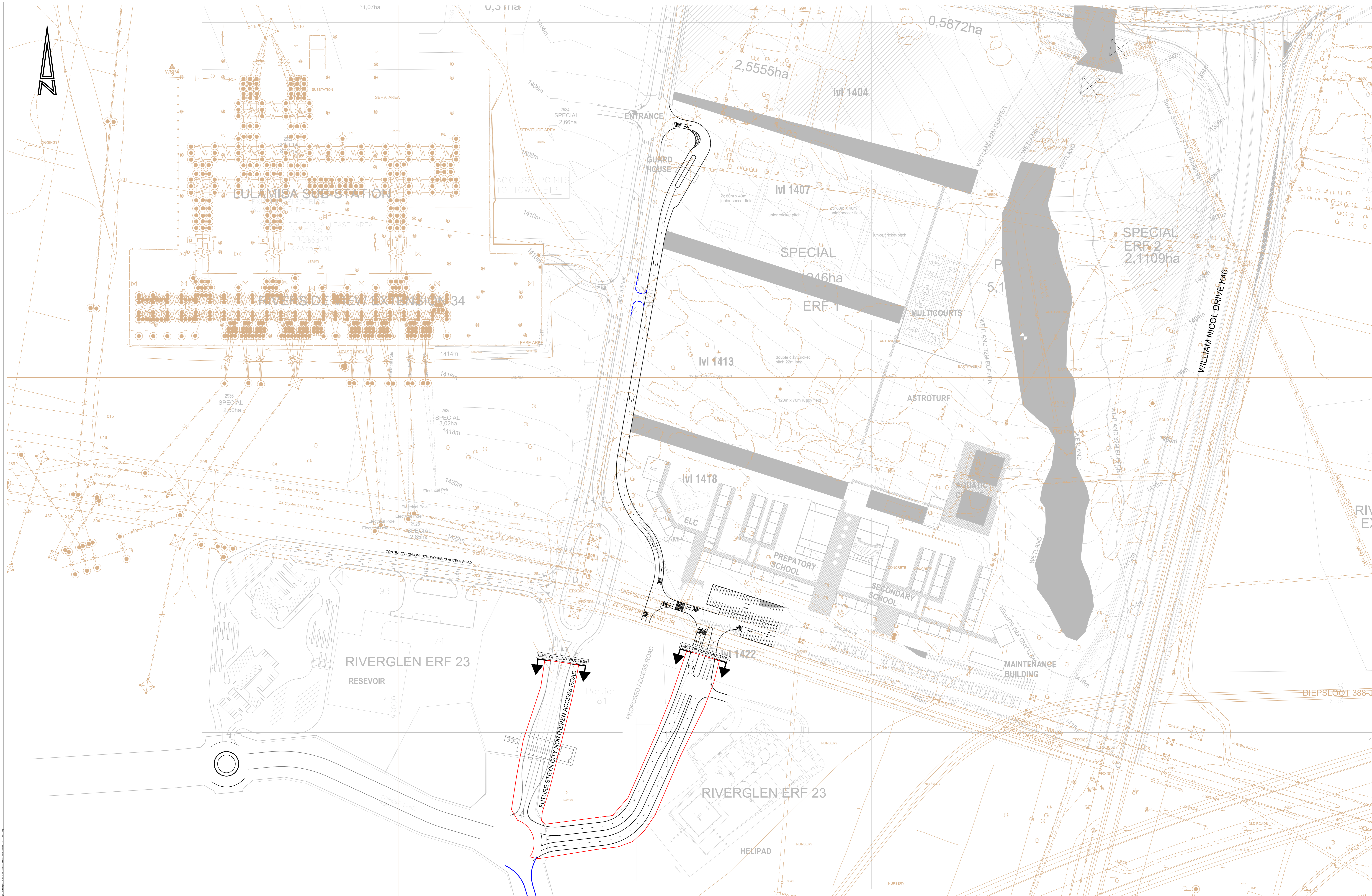
date

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 2031
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 2109
 TEL: (+27 11) 482-4131
 FAX: (+27 11) 482-9959
 E-MAIL: seimo@urbandynamics.co.za



Annexure D

Conceptual Layout Plan



REV	DATE	BY	DESCRIPTION	CHK	APP	REV	DATE	BY	DESCRIPTION	CHK	APP
A	2019/04/24	DM	INITIAL ISSUE			FJR	FJR				

ARCHITECT:	CLIENT:	STEYN CITY PROPERTIES
DRAWING STATUS:	PRELIMINARY	A signed version of construction drawings are available in electronic format at the WSP office of origin as well as at the WSP office of issue.

wsp

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Commercial Civils
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PROJECT:	STEYN CITY NORTHERN ACCESS SCHOOL
TITLE:	GENERAL LAYOUT

SCALE @ A0:	1:1000	CHECKED:	FJR	APPROVED:	FJR
DESIGN:		DRAWN:	DM	DATE:	2019/04/24
PROJECT No:	19140	DRAWING No:	SKC310	REV:	A

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SIDRA Results

MOVEMENT SUMMARY

 Site: [2027 AM + Lat + Dev]

Intersection of View Road and Porcupaine Park Road
 Signals - Fixed Time Isolated Cycle Time = 70 seconds (Practical Cycle Time)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h	
South: View Rd												
1	L2	43	3.0	0.298	40.3	LOS D	1.7	12.0	0.97	0.73	35.7	
2	T1	5	3.0	0.298	34.7	LOS C	1.7	12.0	0.97	0.73	36.4	
3	R2	122	3.0	0.750	44.0	LOS D	4.6	33.0	1.00	0.88	34.4	
Approach		171	3.0	0.750	42.8	LOS D	4.6	33.0	0.99	0.84	34.8	
East: Porcupine Park Rd												
4	L2	693	3.0	0.495	9.5	LOS A	9.6	68.6	0.44	0.72	50.6	
5	T1	442	3.0	0.331	4.0	LOS A	5.7	40.7	0.40	0.36	56.3	
6	R2	5	3.0	0.331	9.6	LOS A	5.7	40.7	0.40	0.36	54.7	
Approach		1140	3.0	0.495	7.4	LOS A	9.6	68.6	0.42	0.58	52.7	
North: View Rd												
7	L2	5	3.0	0.112	39.6	LOS D	0.5	3.8	0.95	0.68	36.4	
8	T1	5	3.0	0.112	34.0	LOS C	0.5	3.8	0.95	0.68	37.1	
9	R2	5	3.0	0.112	39.6	LOS D	0.5	3.8	0.95	0.68	36.4	
Approach		16	3.0	0.112	37.8	LOS D	0.5	3.8	0.95	0.68	36.6	
West: Porcupine Park Rd												
10	L2	5	3.0	0.832	15.0	LOS B	31.2	224.2	0.73	0.73	50.6	
11	T1	1220	3.0	0.832	9.4	LOS A	31.2	224.2	0.73	0.73	52.0	
12	R2	246	3.0	0.877	43.0	LOS D	11.3	81.3	0.91	1.08	34.7	
Approach		1472	3.0	0.877	15.1	LOS B	31.2	224.2	0.76	0.78	48.0	
All Vehicles		2798	3.0	0.877	13.8	LOS B	31.2	224.2	0.64	0.70	48.5	

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.

Intersection and Approach LOS values are based on average delay for all vehicle 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: [2027 PM + Lat + Dev]

Intersection of View Road and Porcupaine Park Road
 Signals - Fixed Time Isolated Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: View Rd											
1	L2	233	3.0	0.246	17.2	LOS B	5.2	37.0	0.59	0.73	45.8
2	T1	5	3.0	0.246	11.6	LOS B	5.2	37.0	0.59	0.73	46.9
3	R2	653	3.0	0.872	35.2	LOS D	28.0	201.1	0.95	0.98	37.5
Approach		891	3.0	0.872	30.4	LOS C	28.0	201.1	0.86	0.91	39.4
East: Porcupine Park Rd											
4	L2	163	3.0	0.870	41.0	LOS D	24.8	178.1	1.00	1.03	36.7
5	T1	976	3.0	0.870	35.4	LOS D	24.8	178.1	1.00	1.03	37.7
6	R2	5	3.0	0.870	41.0	LOS D	24.7	177.4	1.00	1.03	37.3
Approach		1144	3.0	0.870	36.2	LOS D	24.8	178.1	1.00	1.03	37.6
North: View Rd											
7	L2	5	3.0	0.021	16.8	LOS B	0.3	2.3	0.54	0.57	47.0
8	T1	5	3.0	0.021	11.3	LOS B	0.3	2.3	0.54	0.57	48.2
9	R2	5	3.0	0.021	16.9	LOS B	0.3	2.3	0.54	0.57	47.1
Approach		16	3.0	0.021	15.0	LOS B	0.3	2.3	0.54	0.57	47.4
West: Porcupine Park Rd											
10	L2	5	3.0	0.537	28.9	LOS C	11.5	82.2	0.86	0.74	42.5
11	T1	354	3.0	0.537	23.3	LOS C	11.5	82.2	0.86	0.74	43.4
12	R2	58	3.0	0.546	49.0	LOS D	2.4	17.4	1.00	0.77	32.9
Approach		417	3.0	0.546	27.0	LOS C	11.5	82.2	0.88	0.74	41.5
All Vehicles		2467	3.0	0.872	32.4	LOS C	28.0	201.1	0.92	0.94	38.9

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.

Intersection and Approach LOS values are based on average delay for all vehicle 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.