ERF 878
RIEBEEK-KASTEEL

TRANSPORT IMPACT ASSESSMENT

MARCH 2024

Liezl Stodart Pr Eng

COVER PAGE

Certification

It is herewith certified that this Transport Impact Assessment has been prepared according to the requirements of the South African Traffic Impact and Site Traffic Assessment Manual.

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Application details:

a) Municipality name: Swartland Municipality

b) Type of assessment: Transport Impact Assessment

c) Particulars of the Site Development Plan: Riebeeck Kasteel, Subdivision and Rezoning Plan (Drawing No: Rev 46 by InterActive Town and Regional Planning; dated: 12 October 2023).

d) Erf numbers and farm names: Erf 878 Riebeeck-Kasteel

e) Date of report: March 2024

f) Name and address of the Assessor: Douw Louwrens B.Eng (Civil), 16 Jacobus Geldenhuys St, Onrus, 7201

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1. BACKGROUND

Liezl Stodart Pr Eng was appointed to assess the transport impact for the proposed subdivision and rezoning of erf 878, Riebeeck Kasteel. The property is located on the southwestern side of the town adjacent to Church Road (MR00227), approximately 700m north of the R46 / Church Road intersection. Please see the attached ***Figure 1,*** Annexure B.

2. DEVELOPMENT PROPOSAL

The development will entail the subdivision and rezoning of Erf 878 to include the following:

Land Use	**GLA (m²)**	**Units / Erven**
Single residential	-	60 Erven
Town housing	-	62 Erven
Flats	-	28 Units
Frailcare	-	60 rooms
Retail	2661 m²	2
Filling station	343 m²	1

Please see the attached ***Subdivision and Rezoning Plan*** *(Drawing No: Rev 46 by InterActive Town and Regional Planning; dated: 12 October 2023*.

It is expected that the proposed development will be completed in 2028.

3. STUDY AREA

The primary study area was determined as the access roads and high-order roads in the vicinity of the development. The following elements were included in the study area:

- R46 (Trunk Road 2401)
- Church Road (Main Road 227)
- Main Street (Main Road 226)
- Fontein Street
- Intersections between these roads

4. EXISTING TRANSPORT INFRASTRUCTURE AND ACCESS

The roads discussed below are shown in the Locality Plan (***Figure 1***), Annexure B.

The R46 (Trunk Road 2401) is a Class 2 Major Arterial. It is a single-carriageway two-way road with one lane per direction and surfaced shoulders in a rural roadside development environment.

Church Road (Main Road 227) is a Class 3 Minor Arterial in a semi-rural roadside development environment in the vicinity of the development. It is a single-carriageway two-way road with one lane per direction and surfaced shoulders. Paved sidewalks and on-street parking are located along a section of Church Road to the north of the Main Street intersection. Several properties also obtain direct access off Church Road along this section.

The 2020 Provincial Access Management Guidelines document indicates an access spacing requirement of 260 m between two unsignalised full intersections and 105 m between an unsignalised full intersection (UFI) and a high-volume driveway (HVD) for Class 3 roads in a semi-rural roadside development environment.

The Erf 878 development will obtain access off Church Road via an unsignalised full intersection approximately 690 m north of the R46 / Church Road intersection. The position of the proposed access point was previously discussed with the Directorate: Road Planning, Transport and Public Works, Western Cape Government and is in line with the Swartland Municipal Spatial Development Framework (2017 – 2022), indicating the affected section of Church Road as an 'Activity Corridor'.

A left-in-only access is also proposed off Church Road approximately 100 m south of the Church Road / Main Street intersection serving the filling station and commercial component of the development.

The proposed access on Church Road will be positioned just to the south of 'The Barn' opposite an existing farm access road. The intersection will be located approximately 240 m north of the Het Vlock Kasteel access (HVD) and 190 m south of the Kloovenburg access (HVD) and proposed left-in access. Please refer to the attached ***Figure 3***. The spacing therefore complies with the access spacing requirements.

Main Street (Main Road 226) is a Class 4 Collector Street. It is a single-carriageway two-way road with one lane per direction in an intermediate roadside development environment with an urban cross-section, surfaced sidewalks and on-street parking located along sections of the road.

Fontein Street is a Class 5 Local Street in a suburban roadside development environment. It is a single-carriageway two-way road with one lane per direction with multiple direct property accesses.

An unsignalised full intersection providing access on the eastern side of the development is proposed on Fontein Street approximately 150 m south of the Fontein Street / Plein Street intersection and 85m north of the Fontein Street / Van Riebeeck Street intersection.

An emergency access is proposed on the southeastern corner of the development to tie into the Fontein Street / Kloof Street intersection.

5. EXISTING TRAFFIC

Available traffic counts at the Main Street / Fontein Street and Fontein Street / Plein Street intersections in conjunction with peak hour traffic volumes on R46, Church Road and Main Street were used to estimate existing peak hour traffic volumes at the affected intersections.

The Main Street / Fontein Street and Fontein Street / Plein Street intersection counts were carried out on the 25th of November 2017 and traffic volumes on R46, Church Road and Main Street were obtained from the Provincial Road Network Information System (PRNIS). These surveys were conducted on the 23rd of May 2022.

The peak hour traffic volumes were adjusted with growth rates, also obtained from the PRNIS, to obtain existing 2024 peak hour traffic volumes. Details of the traffic counts are given in ***Table 1***.

Table 1: Traffic count details

Intersection	Morning peak hour	Afternoon peak hour	% Minibus taxis	% Buses	% Heavy vehicles
R46 / Church Rd	07:00 – 08:00	17:00 – 18:00	1,4%	0,7%	16,8%
Church Rd / Main St	07:00 – 08:00	17:00 – 18:00	1,3%	0,6%	13,0%
Main St / Fontein St	09:00 – 10:00	14:15 – 15:15	0,8%	0,0%	0,5%
Fontein St / Plein St	09:00 – 10:00	14:15 – 15:15	0,0%	0,0%	0,0%

The affected intersections were analysed using SIDRA software. SIDRA calculates movement and intersection delays and assigns a service level based on the duration of the delay.

A level of service A denotes an excellent service level with very little delay, whereas a level of service F represents very long delays and a breakdown in service. A level of service D is generally taken as the lowest acceptable standard.

The results of the SIDRA analysis are summarised in ***Table 2***. Existing traffic volumes and service levels are shown in ***Figure 4***. All affected intersections currently operate at good service levels.

Table 2: Levels of service with existing (2024) traffic volumes

Intersection	Control measure	Morning peak hour			Afternoon peak hour		
		Inter-section LOS	Avg int delay (s)	Worst movement LOS	Inter-section LOS	Avg int delay (s)	Worst movement LOS
R46 / Church Rd	Side-street stop	-	5,3	A	-	5,6	A
Church Rd / Main St	Side-street stop	-	5,1	A	-	4,6	B
Main St / Fontein St	Side-street stop	-	7,5	A	-	7,5	A
Fontein St / Plein St	Side-street stop	-	3,6	A	-	4,6	A

6. BACKGROUND TRAFFIC DEMAND ESTIMATION

The TMH16 Traffic Impact Assessment Manual suggests that background traffic demand should be estimated for the design horizon and the planning horizon. The design horizon is the year when the development will be completed and the planning horizon is the year when the entire area in which the development is located, will be developed.

It is anticipated that the development will be completed by 2028 which makes this the development horizon. The site is located in a semi-rural to suburban development environment with little growth and the planning horizon was also assumed to be 2028.

Background traffic demand is constituted of two components: percentage growth and traffic build-up from other developments. An annual traffic growth rate from 2015 to 2022 of 2,53% for the R46, 0,63% for Church Road and -0,22% for Main Street was obtained from the Western Cape Government Road Network Information System (https://rnis.westerncape.gov.za/rnis/rnis_web_reports.main) which was used to calculate the

increase in traffic on roads in the study area. No growth was applied to Main Street and no additional growth was applied.

The affected intersections were again analysed with the SIDRA computer program. The results are summarised in ***Table 3***. The analysis shows that all intersections will continue to operate at good service levels. Year 2028 background traffic volumes and service levels are shown in ***Figure 5***.

Table 3: Levels of service with Year 2028 background traffic volumes

Intersection	Control measure	Morning peak hour			Afternoon peak hour		
		Inter-section LOS	Avg int delay (s)	Worst movement LOS	Inter-section LOS	Avg int delay (s)	Worst movement LOS
R46 / Church Rd	Side-street stop	-	5,2	A	-	5,5	A
Church Rd / Main St	Side-street stop	-	5,0	A	-	4,6	B
Main St / Fontein St	Side-street stop	-	7,5	A	-	7,5	A
Fontein St / Plein St	Side-street stop	-	3,6	A	-	4,6	A

7. DEVELOPMENT TRIPS

Trip generation rates were obtained from the COTO TMH 17 South African Trip Data Manual and the South African Trip Generation Rate Manual (SATGRM) for the filling station.

The SATGRM document indicates a 4% calling rate at filling stations which was used. The relevant size adjustment factor, pass-by and diverted traffic percentages as indicated in the COTO TMH 17 document were calculated and used for the retail component.

The development's trip generation potential is summarised in ***Table 4***.

Table 4: Development trip generation potential

			AM						PM					
Land Use	GLA (m^2)	Units	TGR	%IN	%OUT	TOTAL	IN	OUT	TGR	%IN	%OUT	TOTAL	IN	OUT
Single residential		60	1	25%	75%	60	15	45	1	70%	30%	60	42	18
Town housing		62	0.85	25%	75%	53	13	40	0.85	70%	30%	53	37	16
Flats		28	0.65	25%	75%	18	5	14	0.65	40%	60%	18	7	11
Frailcare		60	0.2	70%	30%	12	8	4	0.2	40%	60%	12	5	7
Retail	2661		2.6	65%	35%	70	46	25	15.0	40%	60%	399	160	239
Filling station	343	1	4%	100%	100%	21	10	10	4%	100%	100%	35	18	18
					Total:	**234**	**97**	**137**				**577**	**268**	**309**
					Pass-by	21	10	10				88	39	49
					Diverted	0	0	0				116	46	69
					New	213	87	127				373	183	191

The development will have the potential to generate a total of 234 trips (97 in; 137 out) during the AM peak hour and 577 trips (268 in; 309 out) during the PM peak hour. Of these, 20 trips (10 in; 10 out) during the AM peak hour and 88 trips (39 in; 49 out) during the PM peak hour,

will be pass-by trips, while 116 trips (46 in; 69 out) during the PM peak hour will be diverted trips.

Trips were distributed primarily to and from the southwest and northwest along Church Road, northeast along Main Street and directionally at the affected intersections according to existing splits experienced. The trip distribution is shown in ***Figure 6***.

8. TRAFFIC IMPACT

Trips generated by the proposed development were added to the background 2028 traffic volumes to obtain total traffic volumes. The affected intersections were again analysed with the increased traffic volumes to determine the traffic impact of the development. A summary of the analysis results is given in ***Table 5.*** Total traffic volumes and service levels are shown in ***Figure 7***.

Table 5: Levels of service with total 2028 traffic volumes

Intersection	Control measure	Morning peak hour			Afternoon peak hour		
		Inter-section LOS	Avg int delay (s)	Worst movement LOS	Inter-section LOS	Avg int delay (s)	Worst movement LOS
R46 / Church Rd	Side-street stop	-	5,7	A	-	6,4	B
Church Rd / Main St	Side-street stop	-	4,9	A	-	5,0	B
Main St / Fontein St	Side-street stop	-	7,5	A	-	7,6	A
Fontein St / Plein St	Side-street stop	-	3,2	A	-	4,1	A
Church Rd / Access	Side-street stop	-	3,0	A	-	5,2	B
Fontein St / Access	Side-street stop	-	4,0	A	-	3,2	A

Delays at the affected intersections will only increase slightly as a result of the development by 2028. Two new access intersections will be formed which will both operate at good service levels.

All newly formed internal intersections are expected to operate at good levels of service during the AM and PM peak hours.

The development will have a moderate impact on the surrounding road network, but no improvements will be required.

9. ACCESS, INTERNAL ROADS AND PARKING

The proposed access off Church Rd should be designed according to the local and provincial guidelines. Attention should be given to sight distances along Church Road.

The proposed access on Fontein Street should be designed according to local guidelines. Bell-mouth radii should preferably be 6,0 m (minimum 5,0 m).

The route through the development connecting Church Road in the west with Fontein Street in the east will function as a Class 5 Local Street. The road reserve width as indicated on the attached ***Subdivision & Rezoning Plan*** of 13,0 m is deemed adequate. The road should have a

blacktop width of at least 6,0 m. Other internal access roads have 10,0 m wide reserves indicated which are deemed adequate. Blacktop widths of these roads are proposed to be a minimum of 5,5 m and bell-mouths should preferably be 6,0 m (minimum 5,0 m).

Parking should be provided as per the Swartland Municipality Land Use Planning By-law document. ***Table 6*** summarises the off-street parking requirements for the proposed development:

Table 6: Off-street parking requirements of the proposed development

Land Use	GLA (m²)	Units / Erven	Requirement	Bays required
Single residential	-	60 Erven	2 bays/unit	120
Town housing	-	62 Erven	2 bays/unit	124
Flats	-	28 Units	1,5 bays / unit	42
Frail care	-	60 rooms	1 bay / 2 rooms	30
Retail	2661 m²	2	6 bays / 100 m²	160
Filling station	343 m²	1	4 bays / 100 m²	14

10. PUBLIC AND NON-MOTORISED TRANSPORT

It is expected that certain portions of the development will attract public transport trips. These include the filling station and retail components. It is proposed that adequate public transport facilities should be provided on the filling station- and retail premises.

It is furthermore proposed that a surfaced sidewalk be provided along at least one side of the 13 m reserve) through the development and up to the service station premises as this is expected to be the primary pedestrian route through the development.

No further public transport or non-motorised transport facilities are proposed.

11. CONCLUSIONS

It can be concluded that the proposed subdivision and rezoning of Erf 878, Riebeeck Kasteel will have a moderate traffic impact. Other findings are summarised as follows:

- The application is for the subdivision and rezoning of Erf 878 to include a residential component entailing single residential, townhousing and apartments. A filling station, retail component, and frail care centre are also proposed;
- The development will have the potential to generate a total of 234 trips (97 in; 137 out) during the AM peak hour and 577 trips (268 in; 309 out) during the PM peak hour;
- The development will obtain access off Church Rd via an unsignalised full intersection approximately 690 m north of the R46 / Church Rd intersection, a left-in-only access off Church Rd approximately 100 m south of the Church Rd / Main St intersection and an unsignalised full intersection on Fontein St approximately 150 m south of the Fontein St / Plein St intersection;
- All affected intersections in the vicinity of the development currently operate at good levels of service and will continue to do so with the addition of the proposed development's peak-hour trips;

- Newly formed intersections will operate at good levels of service during the AM and PM peak hours;
- The service station and retail components of the development will attract public transport trips;
- The Class 5 Local Street (13 m reserve) through the development and up to the service station premises is expected to be the primary pedestrian route through the development.

12. RECOMMENDATIONS

The recommendations made in the transport impact assessment are summarised below.

- The proposed access off Church Rd should be designed according to the local and provincial guidelines. Attention should be given to sight distances from the access along Church Road;
- The proposed access on Fontein Street should be designed according to local guidelines;
- The route through the development connecting Church Road in the west with Fontein Street in the east should have a blacktop width of at least 6,0 m. Other internal access roads should have minimum blacktop widths of 5,5 m and bell-mouth radii of 6,0m (minimum 5,0m);
- Off-street parking should be provided as per the Swartland Municipality Land Use Planning By-law document;
- It is proposed that adequate public transport facilities be provided at the filling station- and adjacent retail premises;
- It is furthermore proposed that a surfaced sidewalk be provided along at least one side of the Class 5 Local Street (13 m reserve) through the development and up to the filling station premises.

ANNEXURE A: PHOTOGRAPHIC RECORD OF EXISTING TRANSPORT FACILITIES

1. R46

Photo 1a: Looking southwest along the R46 from the Church Rd intersection

Photo 1b: Looking northeast along the R46 from the Church Rd intersection

Photo 1c: Looking north along Church Rd from the R46

2. Church Road

Photo 2a: Looking north along Church Rd from the proposed access intersection

Photo 2b: Looking south along Church Rd from the proposed access intersection

Photo 2c: Looking north along Church Rd from the Main St intersection

3. Main Street

Photo 3a: Looking northeast along Main St from Church Rd intersection

Photo 3b: Looking northeast along Main St from Fontein St intersection

Photo 3c: Looking southwest along Main St from Fontein St intersection

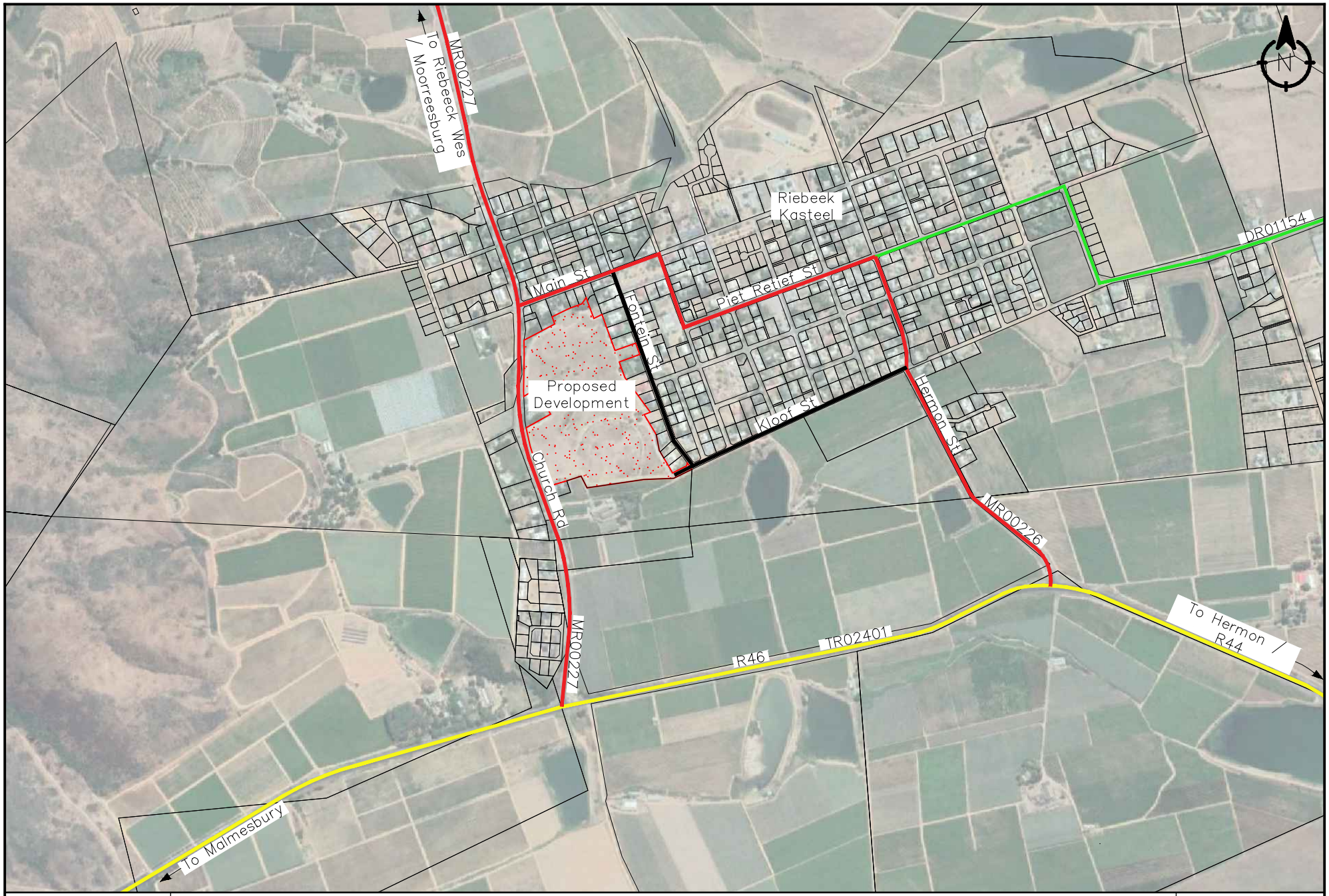
4. Fontein Street

Photo 3a: Looking southeast along Fontein St from Main St intersection

Photo 3b: Looking southeast along Fontein St from proposed access intersection

Photo 3c: Looking northwest along Fontein St from proposed access intersection

ANNEXURE B: DRAWINGS



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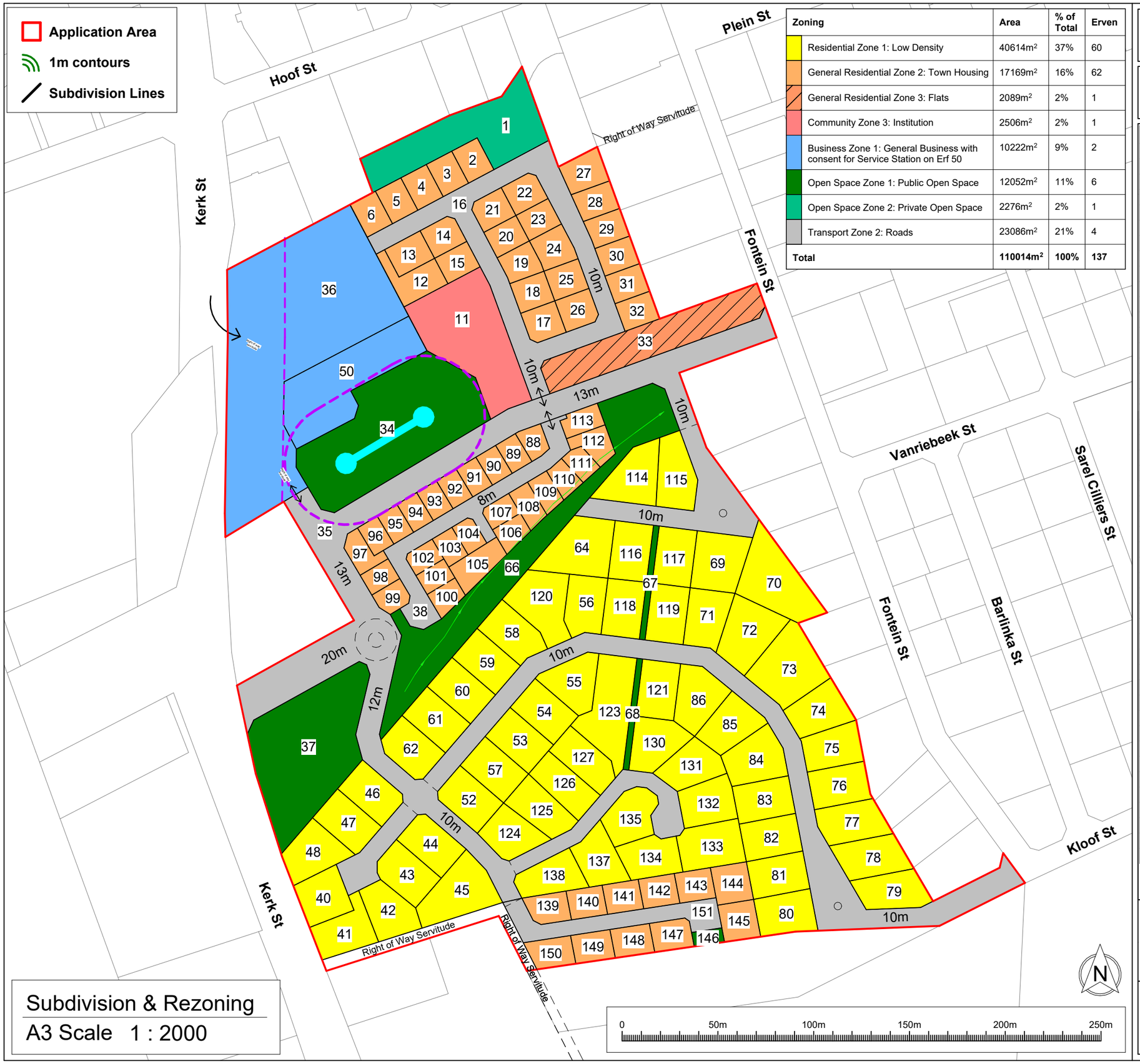
ERF 878
RIEBEEK KASTEEL
LOCALITY PLAN

FIGURE 1

SCALE
1:12 500 (A4)



Zoning	Area	% of Total	Erven
Residential Zone 1: Low Density	40614m²	37%	60
General Residential Zone 2: Town Housing	17169m²	16%	62
General Residential Zone 3: Flats	2089m²	2%	1
Community Zone 3: Institution	2506m²	2%	1
Business Zone 1: General Business with consent for Service Station on Erf 50	10222m²	9%	2
Open Space Zone 1: Public Open Space	12052m²	11%	6
Open Space Zone 2: Private Open Space	2276m²	2%	1
Transport Zone 2: Roads	23086m²	21%	4
Total	**110014m²**	**100%**	**137**

PROJECT

Riebeeck Kasteel

TITLE

Subdivision & Rezoning Plan

Erven	Area	Erven	Area	Erven	Area
1	2276m²	55	641m²	105	409m²
2	283m²	56	604m²	106	218m²
3	284m²	57	600m²	107	202m²
4	286m²	58	629m²	108	246m²
5	287m²	59	600m²	109	217m²
6	288m²	60	600m²	110	204m²
11	2506m²	61	600m²	111	198m²
12	471m²	62	613m²	112	289m²
13	341m²	64	975m²	113	249m²
14	306m²	66	3692m²	114	753m²
15	285m²	67	180m²	115	695m²
16	3574m²	68	176m²	116	610m²
17	327m²	69	792m²	117	600m²
18	314m²	70	1203m²	118	602m²
19	310m²	71	627m²	119	600m²
20	284m²	72	883m²	120	894m²
21	308m²	73	1103m²	121	600m²
22	310m²	74	649m²	123	1165m²
23	285m²	75	603m²	124	602m²
24	359m²	76	606m²	125	624m²
25	314m²	77	672m²	126	601m²
26	328m²	78	686m²	127	601m²
27	384m²	79	642m²	130	658m²
28	318m²	80	622m²	131	605m²
29	301m²	81	600m²	132	625m²
30	296m²	82	600m²	133	747m²
31	295m²	83	600m²	134	602m²
32	295m²	84	725m²	135	632m²
33	2089m²	85	641m²	137	602m²
34	4350m²	86	698m²	138	600m²
35	16839m²	88	200m²	139	318m²
36	8083m²	89	204m²	140	294m²
37	3535m²	90	204m²	141	297m²
38	1549m²	91	204m²	142	300m²
40	610m²	92	204m²	143	304m²
41	643m²	93	204m²	144	381m²
42	622m²	94	204m²	145	376m²
43	532m²	95	204m²	146	120m²
44	615m²	96	204m²	147	317m²
45	947m²	97	265m²	148	316m²
46	606m²	98	204m²	149	313m²
47	609m²	99	217m²	150	339m²
48	677m²	100	216m²	151	1124m²
50	2138m²	101	196m²		
52	626m²	102	202m²		
53	600m²	103	202m²		
54	600m²	104	189m²		

Subdivision & Rezoning

A3 Scale 1 : 2000

DRAWN BY	CHECKED BY	DATE
JM	AW	12-10-2023

SCALE (@ A3)	PROJECT NUMBER
As indicated	0001

DRAWING NUMBER

Rev 46

CLIENT

Huguemont Trust

InterActive Town & Regional Planning

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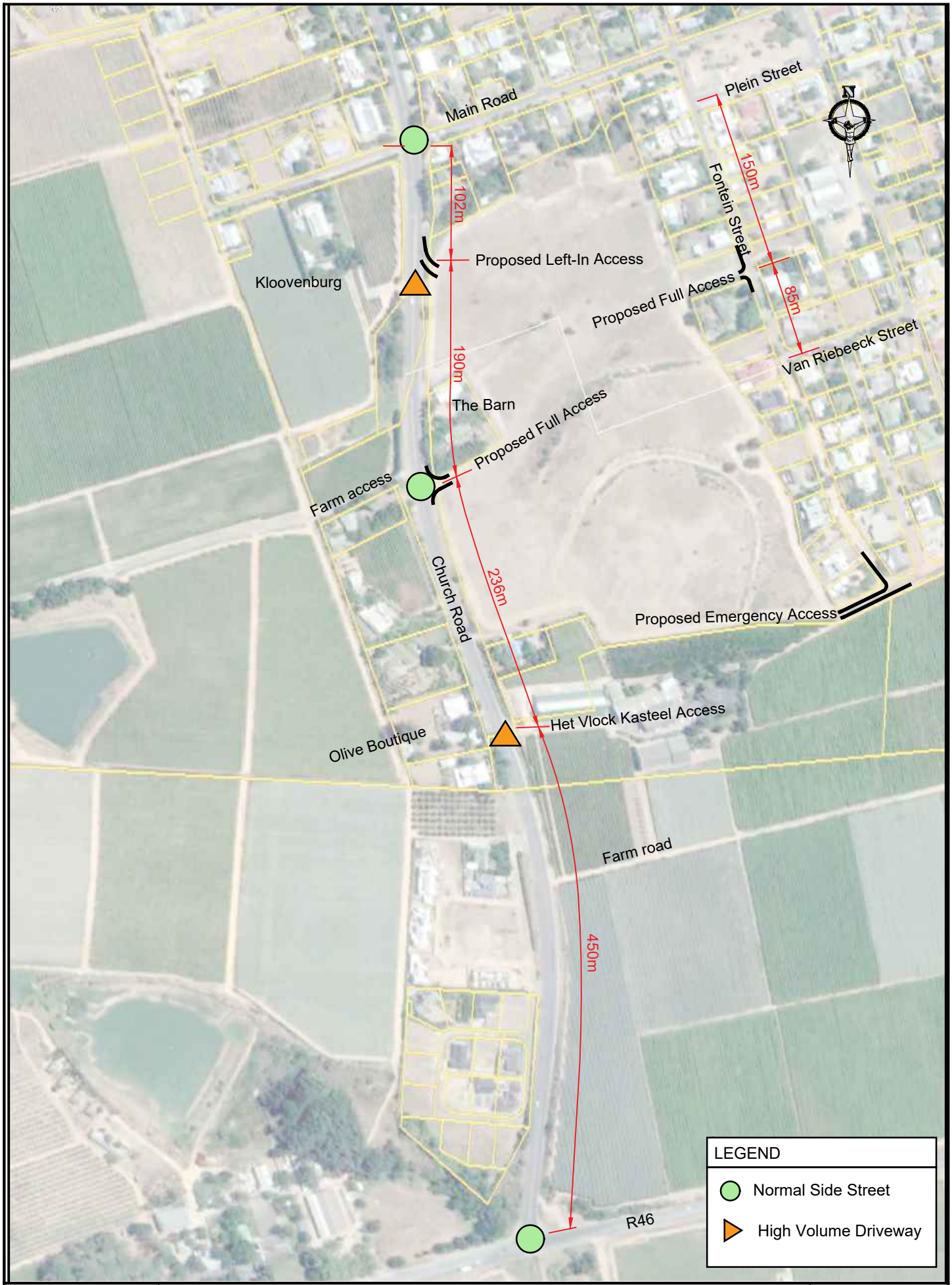

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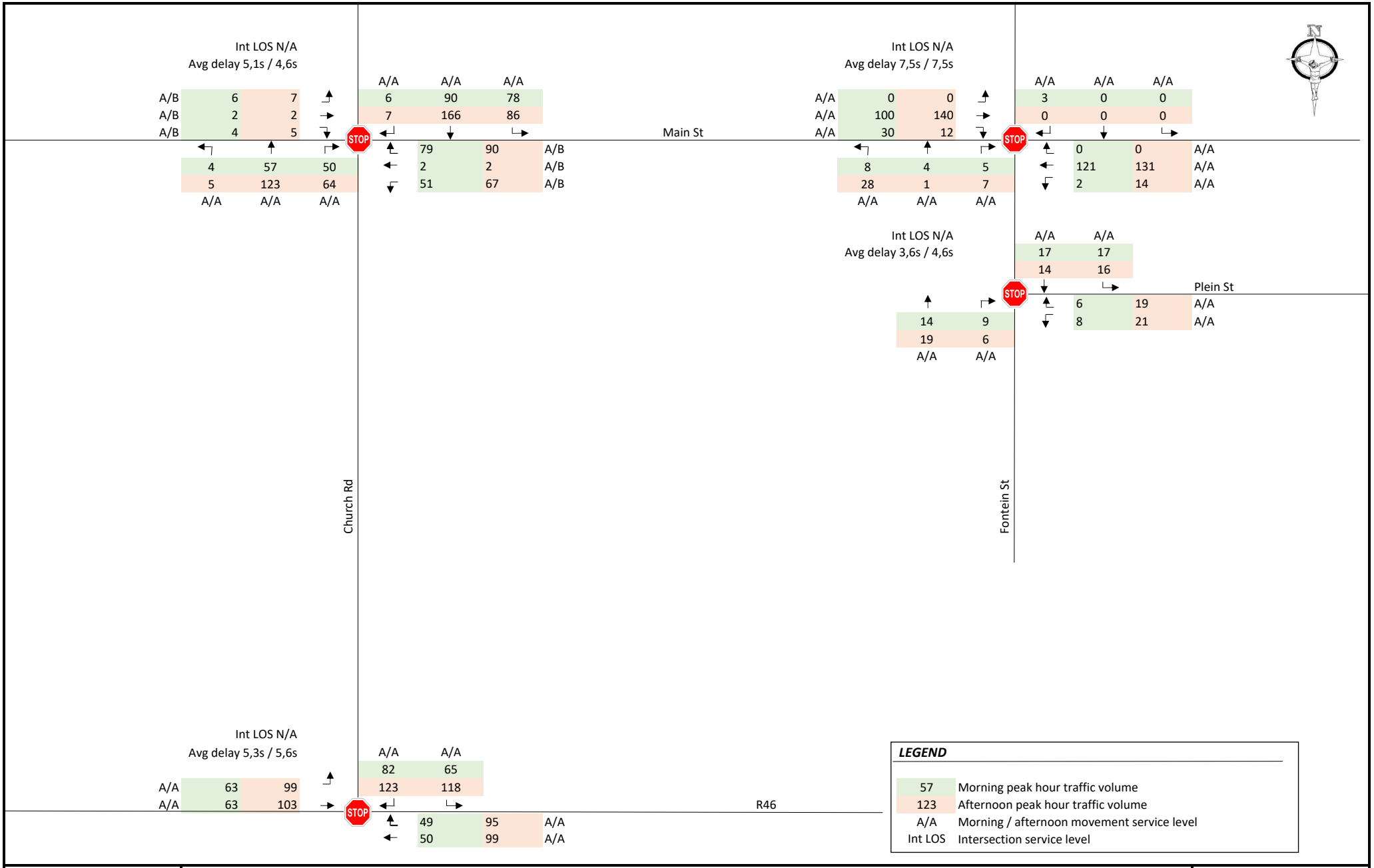
ERF 878 RIEBEEK KASTEEL
ACCESS SPACING PLAN

FIGURE 3

SCALE
1:5 000 (A4)



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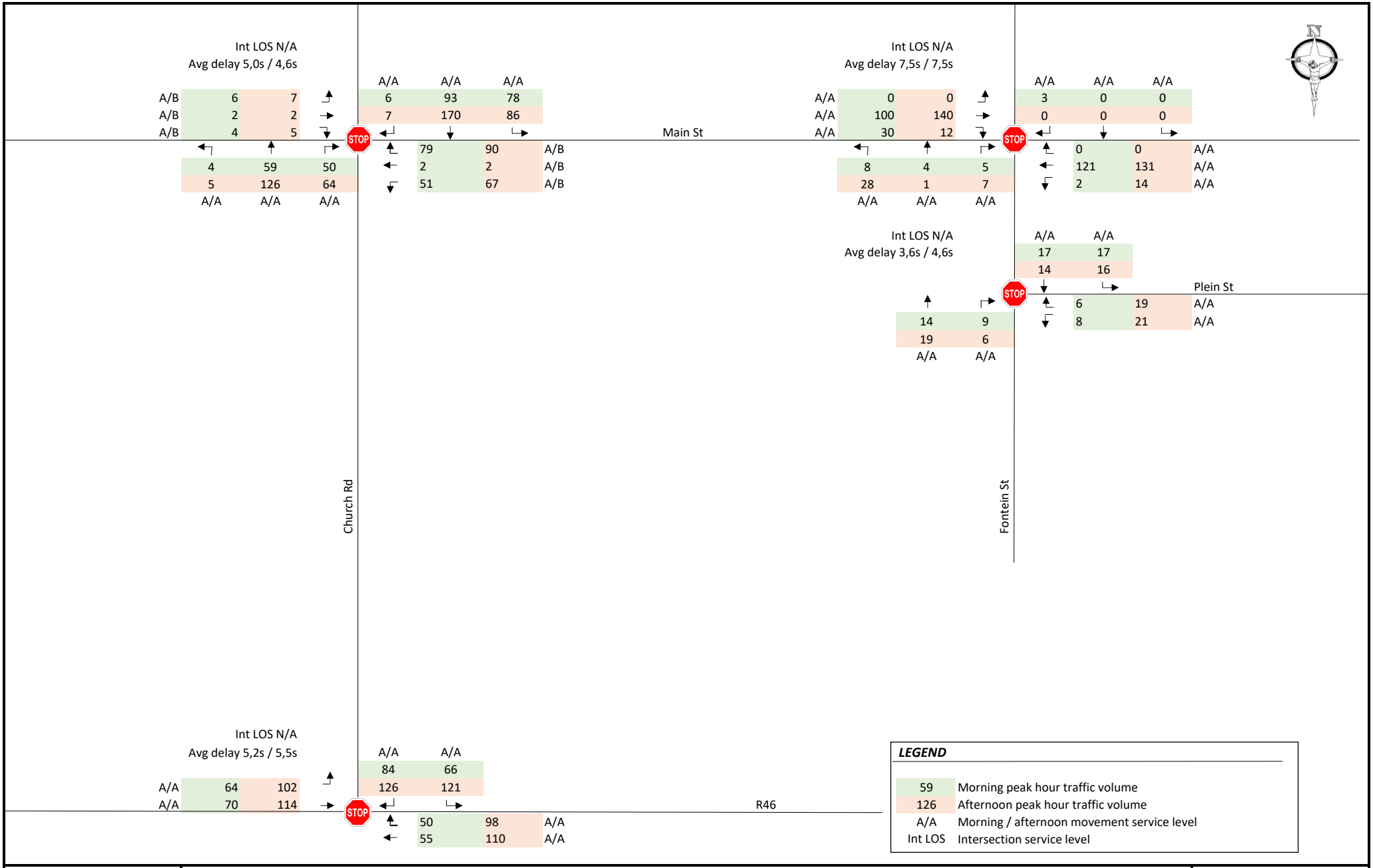
EXISTING 2024 TRAFFIC VOLUMES AND SERVICE LEVELS

FIGURE 4
2024-03-05



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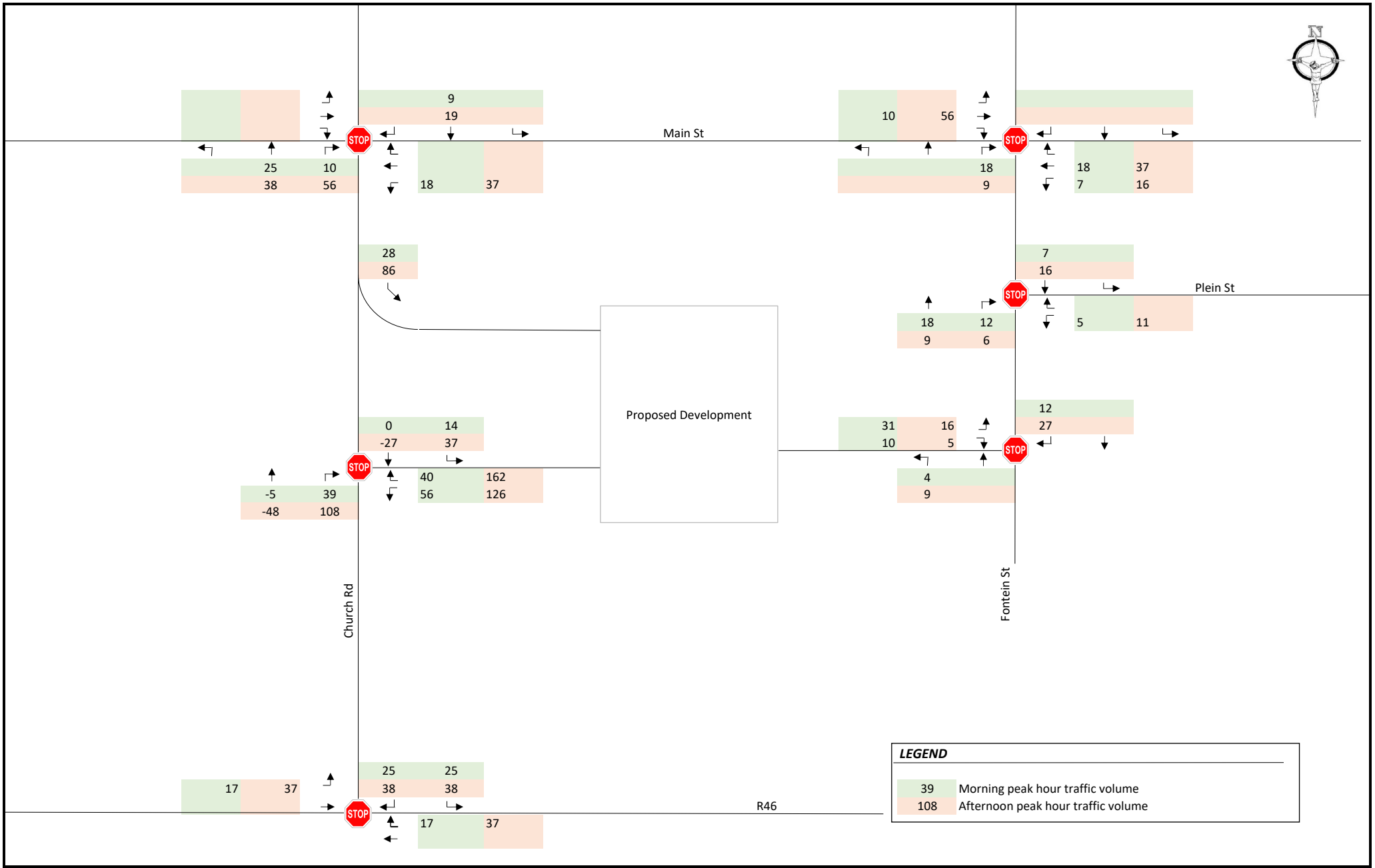
BACKGROUND 2028 TRAFFIC VOLUMES AND SERVICE LEVELS

FIGURE 5
2024-03-05



LEGEND

39	Morning peak hour traffic volume
108	Afternoon peak hour traffic volume

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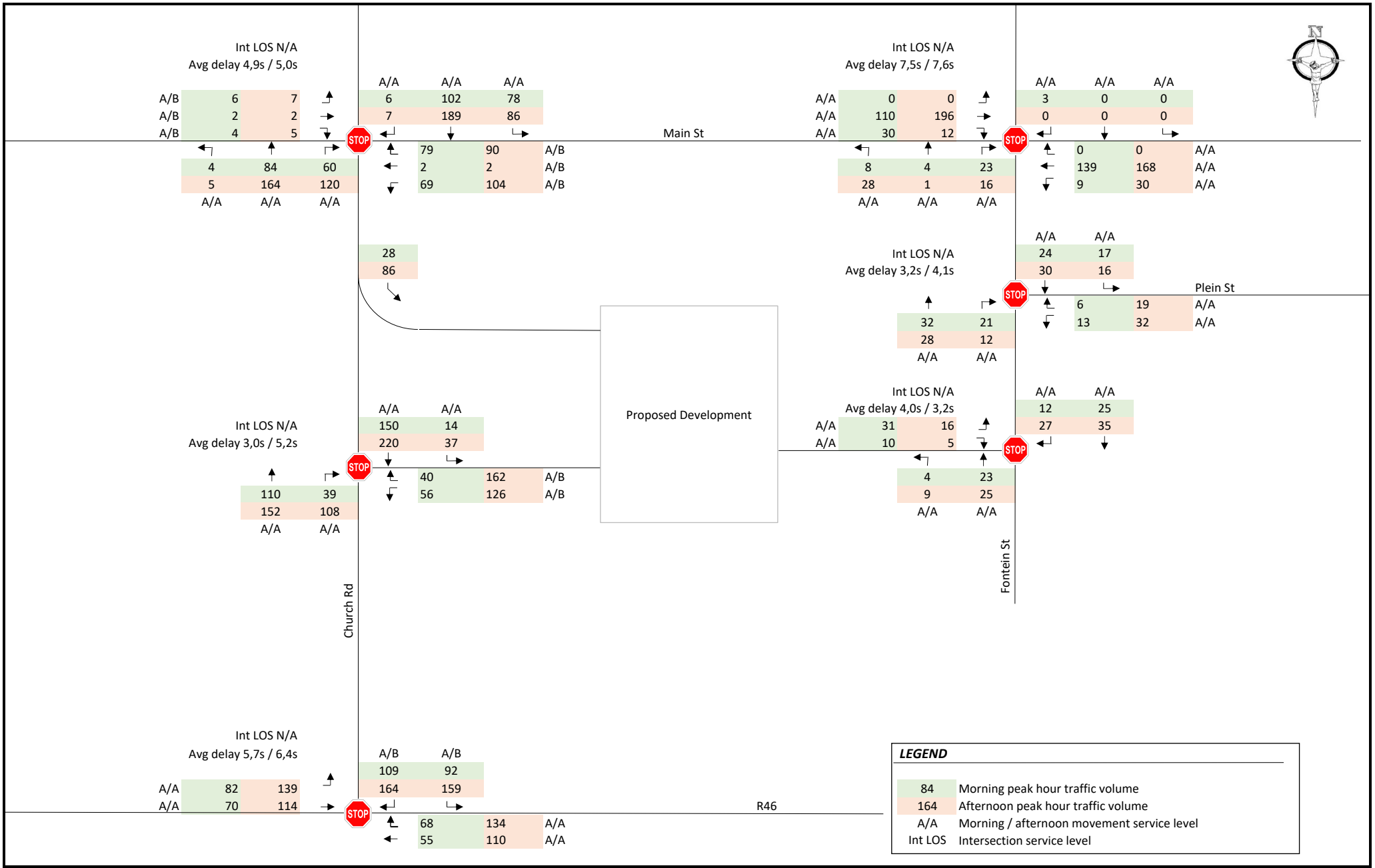
TRIP GENERATION POTENTIAL OF PROPOSED DEVELOPMENT

FIGURE 6
2024-03-05



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TOTAL 2028 TRAFFIC VOLUMES AND SERVICE LEVELS

FIGURE 7
2024-03-05