

Traffic Impact Study

Erand Gardens Extension 33

February 2008

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Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Population	115.9	116.6	117.3	118.1	118.9	119.7	120.5	121.3	122.1	122.9	123.7	124.5	125.3	126.1	126.9	127.7	128.5	129.3	130.1	130.9	131.7	132.5	133.3	134.1	134.9	135.7	136.5	137.3	138.1	138.9	139.7	140.5	141.3	142.1	142.9	143.7	144.5	145.3	146.1	146.9	147.7	148.5	149.3	150.1	150.9	151.7	152.5	153.3	154.1	154.9	155.7	156.5	157.3	158.1	158.9	159.7	160.5	161.3	162.1	162.9	163.7	164.5	165.3	166.1	166.9	167.7	168.5	169.3	170.1	170.9	171.7	172.5	173.3	174.1	174.9	175.7	176.5	177.3	178.1	178.9	179.7	180.5	181.3	182.1	182.9	183.7	184.5	185.3	186.1	186.9	187.7	188.5	189.3	190.1	190.9	191.7	192.5	193.3	194.1	194.9	195.7	196.5	197.3	198.1	198.9	199.7	200.5	201.3	202.1	202.9	203.7	204.5	205.3	206.1	206.9	207.7	208.5	209.3	210.1	210.9	211.7	212.5	213.3	214.1	214.9	215.7	216.5	217.3	218.1	218.9	219.7	220.5	221.3	222.1	222.9	223.7	224.5	225.3	226.1	226.9	227.7	228.5	229.3	230.1	230.9	231.7	232.5	233.3	234.1	234.9	235.7	236.5	237.3	238.1	238.9	239.7	240.5	241.3	242.1	242.9	243.7	244.5	245.3	246.1	246.9	247.7	248.5	249.3	250.1	250.9	251.7	252.5	253.3	254.1	254.9	255.7	256.5	257.3	258.1	258.9	259.7	260.5	261.3	262.1	262.9	263.7	264.5	265.3	266.1	266.9	267.7	268.5	269.3	270.1	270.9	271.7	272.5	273.3	274.1	274.9	275.7	276.5	277.3	278.1	278.9	279.7	280.5	281.3	282.1	282.9	283.7	284.5	285.3	286.1	286.9	287.7	288.5	289.3	290.1	290.9	291.7	292.5	293.3	294.1	294.9	295.7	296.5	297.3	298.1	298.9	299.7	300.5	301.3	302.1	302.9	303.7	304.5	305.3	306.1	306.9	307.7	308.5	309.3	310.1	310.9	311.7	312.5	313.3	314.1	314.9	315.7	316.5	317.3	318.1	318.9	319.7	320.5	321.3	322.1	322.9	323.7	324.5	325.3	326.1	326.9	327.7	328.5	329.3	330.1	330.9	331.7	332.5	333.3	334.1	334.9	335.7	336.5	337.3	338.1	338.9	339.7	340.5	341.3	342.1	342.9	343.7	344.5	345.3	346.1	346.9	347.7	348.5	349.3	350.1	350.9	351.7	352.5	353.3	354.1	354.9	355.7	356.5	357.3	358.1	358.9	359.7	360.5	361.3	362.1	362.9	363.7	364.5	365.3	366.1	366.9	367.7	368.5	369.3	370.1	370.9	371.7	372.5	373.3	374.1	374.9	375.7	376.5	377.3	378.1	378.9	379.7	380.5	381.3	382.1	382.9	383.7	384.5	385.3	386.1	386.9	387.7	388.5	389.3	390.1	390.9	391.7	392.5	393.3	394.1	394.9	395.7	396.5	397.3	398.1	398.9	399.7	400.5	401.3	402.1	402.9	403.7	404.5	405.3	406.1	406.9	407.7	408.5	409.3	410.1	410.9	411.7	412.5	413.3	414.1	414.9	415.7	416.5	417.3	418.1	418.9	419.7	420.5	421.3	422.1	422.9	423.7	424.5	425.3	426.1	426.9	427.7	428.5	429.3	430.1	430.9	431.7	432.5	433.3	434.1	434.9	435.7	436.5	437.3	438.1	438.9	439.7	440.5	441.3	442.1	442.9	443.7	444.5	445.3	446.1	446.9	447.7	448.5	449.3	450.1	450.9	451.7	452.5	453.3	454.1	454.9	455.7	456.5	457.3	458.1	458.9	459.7	460.5	461.3	462.1	462.9	463.7	464.5	465.3	466.1	466.9	467.7	468.5	469.3	470.1	470.9	471.7	472.5	473.3	474.1	474.9	475.7	476.5	477.3	478.1	478.9	479.7	480.5	481.3	482.1	482.9	483.7	484.5	485.3	486.1	486.9	487.7	488.5	489.3	490.1	490.9	491.7	492.5	493.3	494.1	494.9	495.7	496.5	497.3	498.1	498.9	499.7	500.5	501.3	502.1	502.9	503.7	504.5	505.3	506.1	506.9	507.7	508.5	509.3	510.1	510.9	511.7	512.5	513.3	514.1	514.9	515.7	516.5	517.3	518.1	518.9	519.7	520.5	521.3	522.1	522.9	523.7	524.5	525.3	526.1	526.9	527.7	528.5	529.3	530.1	530.9	531.7	532.5	533.3	534.1	534.9	535.7	536.5	537.3	538.1	538.9	539.7	540.5	541.3	542.1	542.9	543.7	544.5	545.3	546.1	546.9	547.7	548.5	549.3	550.1	550.9	551.7	552.5	553.3	554.1	554.9	555.7	556.5	557.3	558.1	558.9	559.7	560.5	561.3	562.1	562.9	563.7	564.5	565.3	566.1	566.9	567.7	568.5	569.3	570.1	570.9	571.7	572.5	573.3	574.1	574.9	575.7	576.5	577.3	578.1	578.9	579.7	580.5	581.3	582.1	582.9	583.7	584.5	585.3	586.1	586.9	587.7	588.5	589.3	590.1	590.9	591.7	592.5	593.3	594.1	594.9	595.7	596.5	597.3	598.1	598.9	599.7	600.5	601.3	602.1	602.9	603.7	604.5	605.3	606.1	606.9	607.7	608.5	609.3	610.1	610.9	611.7	612.5	613.3	614.1	614.9	615.7	616.5	617.3	618.1	618.9	619.7	620.5	621.3	622.1	622.9	623.7	624.5	625.3	626.1	626.9	627.7	628.5	629.3	630.1	630.9	631.7	632.5	633.3	634.1	634.9	635.7	636.5	637.3	638.1	638.9	639.7	640.5	641.3	642.1	642.9	643.7	644.5	645.3	646.1	646.9	647.7	648.5	649.3	650.1	650.9	651.7	652.5	653.3	654.1	654.9	655.7	656.5	657.3	658.1	658.9	659.7	660.5	661.3	662.1	662.9	663.7	664.5	665.3	666.1	666.9	667.7	668.5	669.3	670.1	670.9	671.7	672.5	673.3	674.1	674.9	675.7	676.5	677.3	678.1	678.9	679.7	680.5	681.3	682.1	682.9	683.7	684.5	685.3	686.1	686.9	687.7	688.5	689.3	690.1	690.9	691.7	692.5	693.3	694.1	694.9	695.7	696.5	697.3	698.1	698.9	699.7	700.5	701.3	702.1	702.9	703.7	704.5	705.3	706.1	706.9	707.7	708.5	709.3	710.1	710.9	711.7	712.5	713.3	714.1	714.9	715.7	716.5	717.3	718.1	718.9	719.7	720.5	721.3	722.1	722.9	723.7	724.5	725.3	726.1	726.9	727.7	728.5	729.3	730.1	730.9	731.7	732.5	733.3	734.1	734.9	735.7	736.5	737.3	738.1	738.9	739.7	740.5	741.3	742.1	742.9	743.7	744.5	745.3	746.1	746.9	747.7	748.5	749.3	750.1	750.9	751.7	752.5	753.3	754.1	754.9	755.7	756.5	757.3	758.1	758.9	759.7	760.5	761.3	762.1	762.9	763.7	764.5	765.3	766.1	766.9	767.7	768.5	769.3	770.1	770.9	771.7	772.5	773.3	774.1	774.9	775.7	776.5	777.3	778.1	778.9	779.7	780.5	781.3	782.1	782.9	783.7	784.5	785.3	786.1	786.9	787.7	788.5	789.3	790.1	790.9	791.7	792.5	793.3	794.1	794.9	795.7	796.5	797.3	798.1	798.9	799.7	800.5	801.3	802.1	802.9	803.7	804.5	805.3	806.1	806.9	807.7	808.5	809.3	810.1	810.9	811.7	812.5	813.3	814.1	814.9	815.7	816.5	817.3	818.1	818.9	819.7	820.5	821.3	822.1	822.9	823.7	824.5	825.3	826.1	826.9	827.7	828.5	829.3	830.1	830.9	831.7	832.5	833.3	834.1	834.9	835.7	836.5	837.3	838.1	838.9	839.7	840.5	841.3	842.1	842.9	843.7	844.5	845.3	846.1	846.9	847.7	848.5	849.3	850.1	850.9	851.7	852.5	853.3	854.1	854.9	855.7	856.5	857.3	858.1	858.9	859.7	860.5	861.3	862.1	862.9	863.7	864.5	865.3	866.1	866.9	867.7	868.5	869.3	870.1	870.9	871.7	872.5	873.3	874.1	874.9	875.7	876.5	877.3	878.1	878.9	879.7	880.5	881.3	882.1	882.9	883.7	884.5	885.3	886.1	886.9	887.7	888.5	889.3	890.1	890.9	891.7	892.5	893.3	894.1	894.9	895.7	896.5	897.3	898.1	898.9	899.7	900.5	901.3	902.1	902.9	903.7	904.5	905.3	906.1	906.9	907.7	908.5	909.3	910.1	910.9	911.7	912.5	913.3	914.1	914.9	915.7	916.5	917.3	918.1	918.9	919.7	920.5	921.3	922.1	922.9	923.7	924.5	925.3	926.1	926.9	927.7	928.5	929.3	930.1	930.9	931.7	932.5	933.3	934.1	934.9	935.7	936.5	937.3	938.1	938.9	939.7	940.5	941.3	942.1	942.9	943.7	944.5	945.3	946.1	946.9	947.7	948.5	949.3	950.1	950.9	951.7	952.5	953.3	954.1	954.9	955.7	956.5	957.3	958.1	958.9	959.7	960.5	961.3	962.1	962.9	963.7	964.5	965.3	966.1	966.9	967.7	968.5	969.3	970.1	970.9	971.7	972.5	973.3	974.1	974.9	975.7	976.5	977.3	978.1	978.9	979.7	980.5	981.3	98

**TRAFFIC IMPACT STUDY
PROPOSED ERAND GARDENS x33 DEVELOPMENT
SUMMARY**

LOCATION	The development on Erand Gardens x33 is located on Holding 223 and Portion 1 of Holding 224 of the Farm Erand Agricultural Holdings as well as Portion 784 of the farm Randjesfontein 405 JR Midrand
LAND USE	21885 m ² GLA of Offices (offices assumed to be the critical land use scenario)
TRIP GENERATION	The proposed office development will generate 504 vph during peak hours.
ACCESS	Access is proposed from 14 th Road.
TRIP DISTRIBUTION	The following trip distribution was assumed: <ul style="list-style-type: none"> • 20% of trips to the North; • 20% of trips to the East; • 30% of trips to the West; • 30% of trips to the South.
TRAFFIC COUNTS	November 2007 (only for verification purposes of the modelled volumes)
BACKGROUND VOLUMES	2010 Background (including Latent) Traffic Volumes from the ITS Midrand 2010 Tracks Model
TIME FRAME FOR ANALYSIS	Scenario 1: 2010 background traffic demand (including Latent traffic) Scenario 2: 2010 background traffic demand with development trips
STUDY AREA	The following intersections were evaluated: <ol style="list-style-type: none"> 1. Lever Rd / Coubrough Rd 2. Lever Rd / George Rd 3. 14th Rd / George Rd 4. Lever Rd / Vodacom Boulevard 5. 14th Rd / 13th Rd 6. 3rd Rd / Janadel Rd 7. 14th Rd / Access to the development
CAPACITY ANALYSIS	All intersections are expected to operate at an acceptable level of service.
CAPACITY OF ACCESSES	The proposed accesses can accommodate the expected demand. The queuing space is proposed to be 20m from the access booms to the erf boundary. Refer to Drawing ITS 2418_GL_01.
UPGRADES PROPOSED	<ul style="list-style-type: none"> • Intersection of Lever Rd / George Rd: <ul style="list-style-type: none"> ⇒ Signalisation of the intersection ⇒ Northern approach: Additional Left-Turn Lane • Intersection of 14th Rd / Access: <ul style="list-style-type: none"> ⇒ Southern approach: Additional Right-Turn Lane ⇒ New Eastern approach (access)
GTIA COMPLIANCE	The proposed development does not have any impact on existing or planned K or PWV routes.
COST OF UPGRADES	R1 036 500 using a unit rate of R650/m ² , which excludes professional fees, contingencies, the relocation of major services and VAT.
PUBLIC TRANSPORT	The development will generate ±750 person trips of which ±750 will be accommodated on Public Transport in the weekday peak hours. This is an equivalent of either 11 minibus taxi trips or 3 bus trips.
RECOMMENDATION	The proposed development should be favourably considered from a traffic engineering point of view by the relevant authorities, subject to the construction of the access as indicated in Drawing 2418/GL/01.dwg and the road upgrading as indicated in Drawing 2418/GL/02.dwg

ERAND GARDENS EXTENSION 33

TRAFFIC IMPACT STUDY

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ERAND GARDENS EXTENSION 33

APPENDIX A

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- Figure 5:** Development Traffic Assignment (Erاند Gardens x33) (AM and PM Peak Hour)
- Figure 6:** 2010 Background + Development Traffic (AM and PM Peak Hour)
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ERAND GARDENS EXTENSION 33

TRAFFIC IMPACT STUDY

1. INTRODUCTION

The proposed consolidated development of Erand Gardens X 33 is located on Holding 223 and Portion 1 of Holding 224 of the Farm Erand Agricultural Holdings as well as Portion 784 of the farm Randjesfontein 405 JR in the Midrand West area. The location of the proposed development is shown in **Figure 1**.

ITS Engineers was requested to conduct a traffic impact study for the proposed development.

2. PURPOSE OF THE STUDY AND STUDY AREA

The purpose of this Traffic Impact Study is to quantify the expected additional traffic generated by the development, to determine where the additional vehicle trips will originate and to determine what road improvements (if any) will be necessary to accommodate the additional traffic.

The extent of the study area includes the following intersections and accesses:

- Lever / Coubrough
- Lever / George Road
- Lever / Vodacom Boulevard
- 14th Street / George Road
- 14th Street / 13th Street
- 3rd Street / Janadel Rd

3. TRAFFIC DEMAND MODEL

ITS Engineers completed a traffic demand model on behalf of the JRA during 2004. The purpose of the traffic demand model was to determine what road network was required to accommodate the expected future development in the Midrand West area. The study area for the model was the following:

- Road 795 (Olifantsfontein Road) in the north);

- Ben Schoeman (N1) in the east;
- Allandale in the south;
- The R55 (K71) in the west.

The model included all known development applications in the Midrand West area (as at the end of 2004), as well as an estimate of additional development that will have taken place by 2010 on vacant land in the area. The through trips for the 2010 horizon year were based on information that was received from the Gautrans regional emme/2 model for 2010.

It was agreed with the JRA and the City of Johannesburg that the traffic model could be used to provide information on the expected 2010 background traffic volumes that would be used for traffic impact studies for the Midrand area. It should be noted that the traffic model is a link based model and the assumption was made that the intersections in the study area will have sufficient capacity to accommodate the expected traffic demand or that it is possible to upgrade the intersections to accommodate the traffic demand. The intersection geometries to accommodate the traffic demand have to be investigated in the traffic impact studies based on the traffic volumes obtained from the traffic model. From the traffic model it was concluded that the following intersections were likely to have capacity problems:

- Lever Road/ Road 795
- K73/K56
- Lever Road/ New Road
- Lever Road/K56
- K56/K71

The model also indicated that there would be definite need for the K56 across the N1 by 2010, as well as the provision of a link across the N1 at George Road in the long term.

The 2010 Background traffic demand for this study was obtained from the Tracks Model. However there can be slight changes in the modelled volumes compared to previous studies done in the area due to the fact that the traffic demand around Vodacom seems to have grown at a higher rate than projected in the TRACKS model.

4. EXTENT OF DEVELOPMENT

The extent of the development is shown below in **Table 1**. It should be noted that the development provides for a mix of different land uses.

TABLE 1: LAND USE

Land Use				
Development	Area	Land Use	FAR	Extent [m ²]
Erاند Gardens x33	5.4713 ha	Special (Offices, Hotels, Training centres, Institutions and Residential buildings)	0.4 - 0.6	21885 - 32828

5. TRIP GENERATION

The developer applied for a mix of the above mentioned land use rights, therefore the land use scenario with the worst impact on the surrounding road network (highest possible trip generation in peak direction) was evaluated .

The highest trip generation will be in case the development consists solely of offices with a FAR of 0.6.

The detailed trip generation for the development is shown below in **Table 2a** for the weekday AM and PM peak period. Other alternative land uses were also analysed, refer to **Tables 2b** and **Table 2c** below.

TABLE 2a: PROPOSED TRIP GENERATION

DEVELOPMENT: ERAND GARDENS X33, MIDRAND											
WEEKDAY AM PEAK HOUR											
Extension	Area (m ²)	Density/ FSR	Land Use	Extent	Unit	Trip Rate / 100 m ²	Directional Split		Volume In	Volume Out	Total New Trips
							% In	% Out			
x33	54713	0.4	Office	21885	m ² GLA	2.3	85%	15%	428	76	504
Total X33									428	76	504
WEEKDAY PM PEAK HOUR											
Extension	Area (m ²)	Density/ FSR	Land Use	Extent	Unit	Trip Rate / 100 m ²	Directional Split		Volume In	Volume Out	Total New Trips
							% In	% Out			
x33	54713	0.4	Office	21885	m ² GLA	2.3	15%	85%	76	428	504
Total X33									76	428	504

TABLE 2b: TRIP GENERATION ALTERNATIVE 1

DEVELOPMENT: ERAND GARDENS X33, MIDRAND											
WEEKDAY AM PEAK HOUR											
Extension	Area (m ²)	Density/ FSR	Land Use	Density	Units	Trip Rate / 100 m ²	Directional Split		Volume In	Volume Out	Total New Trips
				u/ha			% In	% Out			
x33	54713	0.6	Residential	40	131	1.1	25%	75%	36	108	144
Total X33									36	108	144
WEEKDAY PM PEAK HOUR											
Extension	Area (m ²)	Density/ FSR	Land Use	Density	Units	Trip Rate / 100 m ²	Directional Split		Volume In	Volume Out	Total New Trips
				u/ha			% In	% Out			
x33	54713	0.6	Residential	40	131	1.1	25%	75%	36	108	144
Total X33									36	108	144

TABLE 2c: TRIP GENERATION ALTERNATIVE 2

DEVELOPMENT: ERAND GARDENS X33, MIDRAND											
WEEKDAY AM PEAK HOUR											
Extension	Area (m ²)	Density/ FSR	Land Use	Extent	Unit	Trip Rate / 100 m ²	Directional Split		Volume In	Volume Out	Total New Trips
							% In	% Out			
x33	31713	0.4	Office	12685	m ² GLA	2.3	85%	15%	248	44	292
	23000	0.4	Hotel	180	beds	0.7	55%	45%	69	57	126
Total X33									317	101	418
WEEKDAY PM PEAK HOUR											
Extension	Area (m ²)	Density/ FSR	Land Use	Extent	Unit	Trip Rate / 100 m ²	Directional Split		Volume In	Volume Out	Total New Trips
							% In	% Out			
x33	31713	0.4	Office	12685	m ² GLA	2.3	15%	85%	44	248	292
	23000	0.4	Hotel	180	beds	0.7	45%	55%	57	69	126
Total X33									101	317	418

It can be seen that the proposed office development generates a significantly higher number of trips compared to the other land uses. The office development was therefore considered to be the most critical land use scenario.

6. SURROUNDING ROAD NETWORK

The following existing and future roads are located in the vicinity of the proposed development:

1. **George Road** is an existing Class 5 road that runs between 14th Road and Lever Road. It is currently a gravel road, the intersection with Lever Road is stop controlled on the George Rd approach. The intersection with 14th Road is 4-way stop controlled.
2. **Lever Road** is an existing Class 3 road that runs parallel to the N1. Sections of the road have been upgraded to a four lane dual carriageway road, but most of it is still a single carriageway two lane road. Some intersections along this road are operating close to capacity at the moment. This is due to motorists using the road as an alternative to the N1, R101 and R55 as these roads are operating at capacity.
3. **Road 795 (Olifantsfontein Road)** is a class 2 road. It has been upgraded to a four lane dual carriageway road from ±100 metres west of the N1 past the R55 (K71) in the west. This road carries reasonably high traffic volumes during the weekday peak periods.
4. **New Road** is class 3 road that intersects with the N1 in the east, sections of the road has been upgraded to four lane dual carriageway road; however, in the west it becomes Wisken Road which has not been constructed to carry high traffic volumes. At this stage New road is fulfilling the function of a higher order road, a function that should be provided for by the proposed K56.

7. ACCESS TO THE DEVELOPMENT

Access to the consolidated development of Erand Gardens Extension 33 is proposed from 14th Road between Skurweberg Street and Frederick Drive. The proposed access layout is shown in **Drawing ITS 2418_GL_01**.

Access control, if implemented, should be placed in line with the distances tabulated below measured from the property boundary:

TABLE 3: ACCESS CONTROL REQUIREMENTS

No. of access lanes per direction	Service Flow Rate	Required Storage (m)
2	300vph	20
3		15

8. PROPOSED FUTURE ROAD NETWORK

There are a number of proposed roads within and surrounding the study area that have not been constructed as yet. These roads are:

1. **K56** is an east-west class two road to the north of New Road. No interchange with the N1 is planned and this route will therefore have an important function in carrying vehicles across the N1. The construction of this road can be expected to alleviate some of the existing pressure on New Road.
2. **K73** is a proposed north / south class two road. It will assist with the north/south travel demand for which the existing road network do not have sufficient capacity. Within the study area, K73 runs mostly on the alignment of the existing Garden Road. In the north in the Summerset area where the road deviates to the east of the existing alignment of Garden road. An at grade intersection with K56 is planned, but the existing Garden / New Road intersection will become a grade separation in future. All turning movements will have to be accommodated at the K56/K73 intersection.
3. **PWV5** is an east-west freeway (class 1 road) in the north of the study area. No access interchanges is proposed within the study area. This road is also not expected to be constructed in the foreseeable future.
4. **George Road** is a class 3 or 4 road that will cross the N1 in future. This road is located to the south of Olifantsfontein Road and will assist with the distribution of traffic in the area. It can also be expected that the construction of this road will alleviate the pressure on the surrounding interchanges with the N1.

9. GTIA COMPLIANCE

In terms of the Gauteng Transport Infrastructure Act, no 8 of 2001, no development application for township establishment or rezoning may be considered on land affected by the proposed alignment of future K or PWV routes.

The proposed development has no impact on any K or PWV routes.

10. PLANNED ROAD UPGRADES

A number of developers in the area have committed themselves to the upgrading of roads and intersections in the vicinity of the development. The planned road upgrades to which developers or the JRA have committed themselves in the area are the following (upgrades known to ITS Engineers):

- Infragen investigated the possibility of constructing the second carriageway of Lever Road from 9th Avenue up to Vodacom Boulevard.
- Noordwyk x49 as well as one or two of the adjacent developments must construct the section of Liebenberg Road from 8th up to Lever Road. This includes the upgrading and signalisation of the Liebenberg/8th and Liebenberg/Lever

intersections. This intersection upgrading has been implemented however the traffic signal still needs to be constructed.

- The construction of left turn lanes at the Lever/Kiaat intersection (is the responsibility of Sagewood x2).
- Signalisation of the existing Lever/Liebenberg intersection as well as the construction of a left turn lane on Lever Road (responsibility of Sagewood x2).
- Upgrading of Lever Road to a 4 lane cross-section from Coubrough to south of Liebenberg Road was done by M&T Developments as part of the upgrading required for Sagewood x10, x13 and x14.
- Erand Gardens x87 & x103 will upgrade the intersection of George/Lever and sections of George Road. See also the Revised Traffic Impact Study done by ITS, submitted in May 2007.

Most of the above mentioned road upgrading projects have been assumed as a given in the analysis of **Scenario 1** discussed above.

11. ANALYSIS SCENARIOS

A number of traffic impact studies previously conducted within the study area have confirmed that a significant portion of the road network that is required to accommodate the traffic demand in the area still needs to be constructed. It was therefore decided that the base year scenario with the proposed development that is usually included in traffic impact studies, will be of limited use. The focus of this traffic study will therefore be on the 2010 horizon year, where the future road network is evaluated.

The following analysis scenarios will be discussed in this document:

- **Scenario 1 (2010 Background traffic volumes)** – the intersection performance based on an upgraded road network to ensure that the intersections operate at an acceptable level of service, given the expected 2010 background traffic demand (as per the Tracks model prepared by ITS).
- **Scenario 2 (2010 background traffic volumes including development traffic)** – analyses based on the required intersection geometries to accommodate the 2010 background traffic as well as the proposed development traffic at an acceptable level of service.

12. ANALYSIS METHODOLOGY

Intersections were analysed using the Highway Capacity Manual 2000 methodologies for signalised and unsignalised intersections. The analyses were based on background traffic volumes obtained from the traffic model prepared by ITS Engineers on behalf of the JRA. The trips generated by the proposed development were added to the background trips and analysed using HCM2000.

13. TRIP DISTRIBUTION AND TRIP ASSIGNMENT

The expected trip distribution and assignment of development trips is shown in **Figure 4** and **Figure 5** respectively (AM and PM peak hours).

14. CAPACITY ANALYSIS

14.1 2010 Background Traffic Analyses (Scenario 1)

The expected Scenario 1 background traffic volumes (2010 background traffic volumes including latent rights) as obtained from the traffic model is shown in **Figures 2** for the AM and PM peak hours. In order to accommodate the **Scenario 1** traffic volumes the following road upgrades as indicated in **Figure 3** need to be implemented:

- **Lever/Coubrough**
 - Signalise intersection
 - Exclusive right turn lane on eastern approach
- **Lever/George**
 - Left & right turn lanes on the eastern approach.
 - Right turn lane on southern approach
- **Lever/Vodacom Boulevard**
 - 2nd through lane on southern approach
 - 2nd through lane on northern approach

14.2 2010 Traffic Analyses including proposed development (Scenario 2)

The 2010 peak hour traffic volumes and intersection performance for Scenario 2 (2010 Background traffic including development trips) is summarised in **Figure 6**.

The proposed development of Erand Gardens Extension 33 can be accommodated at an acceptable level of service on the upgraded road network for Scenario 1 as indicated in Figure 7 provided that the following additional intersection upgrade is implemented:

- **Lever/George**
 - Signalise intersection
 - Left turn lane on northern approach

15. PROPOSED ROAD UPGRADES

15.1 Access to development

Access is proposed from 14th road to the development, located between Skurweberg Rd and Frederick Drive, approximately 210m north of George Road. The upgrading of the access should include the following (refer to **Drawing ITS 2418 / GL / 01**):

- Exclusive Right turn lane on the southern approach along 14th Road
- Construction of the eastern approach with a right & left turn lane

15.2 Lever Road/George Road

The developer is also responsible for the upgrading of the intersection of Lever/George Road including the following (refer to **Drawing ITS 2418 / GL / 02**):

- Exclusive Left turn lane on the northern approach along Lever Road
- Signalisation of Lever Road and George Road

The proposed road upgrades are subject to the availability of the road reserve on Lever Rd. It is assumed that the JRA will assist with obtaining the road reserve if required.

16. PUBLIC TRANSPORT NEEDS ASSESSMENT

In the City of Johannesburg's 2003/2008 ITP it is stated that the philosophy for provision of strategic public transport routes in the city is not to serve all possible origins and destinations, but rather to establish a grid of east-west and north-south routes that will provide a high level of service. Feeder systems/routes should feed these SPTN routes. The

closest SPTN routes to the development are the Midrand bus link, the Gautrain with a station in Midrand and the N1.

The development proposed in the Midrand West area will result in an increased demand for public transport services, which will result in an increased demand for operating licences in the area. These licences should be amongst others for routes that service the SPTN routes that run through the Midrand CBD. Although the proposed development will therefore result in an increased demand for public transport services, it will also assist in the provision of the travel demand required to make the provision of services on the SPTN routes viable.

The table below provides an indication of the expected public transport demand that will be created as a result of the proposed development:

PUBLIC TRANSPORT NEEDS ASSESSMENT

Public Transport Mode	Average Vehicle Occupancy
Taxi	15
Bus	60
Assumption: 20% of office trips will be on Public Transport	
Total number of office trips in private vehicles	504
Vehicle occupancy rate [passenger per private vehicle]	1.2
Total number of passenger trips in private vehicles (80% of all trips)	605
Total number of passenger trips with Public Transport (commuter trips) (20% of all trips) during weekday peak hour	151
Total number of passenger trips (100% of all trips)	756
Expected number of taxi trips during weekday peak hour (if public transport service is provided exclusively by taxi's)	11
Expected number of bus trips during weekday peak hour (if public transport service is provided exclusively by bus)	3

17. COST ESTIMATE

A summary of the road upgrading that is proposed in this document as well as a first order cost estimate is provided in **Table 4**.

The cost estimate is based on a unit rate of R650/m² construction cost and estimated square metres of road upgrading as well as R 380 000 per traffic signal.

The estimated total cost is ±R 1 036 500.00

TABLE 4: SUMMARY OF UPGRADING AND COST ESTIMATE

.NO	DESCRIPTION	COST
1	Upgrading of the intersection of Lever/George (360 m ²)	R 234 000.00
2	Traffic Signal at the intersection of Lever/George	R 380 000.00
3	Upgrading of the intersection of 14 th Road/Access (650 m ²)	R 422 500.00
TOTAL		R 1 036 500.00

The estimate does not make provision for the relocation of major services, professional fees, VAT, contingencies, etc. Internal roads of the development have also not been included in the estimate. The estimate was also based a conceptual layout, which was done without detailed services information being available at the time of the study.

18. CONCLUSIONS

Given the findings of this report, the following conclusions are drawn:

1. The proposed development will be situated on Holding 223, Portion 1 of Holding 224 of the Farm Erand Agricultural Holdings and Portion 784 of the Farm Randjesfontein 405 JR in the Midrand West area. The development will consist of 5.7413 ha with a mixed land use.
2. The expected total trip generation of the development is 504 trips.
3. Access to the proposed consolidated development will be from 14th Road.
4. Should access control be implemented it must be positioned in line with the requirements of **Table 3**.
5. The developer is responsible for the following road upgrades (refer to **Drawing ITS 2418 / GL / 01** and **Drawing ITS 2418 / GL / 02**):
 - An exclusive Left turn lane on the northern approach along Lever Road at the intersection of Lever/George Road.
 - Signalisation of the intersection Lever Road/George Road.
 - An exclusive right turn lane on the southern approach along 14th Road at the access, construction of the new eastern approach (access).
 - The estimated cost of total road upgrading is ±R 1 036 500.00, which excludes provision for engineering fees, contingencies and VAT as well as the relocation of major services, EIA fees etc.

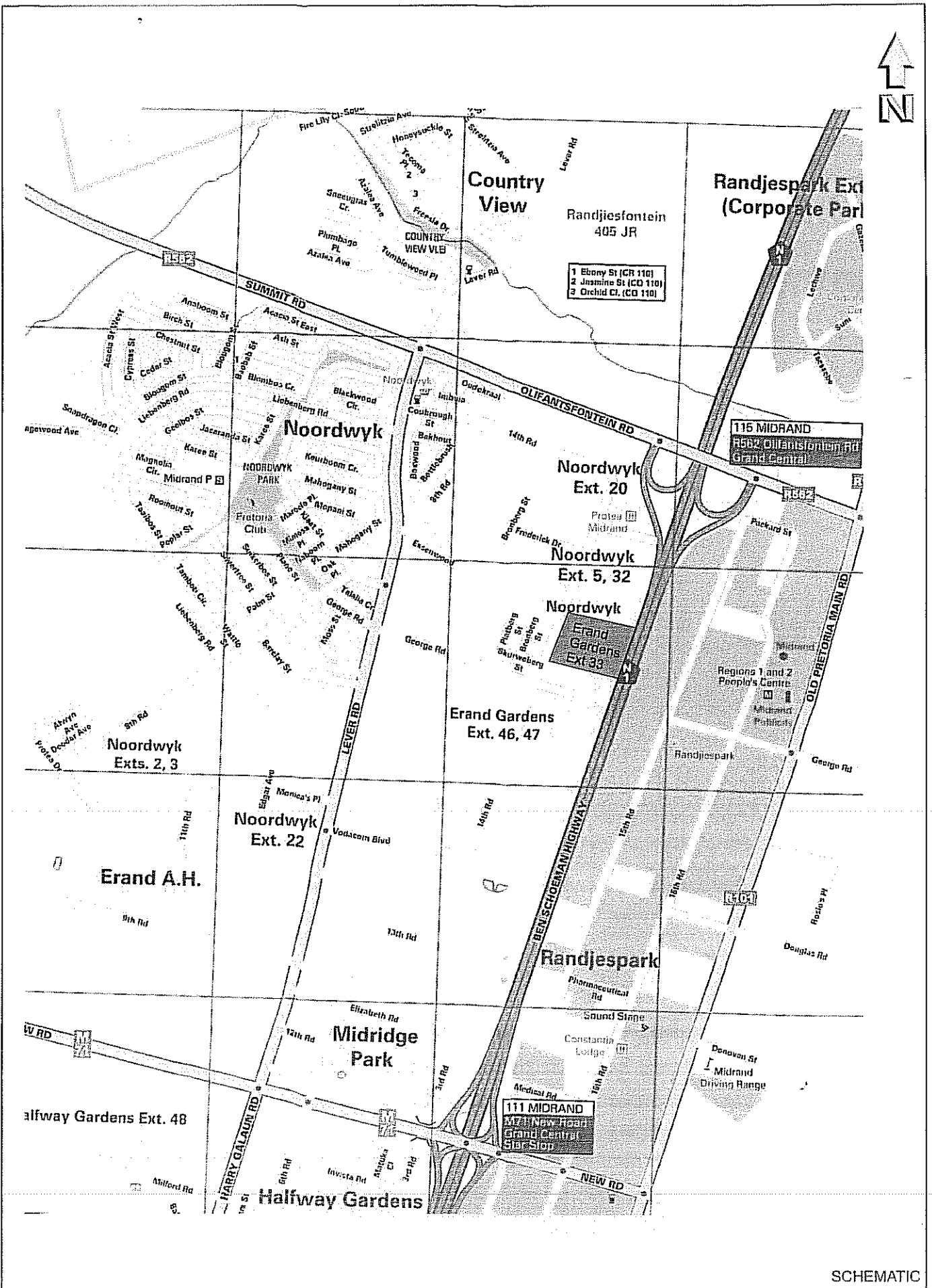
19. RECOMMENDATIONS

Given the findings of this report, the following recommendations are made:

1. The proposed development be considered favourably from a traffic engineering point of view by the relevant authority, subject to the construction of the development access and upgrades as indicated in **Table 4**.
2. A detail design should be conducted by a professional engineer for the construction of the upgrades as discussed above.

APPENDIX A

FIGURES



SCHEMATIC

2418\Figures.cdr



Project:

Erand Gardens X33

Figure:

Locality Plan

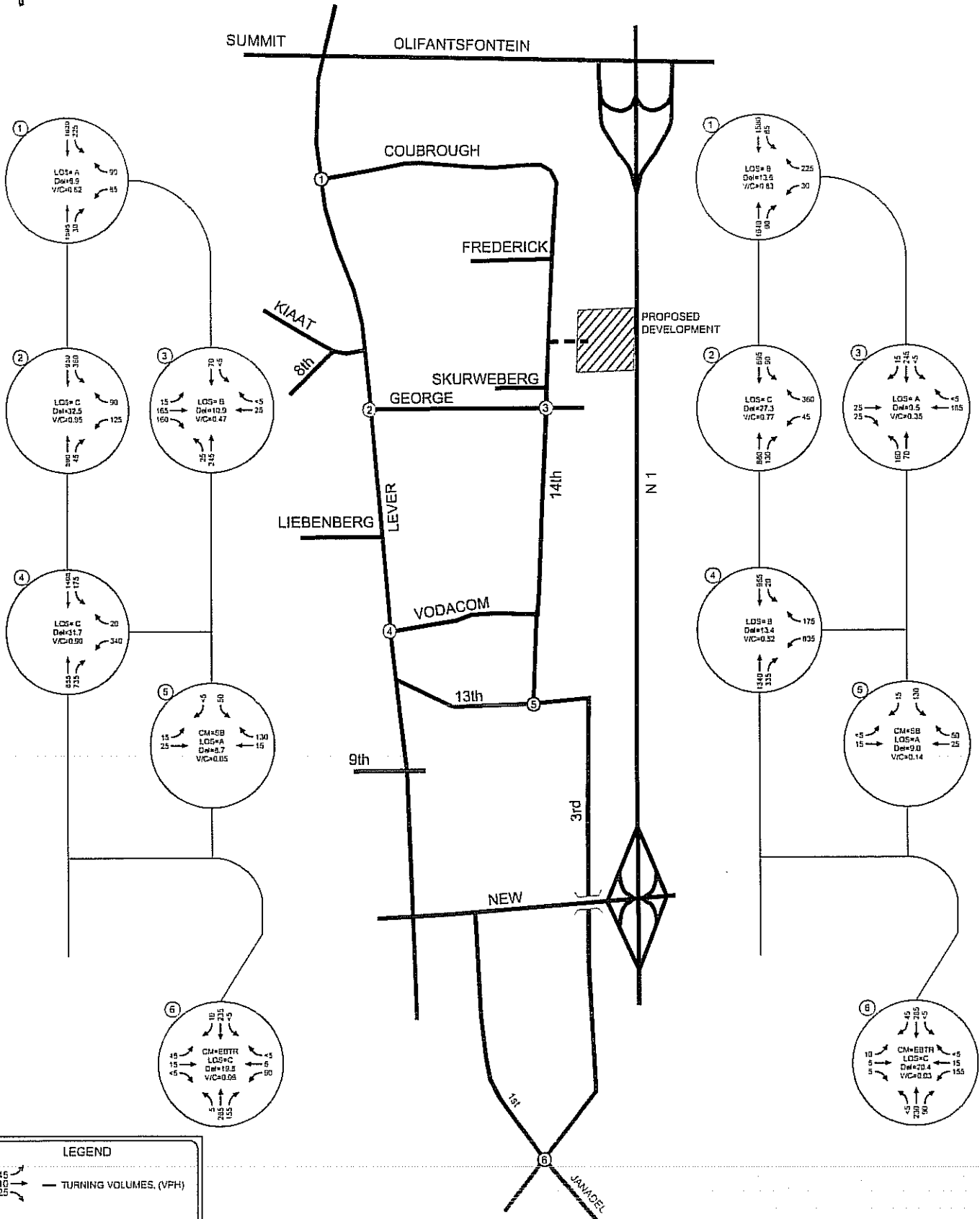
No.

1



AM PEAK HOUR VOLUMES

PM PEAK HOUR VOLUMES



SCHMATIC

2418_Traffic Figures.dwg



FIGURE:

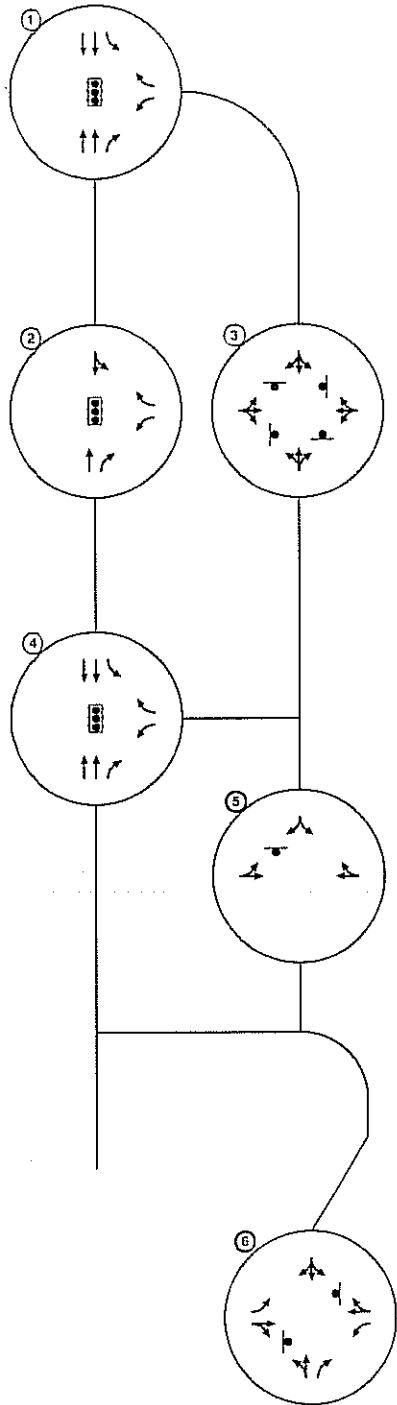
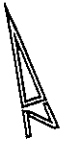
Erand Gardens x 33

PROJECT:

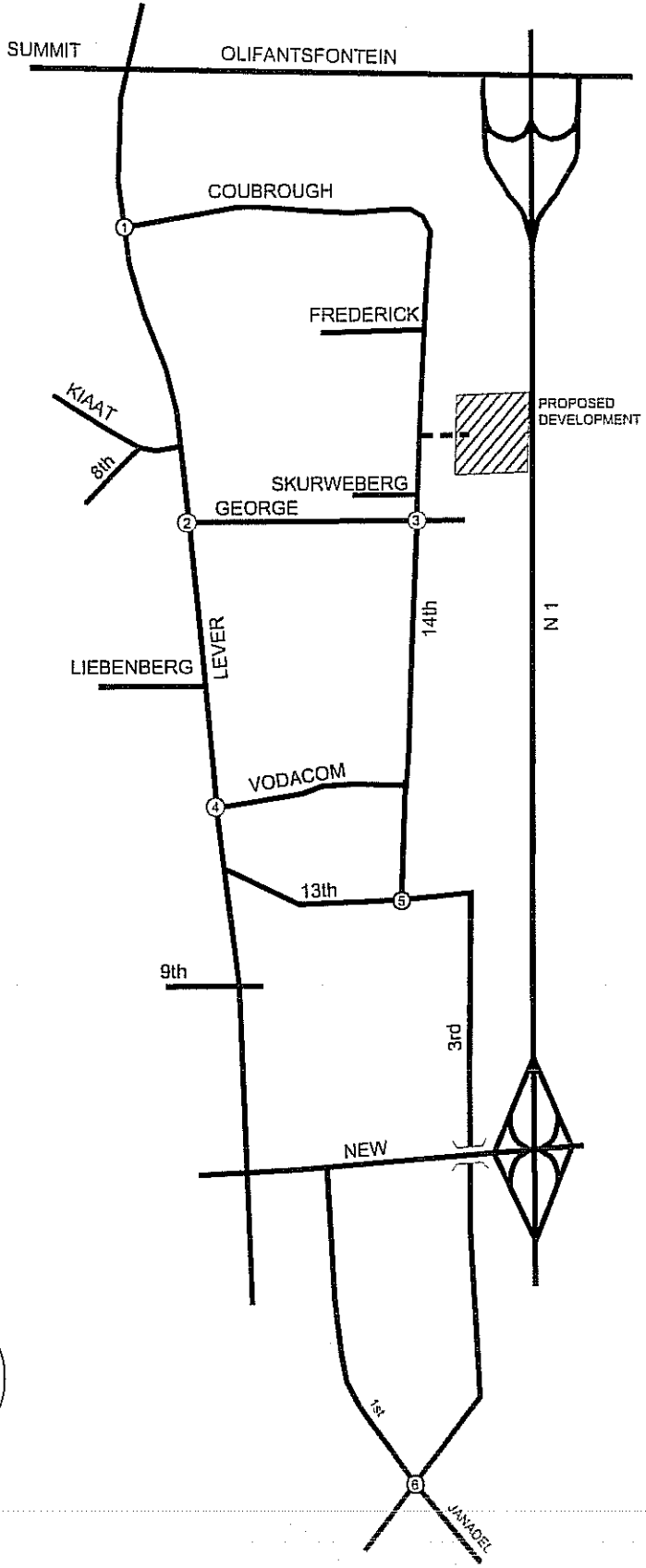
Scenario 1 - 2010 Background Traffic (incl. Latent Rights)
AM and PM Peak Hour

NUMBER:

2



LEGEND	
	TRAFFIC SIGNAL
	STOP CONTROLLED
	EXCLUSIVE LEFT LANE
	THROUGH LANE
	EXCLUSIVE RIGHT LANE
	SHARED LANE

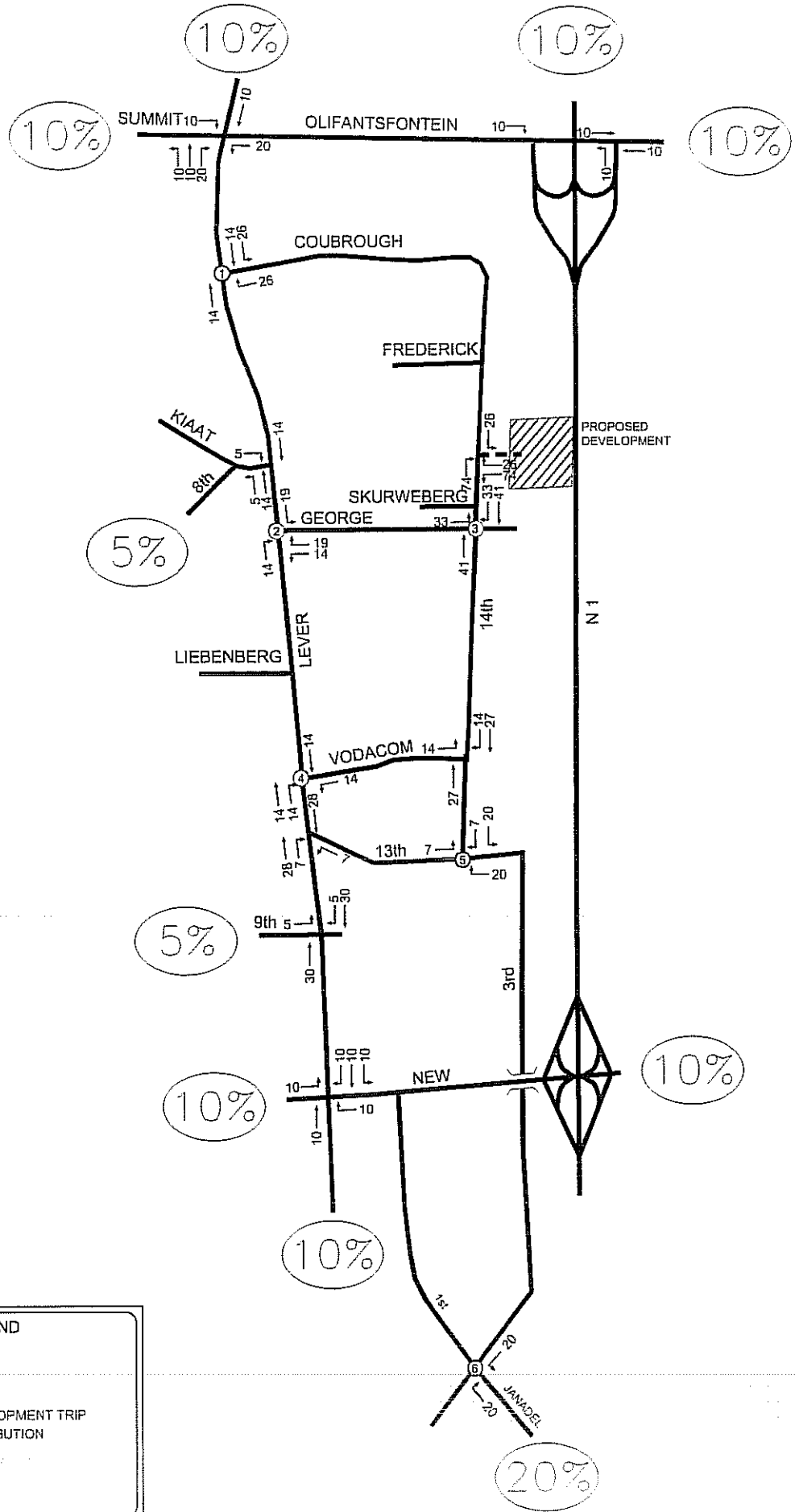
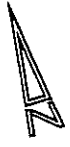


SCHEMATIC

2418_Traffic Figures.dwg



FIGURE:	PROJECT:	NUMBER:
Erand Gardens x 33	Intersection Geometry required to accommodate Scenario 1 2010 Background Traffic (incl. Latent Rights)	3



LEGEND

10% — DEVELOPMENT TRIP DISTRIBUTION

10
10
20 —

SCHEMATIC

2418_Traffic Figures.dwg



FIGURE: Erand Gardens x 33

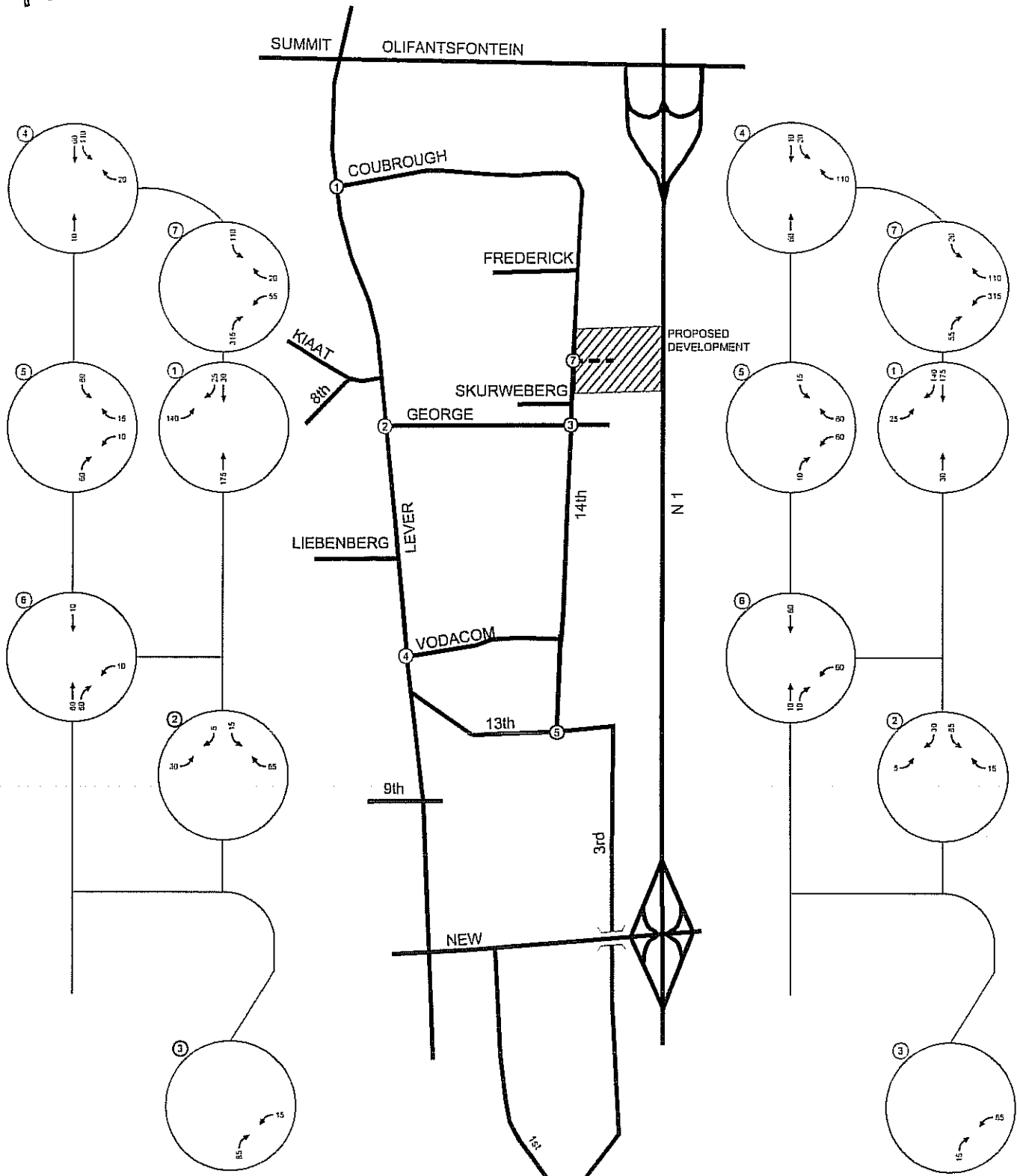
PROJECT: Development Trip Distribution

NUMBER: 4



AM PEAK HOUR VOLUMES

PM PEAK HOUR VOLUMES



LEGEND

1045
310
25

— TURNING VOLUMES, (VPH)

LOS — LEVEL OF SERVICE
Del — DELAY SECOND / VEHICLE
V/C — VOLUME / CAPACITY RATIO
CM — CRITICAL MOVEMENT

SCHMATIC

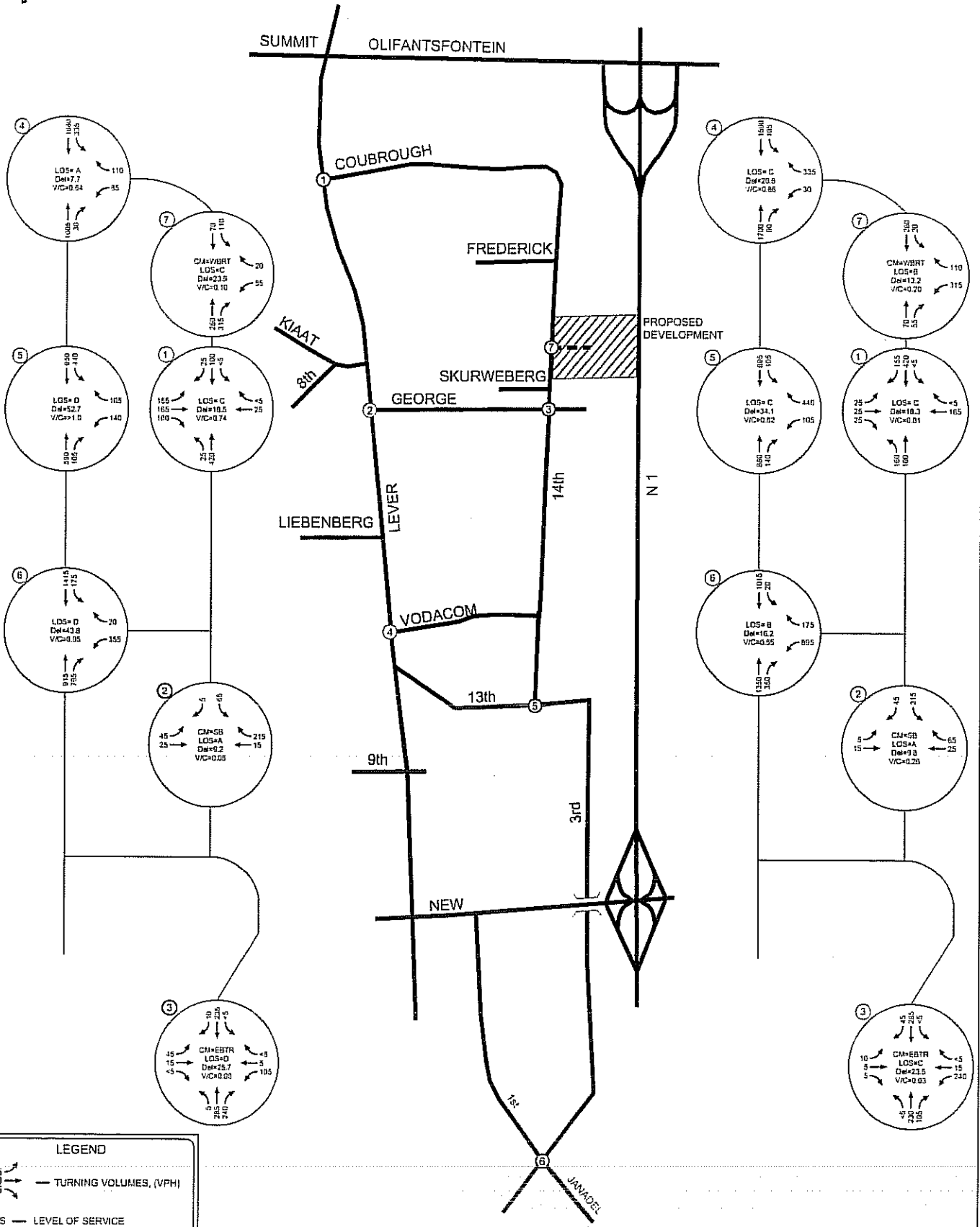
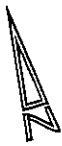
2418_Traffic Figures.dwg



<p>FIGURE:</p> <p style="text-align: center;">Erand Gardens x 33</p>	<p>PROJECT:</p> <p style="text-align: center;">Development Trip Assignment AM and PM Peak Hour</p>	<p>NUMBER:</p> <p style="text-align: center;">5</p>
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AM PEAK HOUR VOLUMES

PM PEAK HOUR VOLUMES



LEGEND

- 1045
310
70 — TURNING VOLUMES, (VPH)
- LOS — LEVEL OF SERVICE
- Del — DELAY SECOND / VEHICLE
- VIC — VOLUME / CAPACITY RATIO
- CM — CRITICAL MOVEMENT

SCHMATIC

2418_Traffic Figures.dwg



FIGURE:

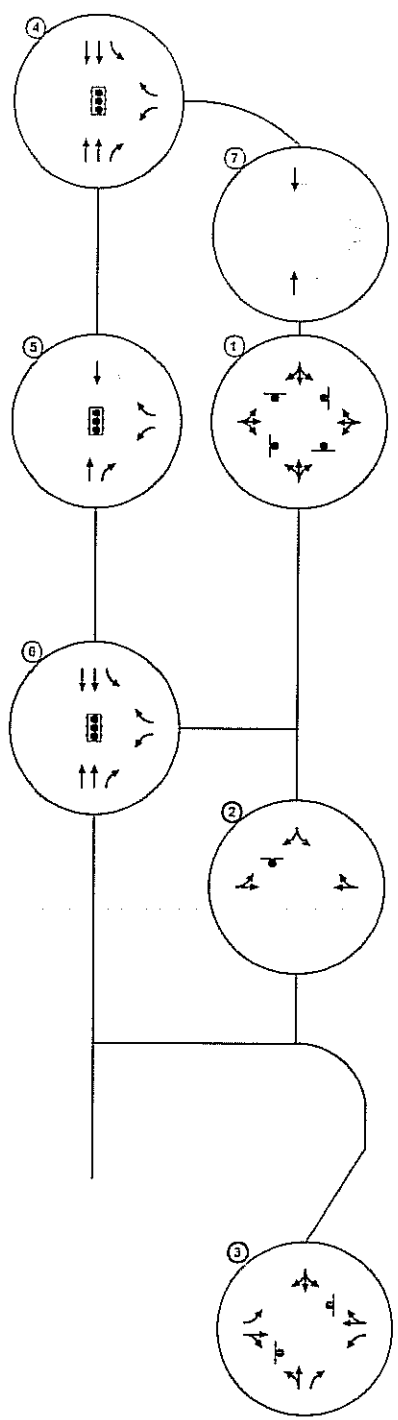
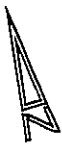
Erand Gardens x 33

PROJECT:

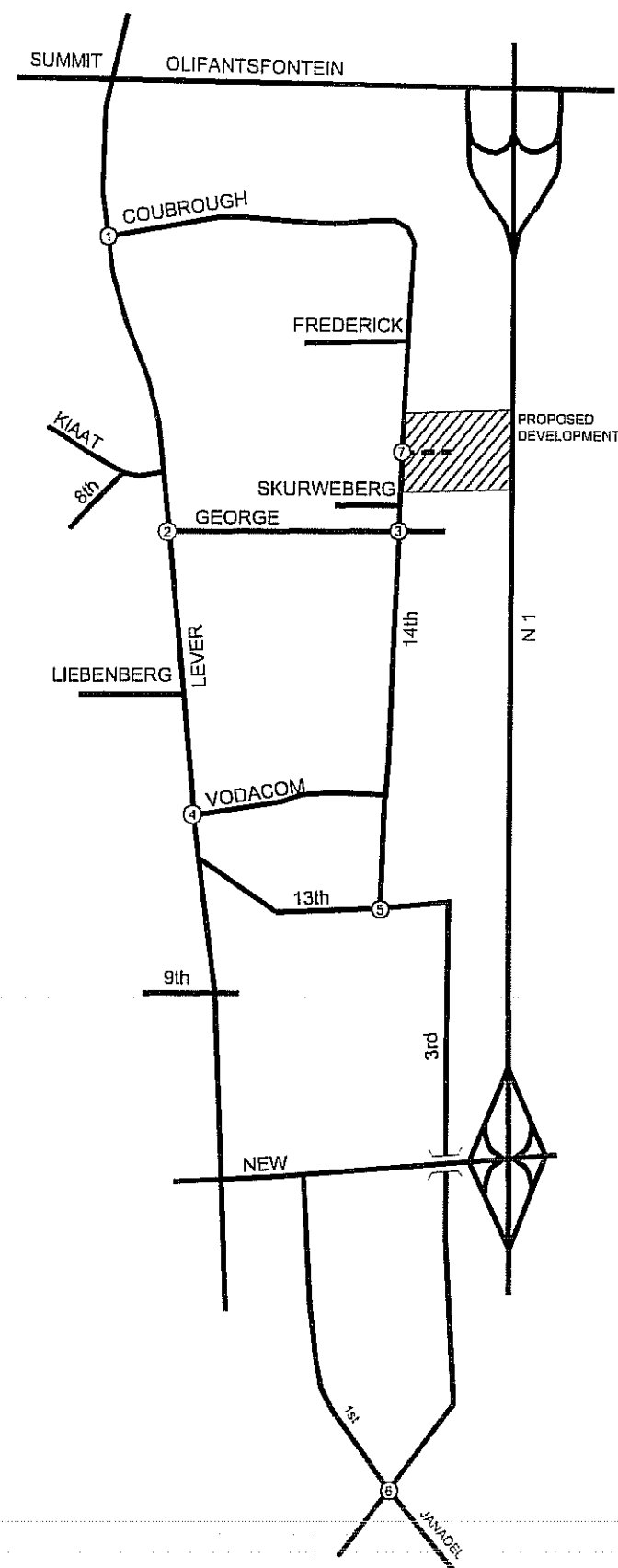
Scenario 2 - 2010 Background Traffic (incl. Latent Rights)
+ Development Traffic
AM and PM Peak Hour

NUMBER:

6



LEGEND	
	TRAFFIC SIGNAL
	STOP CONTROLLED
	EXCLUSIVE LEFT LANE
	THROUGH LANE
	EXCLUSIVE RIGHT LANE
	SHARED LANE



SCHEMATIC

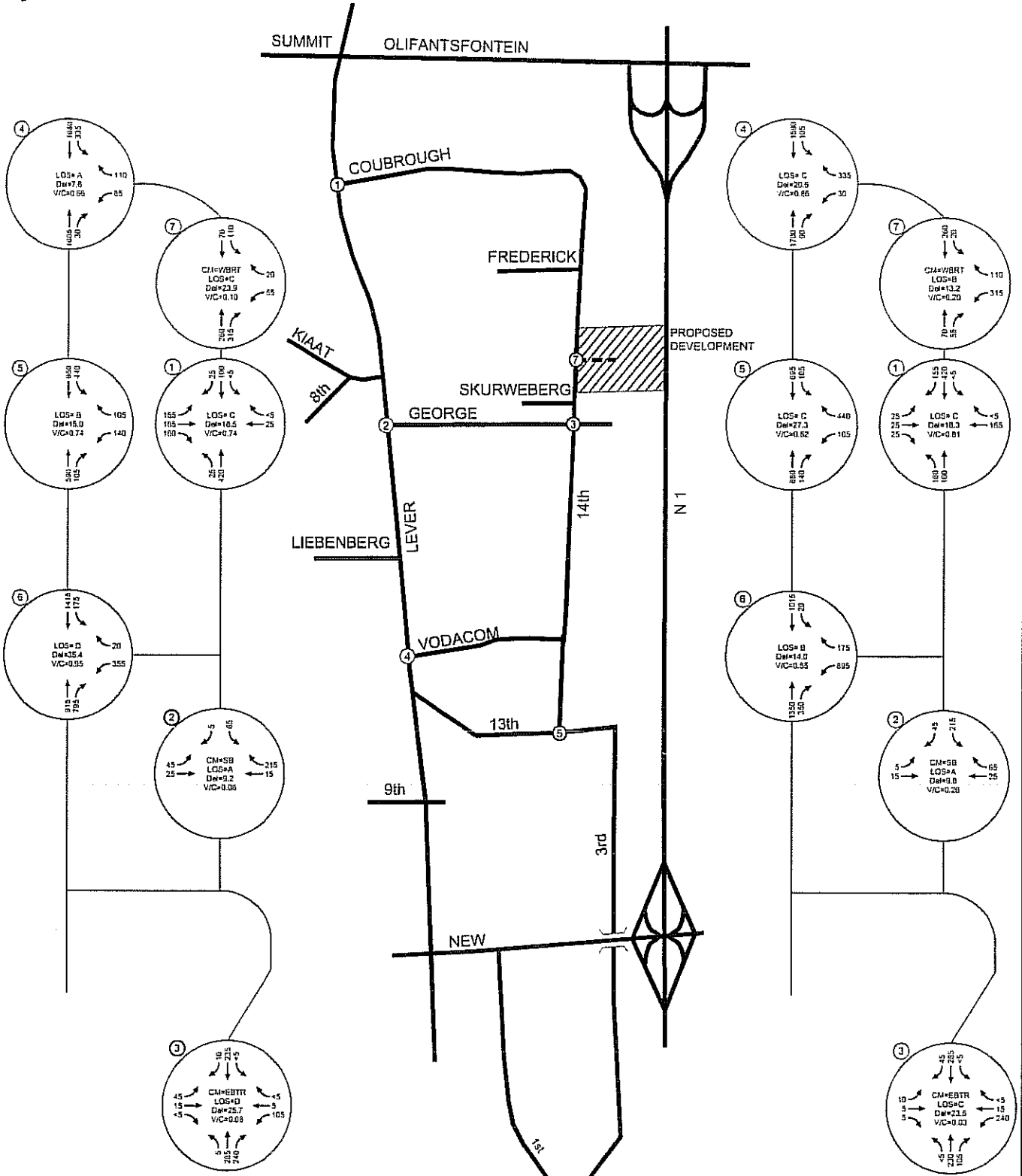
2418_Traffic Figures.dwg



<p>FIGURE: Erand Gardens x 33</p>	<p>PROJECT: Intersection Geometry required to accommodate Scenario 2 2010 Background Traffic (incl. Latent Rights) + Development Traffic</p>	<p>NUMBER: 7</p>
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AM PEAK HOUR VOLUMES

PM PEAK HOUR VOLUMES



LEGEND

1045
 310
 20
 — TURNING VOLUMES, (VPH)

LOS — LEVEL OF SERVICE
 Dm — DELAY SECOND / VEHICLE
 V/C — VOLUME / CAPACITY RATIO
 CM — CRITICAL MOVEMENT

SCHMATIC

2418_Traffic Figures.dwg



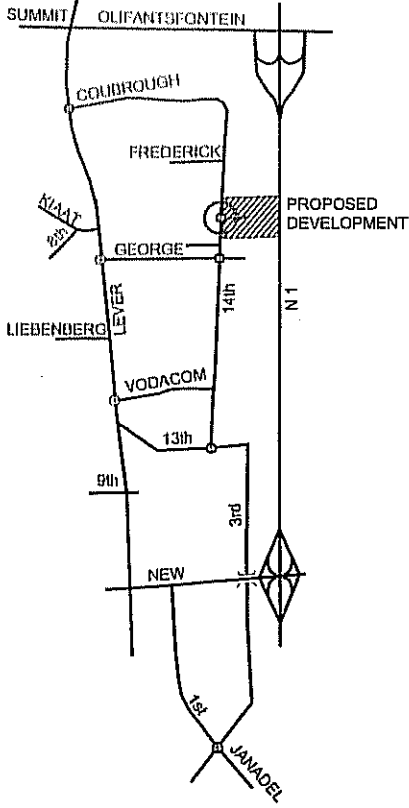
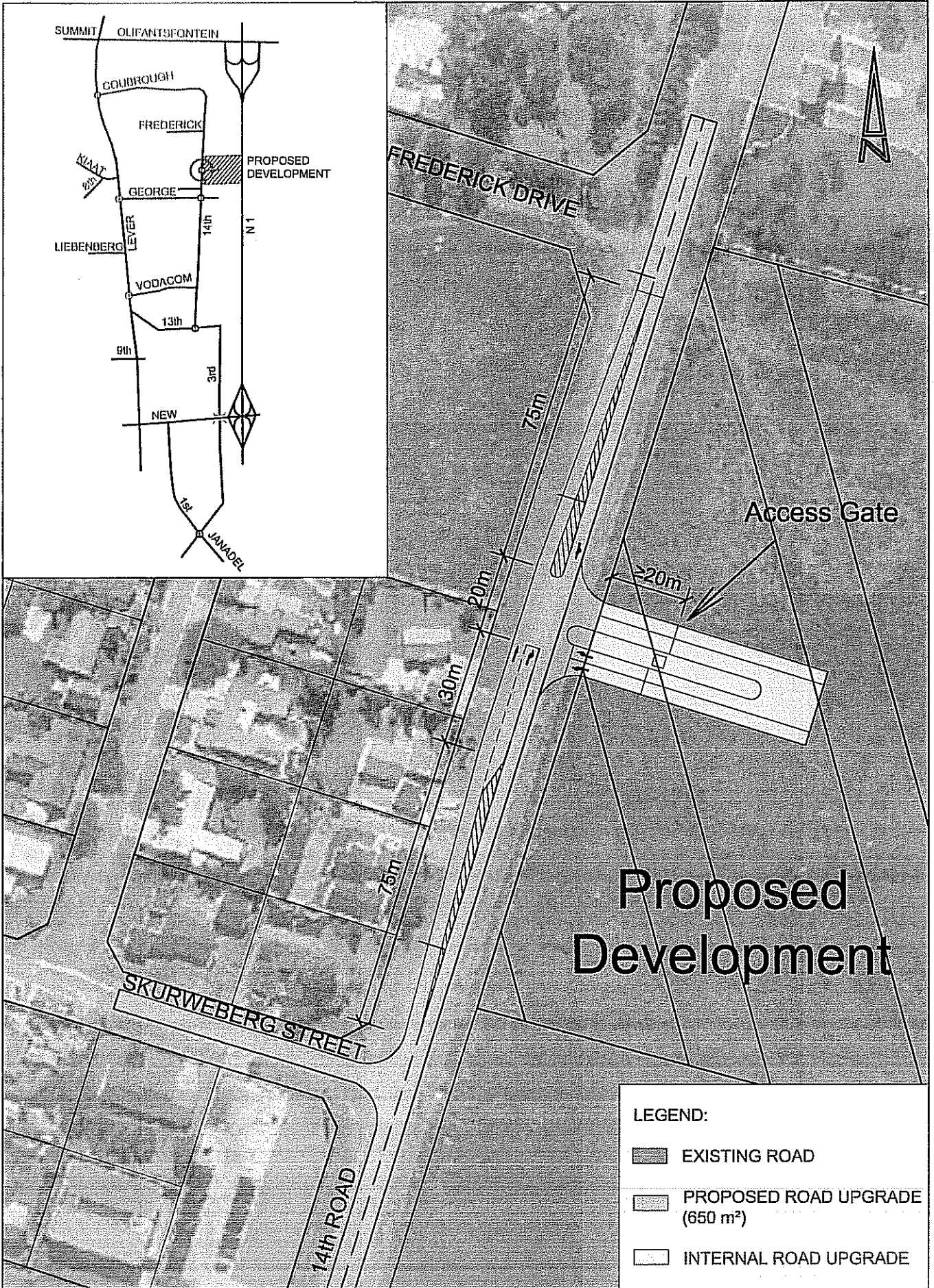
FIGURE: Erand Gardens x 33

PROJECT: Scenario 2 - 2010 Background Traffic (incl. Latent Rights) + Development Traffic with upgraded geometry AM and PM Peak Hour

NUMBER: 8




APPENDIX B

DRAWING



Proposed Development

LEGEND:

-  EXISTING ROAD
-  PROPOSED ROAD UPGRADE (650 m²)
-  INTERNAL ROAD UPGRADE

its
Engineers

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CLIENT: **CENTRAL DEVELOPMENTS**

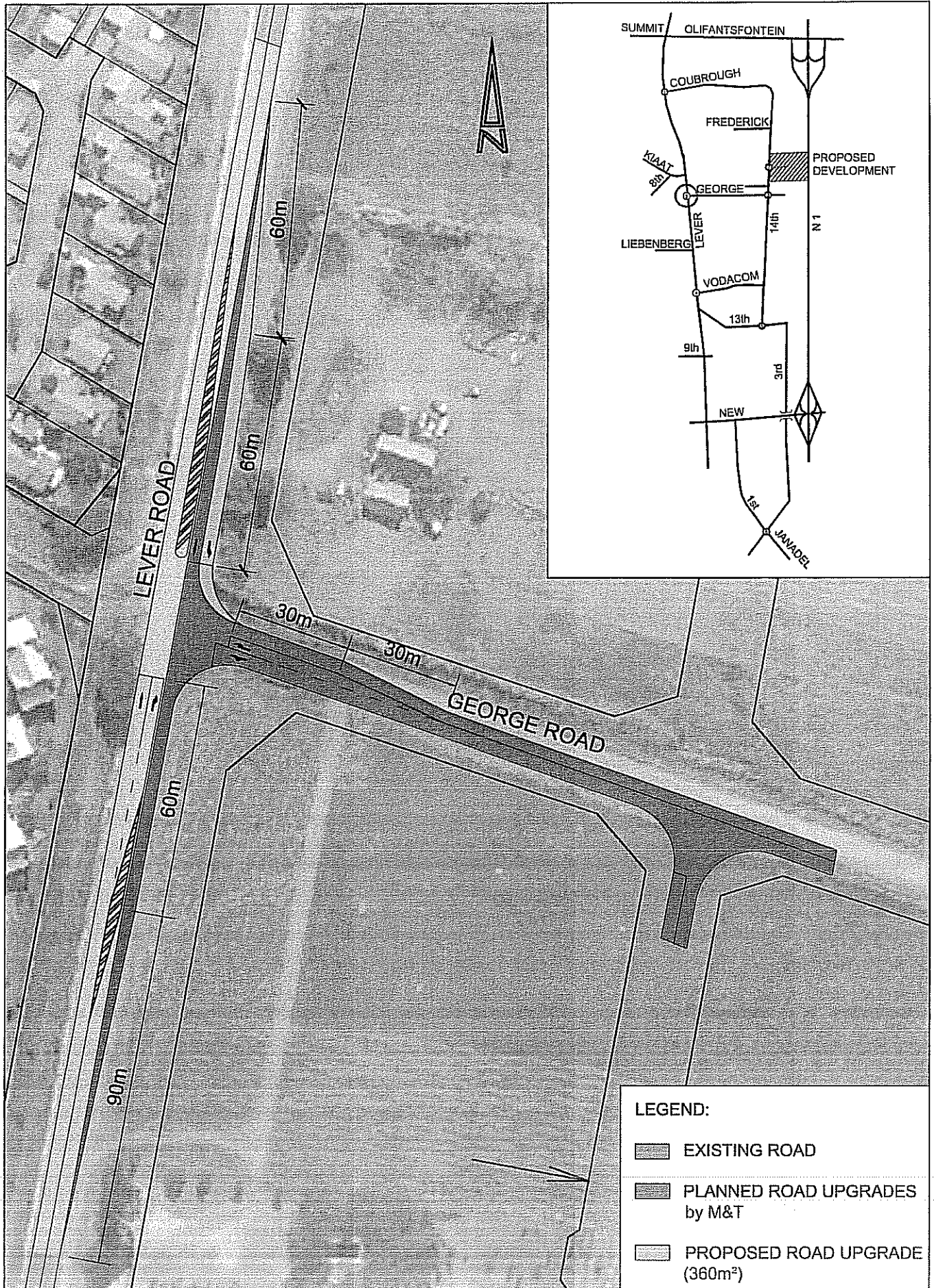
PROJECT: **2418 Erand Gardens x33**

DRAWING TITLE: **Proposed Road Upgrades
14th Road / Access**

SCALE: **1:1250**

REV: **DATE: 2008/02/04**

DRAWING NUMBER: **2418 / GL / 01**



LEGEND:

- EXISTING ROAD
- PLANNED ROAD UPGRADES by M&T
- PROPOSED ROAD UPGRADE (360m²)

its
 CONSULTANTS

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CLIENT:
CENTRAL DEVELOPMENTS

PROJECT:
 2418 Erand Gardens x33

DRAWING TITLE:
 Proposed Road Upgrades
 Lever Road / George Road

SCALE: 1:1250	REV
	DATE 2008/02/14
DRAWING NUMBER 2418 / GL / 02	