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TRAFFIC IMPACT STATEMENT

Proposed Industrial Development

Sylvester Ave, Unanderra

KF109450

Amended July 2009

TABLE OF CONTENTS

1.0 INTRODUCTION

2.0 LOCATION OF DEVELOPMENT SITE

3.0 EXISTING SITE CONDITIONS

- 3.1 Traffic Conditions
- 3.2 Public Transport/Amenity

4.0 DESCRIPTION OF PROPOSED DEVELOPMENT

5.0 ON-SITE CAR PARKING REQUIREMENTS

- 5.1 Carparking Numbers
- 5.2 Carparking Standards

6.0 TRAFFIC GENERATION

- 6.1 Predicted Traffic Generation
- 6.2 Site Access Routes/Impacts

7.0 RECOMMENDATIONS AND CONCLUSIONS

APPENDICES

- A. K F WILLIAMS & ASSOCIATES PLAN KF109450/C01
- B. EXISTING DEPOSITED PLAN & SITE SURVEY PLAN
- C. INTERSECTION TRAFFIC COUNT
- D. K F WILLIAMS & ASSOCIATES PLANS KF109450/C07 & C08
- E. SIDRA DOCUMENTATION – INTERSECTION PRINCES HIGHWAY & ORANGEGROVE AVENUE

1.0 INTRODUCTION

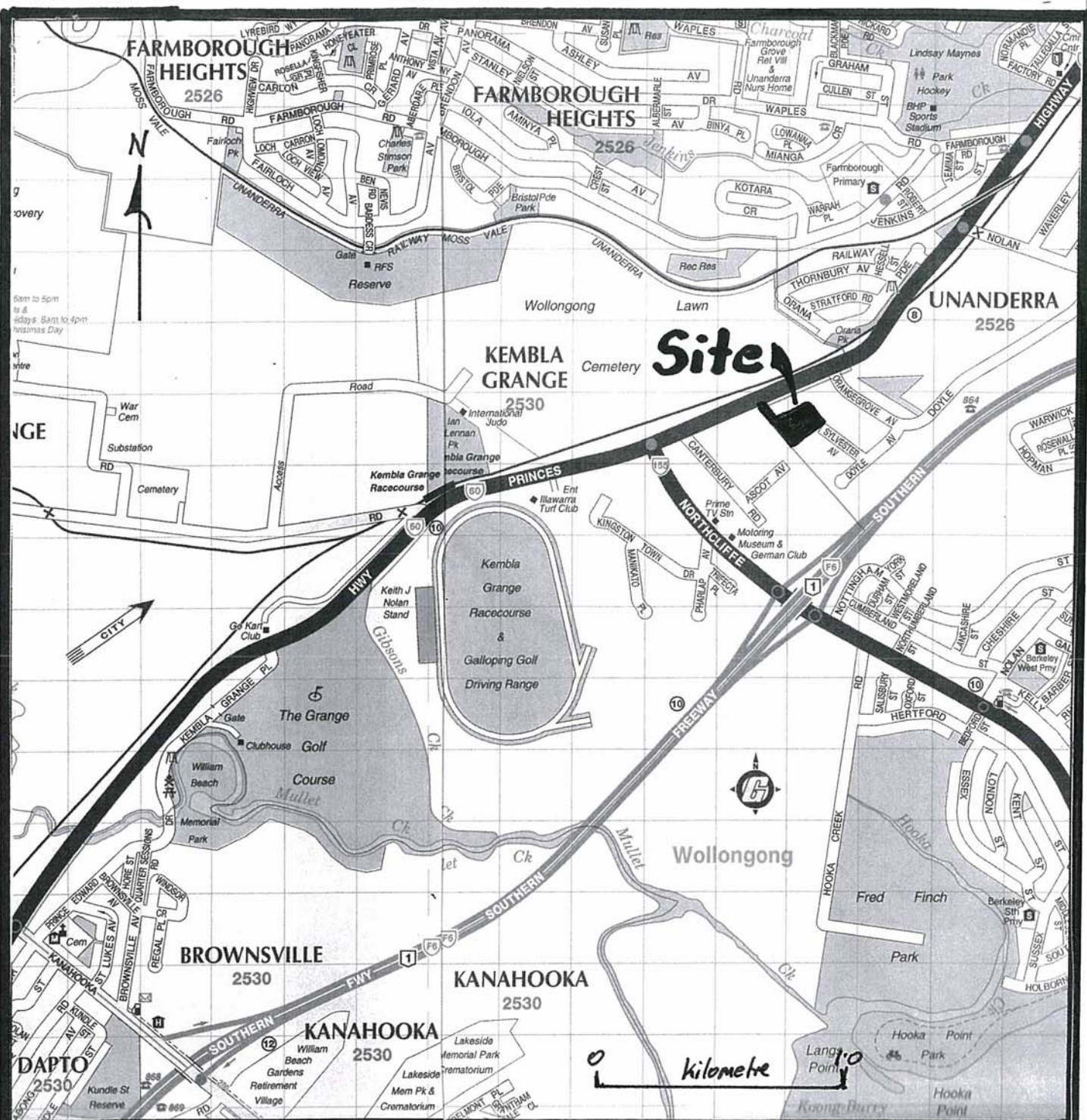
K.F. Williams & Associates Pty Ltd has been commissioned by Prince Property Consulting on behalf of Obnova Concrete Pty Ltd to undertake a Traffic Study for a proposed industrial development in Sylvester Avenue, Unanderra. A Traffic Impact Report was undertaken in October 2008 as part of the development application.

The development application has been assessed by Wollongong City Council and the RTA who have provided comments and concerns relating to direct access onto the Princes Highway and carparking in the access handle. They also required further details and a SIDRA analysis of the intersections. A meeting was held with RTA officers on 29 June 2009 to clarify there concerns. This revised report discusses the item raised and presents a revised carpark / traffic layout.

2.0 LOCATION OF DEVELOPMENT SITE

The site is in the southern Wollongong suburb of Unanderra and has road access from both Sylvester Avenue and the Princes Highway (refer attached plan KF109450/C01 – Appendix A). The site consists of two lots (lots 1 and 2 DP 1064872 refer Appendix B) with a total site area of 2.697ha and is presently vacant. The lot slopes in a northwesterly direction at approximately 10% grade.

For existing site survey refer plan by jrk Surveys copy Appendix B. For site location sketch refer SK01 attached.



Location Plan



K.F. WILLIAMS & ASSOCIATES PTY LTD
 CONSULTING SURVEYORS, CIVIL & STRUCTURAL ENGINEERS
 28 Auburn Street, Wollongong NSW 2500. Telephone: (02) 4228 7044

KF109450

SK01

3.0 EXISTING SITE CONDITIONS

3.1 Traffic Conditions

The site is at the end of Sylvester Avenue, Unanderra. Sylvester Avenue has a carriageway width of 12.8m, and connects to Doyle Avenue, which has links to the Princes Highway via Orangegrove Avenue and Nolan Street. All the above streets have wide carriageways which can cater for large heavy vehicles.

The Princes Highway provides a link to Unanderra and Wollongong to the north and Dapto to the south. Northcliffe Drive connects the Princes Highway to the F6 Freeway, which provides a link to Sydney to the north, and Nowra to the south. For road layout plan adjacent to the site refer SK01 – Section 2.

The site also has a handle which gives it frontage to the Princes Highway with kerb returns existing to allow vehicle access to the site and a break in the double lines provided to allow vehicles to turn into the site. A stop sign is provided at this entry.

Limited street parking only is available on the Princes Highway and in Sylvester Avenue.

3.2 Public Transport/Amenity

Private bus services operate along the Princes Highway (service Nos 33, 37 & 57) at hourly intervals and provide links to Dapto to the south and Wollongong to the north.

The closest railway station is Kembla Grange Racecourse, which is 1.2km from the site.

The closest amenities in the form of a small local shopping centre are in Farmborough Road, Unanderra approx 1.3km north of the site.

4.0 DESCRIPTION OF PROPOSED DEVELOPMENT

It is proposed to construct an industrial building with offices and amenities and provide associated truck turning and vehicle parking areas. The development is to accommodate the re-location of the existing Cooksons Plant in Bulli. The Bulli site presently has 53 carparking spaces with overflow parking for 10 additional cars. The present Carpark is adequate to cater for the company needs.

The proposed number of employees is 40 office workers and 55 plant workers who will work in two (2) shifts i.e. 6am to 2pm / 2pm to 10pm, five days, Monday to Friday.

Vehicle access to the site is proposed from Sylvester Avenue with large vehicle truck exit onto the Princes Highway only. Raw materials and product (approx 400 tonnes/week) will be transported by road vehicles, the preferred vehicle type being B – doubles. It is estimated that there will be 4 movements in and 4 out of the site per day. (Monday to Friday only).

Visitors to the site based on the existing facilities will be approximately 10-passenger vehicles/day. A separate visitor / administration carpark has been provided adjacent to the site entry, the truck turning / unloading area has also been separated from the employee carpark area. A total of 102 car parking spaces has been provided.

In accordance with State Environmental Planning Policy (Infrastructure) 2007
Schedule 3 of the Infrastructure SEPP captures the proposal.

For site layout plan of the proposal refer Appendix A.

5.0 ON-SITE CARPARKING REQUIREMENTS

5.1 Carparking Numbers

Carparking requirements have been calculated using Wollongong City Council DCP6, the numbers have been compared to the actual usage requirements of the proposed development by the Client.

The required carpark numbers based on the DCP requirements are shown in Table 1 below.

Table 1 Carparking Requirements				
Usage	Area m ²	Requirement	No. Required	No. Provided
Offices	900	1/40m ²	22.5	
Industrial Building	8,000	1/60m ²	133.3	
Totals			155.8	102

The site is to be developed specifically in order to re-locate the existing Cooksons Plant in Thirroul.

The required carparking numbers, to adequately cater for the actual building usage are:

i.e. Office requirement	30
Industrial 30/ shift i.e.	60 at changeover
Visitors	10
Total required	<u>100</u>

The proposal is to provide 102 car parking spaces on-site.

5.2 Carparking Standards

In accordance with AS2890.1 the user class would be User Class 2 this requires minimum carparking sizes of 5.4m x 2.5m with minimum aisle width of 5.8m. The visitor carpark should provide parking for 2 disabled people (min 3.2m wide) and bicycle parking for 12 bicycles.

6.0 TRAFFIC GENERATION

6.1 Predicted Traffic Generation

The predicted traffic generation was calculated using the RTA Guide to Traffic Generating Developments. Table 2 below summarises the predicted vehicle generation over the peak hour period.

Table 2 Peak hour Traffic Generation			
Usage	Area m²	Generation Rate	Total Trips/hour
Offices	900	2/100m ²	18
Industrial Building	8,000	0.5/100m ²	40
Totals			58

The peak hour traffic generation in accordance with the RTA guidelines is 58 vehicles/hour. Due to the staggered work hours between the office and factory workers this number is considered conservative. A maximum of four (4) B-doubles will access the site each work day.

6.2 Site Access Routes/Impacts

Access to the site is via Sylvester Avenue, Doyle Avenue, Orangegrove Avenue and hence Princes Highway (refer SK01 – Section 2). All the above roads have wide carriageways (min 10.8m) and serve a well established industrial area.

Goods being transported to and from the site are from the Sydney region and will come via the F6 Freeway which links to the site via Northcliffe Drive and Princes Highway, the preferred vehicle type being B-Doubles. The turning circles for B-Doubles were checked over the route – refer plan KF109450/C08 Appendix D, and were found to be satisfactory.

All vehicle entry and exit from the site will be via the Sylvester Avenue entry except B-Double exist which will be directly onto the Princes Highway. After consultation with the RTA the access handle giving direct access onto the Princes Highway will be blocked off and utilized for B-Double exit only. The intersection with the Princes Highway will be modified to allow for this movement and be restricted to left turn only (refer Traffic Management Plan and turning circles Appendix D). Safe intersection site distance available is 260m.

Entering sight distance for heavy vehicles based on eye height of 1.8m is well in excess of 300m, the desirable minimum required. B-Doubles can enter the Highway turning left into the outside lane and not encroach onto the inside lane through traffic (refer turning movement plan KF109450 C07). Modifications to the entry will be required to accommodate this movement.

A review of the intersection of Orangegrove Avenue and Princes Highway was undertaken with a 12 hour vehicle survey undertaken on Thursday 9 July 2009. The weather was overcast with rain showers. For details of the survey, refer Appendix C.

The right hand turn lane into Orangegrove Avenue from the Princes Highway resulted in maximum queue length of 3 vehicles during the survey – capacity of 10 vehicles available.

Observations of the intersection operation revealed it to be well below capacity. A full SIDRA analysis has been undertaken for the existing intersection condition, the predicted traffic increase due to the development and predicted traffic conditions for the year 2020. The AADT's for the Princes Highway based on RTA data have been constant over the last fifteen (15) years, an increase of 5% has been allowed for. For full details, refer Appendix E.

7.0 RECOMMENDATIONS & CONCLUSION

The number of carparks provided is adequate to cater for the development and is based on the existing development at Bulli which is to be re-located to this site.

The streets within the area have ample capacity to cater for the predicted increased traffic generation. The major transport link for Goods is to and from the Sydney region via the F6 Freeway, Northcliffe Drive and the Princes Highway. The route was checked for B-Double vehicles and found to be satisfactory.

It is recommended the B-Double route be via right turn into Orangegrove Avenue and left turn from the site onto the Princes Highway. Available sight distances and entering sight distances onto the Princes Highway were measured and are considered adequate.

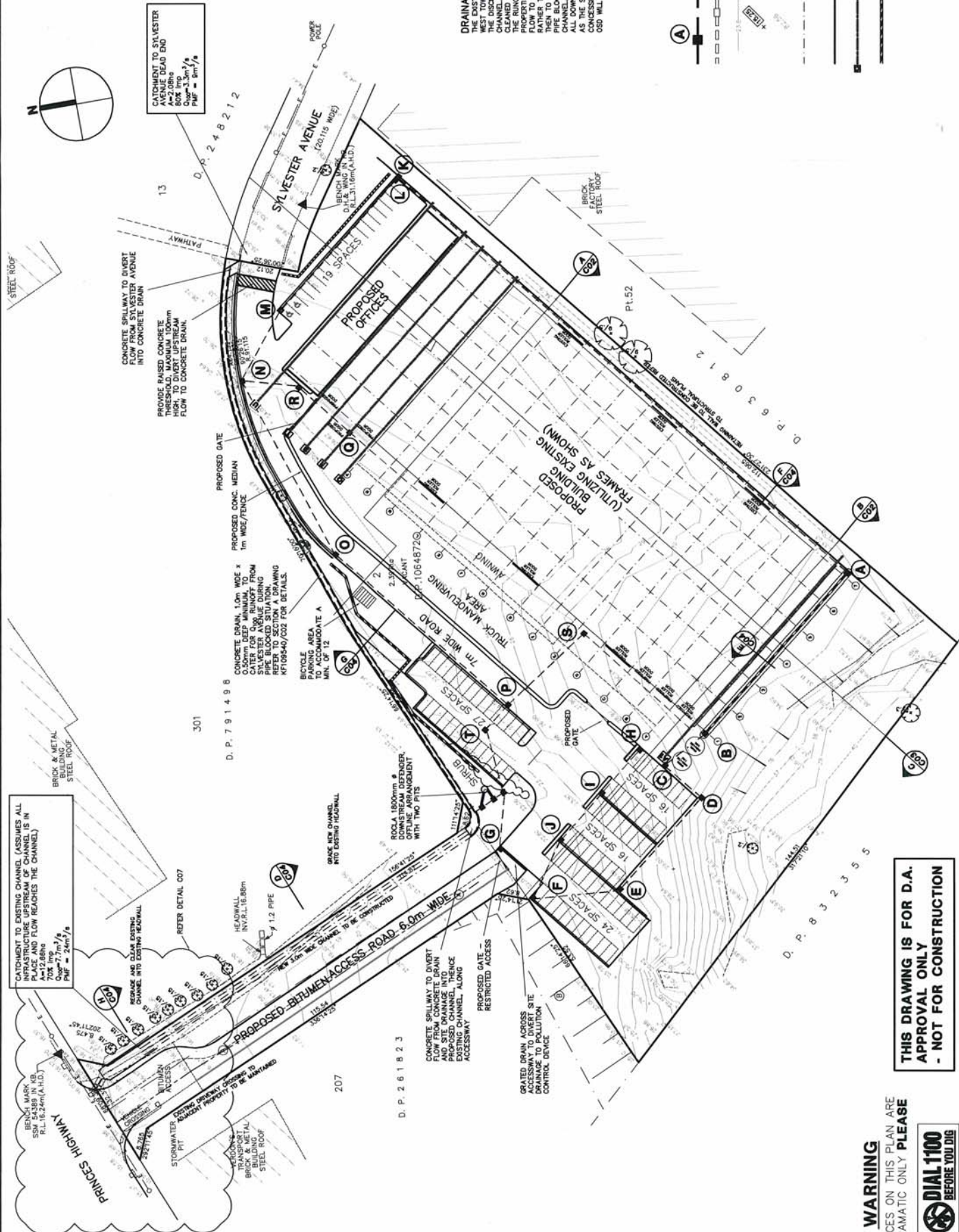
It is also recommended that the right turn movement onto the Princes Highway from the site via the access handle be banded and that the access handle be utilised for D-Double exit only. An internal Traffic Management Plan (refer Appendix D) has been produced which separates vehicle types within the site and restricts access onto the Princes Highway.

APPENDIX A

K F WILLIAMS & ASSOCIATES PLAN

KF109450/C01

DO NOT SCALE



DRAINAGE NOTES:-
THE EXISTING DIRECTION OF FLOW IS TO THE NORTH
WEST TOWARDS PRINCES HIGHWAY. THE PROPOSED
CHANNEL WILL BE UPGRADED AND
CLEANED OUT.
THE RUNOFF FROM THE SITE ONTO THE ADJACENT
CHANNEL WILL BE CONTAINED WITHIN THE
CHANNEL. THE PROPOSED CHANNEL WILL BE
CONTAINED WITHIN THE CHANNEL. THE PROPOSED
CHANNEL WILL BE CONTAINED WITHIN THE CHANNEL.
AS THE SITE IS WITHIN THE WOLLONGONG CITY COUNCIL'S
CONCESSION ZONE FOR ON-SITE DETENTION (OSD), NO
OSD WILL BE PROVIDED.

LEGEND

- PROPOSED DRAINAGE PITS AND PIPES
- EXISTING DRAINAGE PIPE AND PITS
- EXISTING CONTOURS
- PROPOSED SURFACE LEVELS
- EXISTING SURFACE LEVELS
- EXTENT OF EXISTING EASEMENTS
- PROPOSED BOUNDARY
- PROPOSED ADDITIONAL PORTALS
- PROPOSED RETAINING WALL

WARNING

SERVICES ON THIS PLAN ARE
DIAGRAMATIC ONLY PLEASE



THIS DRAWING IS FOR D.A. APPROVAL ONLY - NOT FOR CONSTRUCTION

DATE: 25-08-99		PROJECT: PROPOSED INDUSTRIAL BUILDING		REV: B	
DRAWN: K.F. WILLIAMS		LOT 2 D.P. 1064872		TWO No.	
CHECKED: K.F. WILLIAMS		PRINCES HWY & SYLVESTER AVE, UNANDERRA		C01	
APPROVED: K.F. WILLIAMS		OVERALL PLAN		SECRET 1 OF 4	
SCALE: 1:500		ISSUED FOR D.A. APPROVAL		AL	

K.F. WILLIAMS & ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS, ARCHITECTS & PLANNERS
88 Ashurst Rd, Wollongong, N.S.W. 2500
Telephone: (01) 4228 7044 Facsimile: (02) 4228 3004
Email: info@kfwilliams.com.au
A.C.T. 004 004 471

NO.	REVISION	DATE
1	ISSUED FOR D.A. APPROVAL	25-08-99
2	FOR CONSTRUCTION	14-09-99

APPENDIX B

EXISTING DEPOSITED PLAN & SITE SURVEY PLAN

SIGNATURES AND SEALS ONLY

THE COMMON SEAL OF
MANBEAD PTY LIMITED
(ACN 068376590)
WAS HERETO AFFIXED
PURSUANT TO A RESOLUTION
OF ITS BOARD OF DIRECTORS
AND IN THE PRESENCE OF
Signed on behalf of Member P414
by Vito Burmimpade

Sole DIRECTOR / Secretary

Sole SECRETARY / Director

Signed and Sealed by the said Bank
at Sydney by its Attorney
by its Agency
BANK OFFICER
2011 MARKET STREET
SYDNEY
BANK OFFICER

AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED
ACN: 005 357 522

and I, the said Attorney state that I have not received
any notice of the revocation of the Power of Attorney
registered in the Office of the Registrar General in New
Zealand, and I am not aware of any such revocation.

ACTING MANAGER RESOURCES FOR THE TIME BEING
OF AUSTRALIA AND NEW ZEALAND BANKING GROUP LIMITED

Department of Lands Approval

I certify that the provisions of s.109(3) of the Environmental Planning and
Assessment Act 1979 have been satisfied in relation to the proposed
SUBDIVISION

Consent Authority: *Wollongong City Council*
Date of Endorsement: *21.12.04*
Subdivision Certificate No: *SC-200416*
File No: *107498*

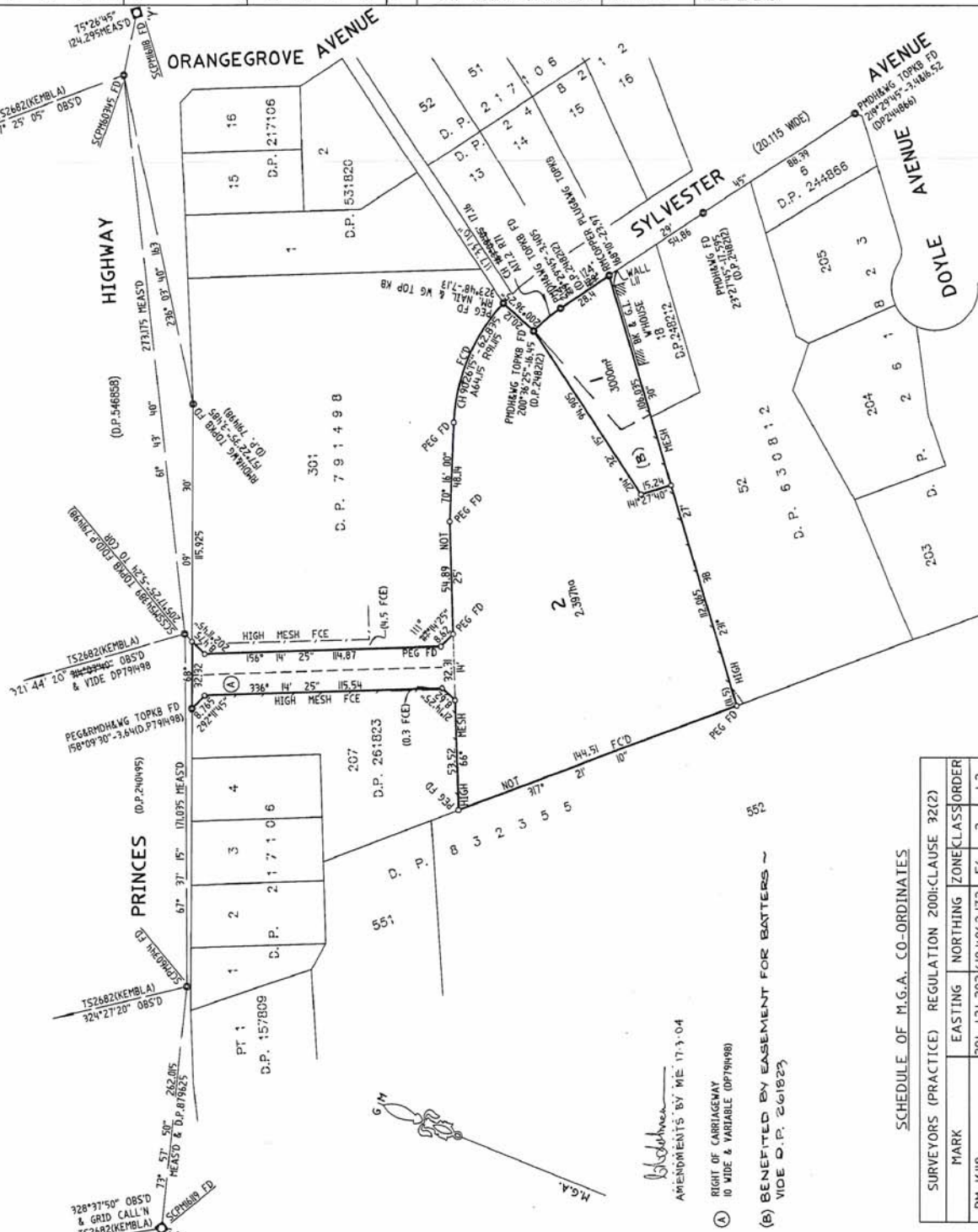
Subdivision Certificate

I certify that the provisions of s.109(3) of the Environmental Planning and
Assessment Act 1979 have been satisfied in relation to the proposed
SUBDIVISION

Consent Authority: *Wollongong City Council*
Date of Endorsement: *21.12.04*
Subdivision Certificate No: *SC-200416*
File No: *107498*

DATE WHENEVER IS INAPPLICABLE

NOTE:
P.M. 1608 FD - P.M. 1608 FD
68°52'22"-826.505' MEASD & PLANE CALC



DP1064872

Registered: *21.12.2004*
Title System: TORRENS
Purpose: SUBDIVISION
Ref. Map: W8277 - 1
Last Plan: DP248212 & DP791498
PLAN OF SUBDIVISION OF
LOT 302 DP791498
& LOT 19 DP248212

Lengths are in metres.
Reaction Ratio: 1:500
LGA: WOLLONGONG
Suburb/Locality: KEMBLA GRANGE
Parish: KEMBLA
County: CAMDEN

This is sheet 1 of my plan in sheets
Survey Regulation, 2001
I, NEIL CRAIG JOHNSON
P.O. BOX 1077 WOLLONGONG 2500
K.F. WILLIAMS & ASSOC. P/L ABN 170086447
I certify that the survey represented in this plan is accurate, has
been made in accordance with the Surveying Regulation 2001 and
was completed on 20/12/2004
The survey relates to LOTS 1 & 2
I have specified the land actually surveyed, or specify the land shown
in the plan that is the subject of the survey
Signature: *Neil Craig Johnson*
Date: *21.12.2004*
Type: *Urban/Res*

Plans used in preparation of survey/compilation
D.P. 27106 D.P. 63062
D.P. 244866 D.P. 791498
D.P. 248212 D.P. 812955
D.P. 53820 D.P. 876625

PANEL FOR USE ONLY for statements of
intention to dedicate public roads, to create
public reserves, drainage reserves, easements,
restrictions on the use of land or positive
covenants.

SCHEDULE OF M.G.A. CO-ORDINATES

SURVEYORS (PRACTICE)	REGULATION 2001: CLAUSE 32(2)
MARK	EASTING NORTHING ZONE/CLASSORDER
PM 16118	301 121.302 618 4062.172 56 2 L2
PM 16119	300 350.369 618 3764.015 56 2 L2
TS 2682 (KEMBLA)	298 584.283 618 6660.783 56 2A 0
SOURCE:	L.P.I. N.S.W. SCIMS 23.12.03
MEAN SEA LEVEL/SCALE FACTOR ADOPTED:	1.000090

AMENDMENTS BY ME 17.3.04
RIGHT OF CARRIAGEWAY
10 WIDE & VARIABLE (DP791498)
(B) BENEFITED BY EASEMENT FOR BATTERS ~
VIDE D.P. 261823

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

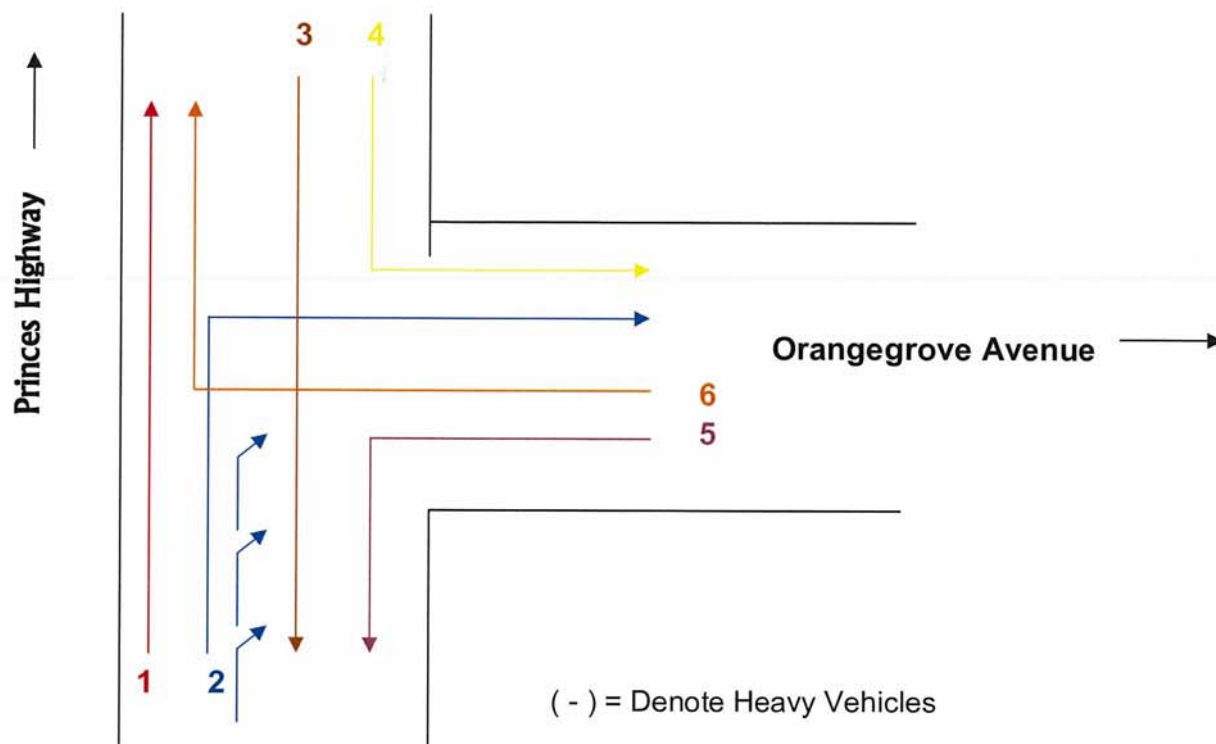
APPENDIX C

INTERSECTION TRAFFIC COUNT

Intersection Count

Thursday 9th July 2009

Cnr Princes Highway – Orangegroave Avenue, Unanderra



Time	1	2	3	4	5	6	Total
6.00 - 6.15am	61 (2)	17 (-)	25 (4)	5 (1)	3 (3)	- (1)	111 (11)
6.15 - 6.30am	123 (11)	62 (3)	42 (2)	7 (-)	1 (1)	1 (-)	236 (17)
6.30 - 6.45am	110 (4)	59 (-)	44 (-)	12 (-)	9 (1)	1 (-)	235 (5)
6.45 - 7.00am	78 (9)	52 (-)	55 (9)	6 (-)	6 (3)	1 (-)	198 (21)
7.00 - 7.15am	70 (5)	63 (1)	60 (2)	15(1)	16 (3)	1 (-)	225 (12)
7.15 - 7.30am	70 (7)	43 (4)	70 (4)	11 (-)	3 (2)	3 (-)	200 (17)
7.30 - 7.45am	70 (2)	40 (1)	45 (1)	10 (-)	2 (1)	1 (-)	168 (5)
7.45 - 8.00am	78 (8)	62 (3)	64 (3)	10 (-)	11 (4)	2 (-)	227 (18)
8.00 - 8.15am	125 (7)	59 (3)	90 (7)	10 (2)	10 (2)	2 (1)	296 (22)
8.15 - 8.30am	131 (4)	40 (4)	103 (12)	3 (-)	13 (3)	5 (1)	295 (24)
8.30 - 8.45am	140 (8)	23 (-)	98 (7)	12 (-)	14 (3)	4 (-)	255 (18)
8.45 - 9.00am	147 (4)	28 (3)	125 (6)	6 (2)	20 (4)	3 (-)	329 (19)
9.00 - 9.15am	107 (6)	32 (4)	115 (11)	7 (1)	15 (8)	9 (-)	285 (30)
9.15 - 9.30am	94 (8)	17 (5)	94 (8)	4 (-)	17 (9)	4 (1)	230 (31)
9.30 - 9.45am	93 (3)	15 (2)	103 (9)	7 (-)	17 (8)	5 (1)	240 (23)
9.45 - 10.00am	94 (6)	11 (-)	150 (9)	4 (-)	18 (1)	5 (-)	282 (16)
10.00 - 10.15am	94 (7)	12 (-)	86 (5)	6 (1)	17 (4)	5 (1)	220 (18)
10.15 - 10.30am	75 (9)	11 (1)	75 (7)	4 (1)	18 (1)	9 (1)	192 (20)
10.30 - 10.45am	92 (4)	13 (3)	120 (4)	6 (3)	24 (3)	4 (1)	259 (18)
10.45 - 11.00am	115 (6)	13 (6)	93 (16)	7 (2)	17 (2)	5 (2)	250 (34)
11.00 - 11.15am	100 (7)	9 (8)	155 (12)	5 (-)	23 (4)	5 (1)	297 (32)
11.15 - 11.30am	82 (3)	15 (6)	85 (2)	3 (2)	14 (2)	6 (1)	205 (16)
11.30 - 11.45am	104 (8)	15 (1)	107 (4)	8 (1)	22 (3)	5 (2)	261 (19)
11.45 - 12.00pm	96 (6)	12 (3)	130 (8)	5 (-)	30 (6)	9 (1)	282 (24)
12.00 - 12.15pm	106 (4)	17 (4)	105 (10)	9 (2)	26 (5)	9 (-)	272 (25)
12.15 - 12.30pm	114 (4)	12 (2)	94 (4)	6 (-)	21 (5)	8 (-)	255 (15)
12.30 - 12.45pm	61 (1)	7 (3)	66 (2)	12 (1)	10 (2)	4 (-)	160 (9)
12.45 - 1.00pm	88 (4)	16 (3)	88 (5)	11 (-)	23 (3)	6 (1)	232 (16)

Time	1	2	3	4	5	6	Total
1.00 – 1.15pm	105 (2)	13 (2)	95 (4)	2 (2)	17 (1)	7 (1)	239 (12)
1.15 – 1.30pm	104 (6)	13 (3)	110 (7)	1 (-)	12 (2)	3 (-)	243 (18)
1.30 – 1.45pm	115 (5)	24 (8)	117 (6)	5 (-)	16 (2)	3 (-)	280 (22)
1.45 – 2.00pm	115 (7)	13 (3)	88 (8)	12 (1)	16 (1)	7 (1)	251 (21)
2.00 – 2.15pm	96 (11)	18 (2)	109 (6)	8 (-)	27 (3)	9 (-)	267 (23)
2.15 – 2.30pm	131 (7)	18 (2)	102 (3)	1 (-)	27 (4)	3 (1)	282 (16)
2.30 – 2.45pm	95 (2)	16 (4)	109 (6)	10 (-)	27 (1)	8 (-)	265 (13)
2.45 – 3.00pm	132 (8)	20 (4)	109 (10)	32 (1)	32 (1)	3 (-)	328 (24)
3.00 – 3.15pm	150 (5)	17 (3)	143 (3)	2 (4)	43 (3)	8 (2)	363 (19)
3.15 – 3.30pm	125 (4)	19 (3)	153 (4)	12 (1)	70 (5)	4 (1)	383 (17)
3.30 – 3.45pm	103 (1)	2 (3)	161 (3)	2 (-)	97 (2)	7 (-)	272 (9)
3.45 – 4.00pm	127 (5)	5 (4)	132 (7)	2 (-)	43 (3)	6 (-)	275 (20)
4.00 – 4.15pm	103 (4)	8 (3)	159 (5)	3 (-)	94 (4)	10 (1)	377 (16)
4.15 – 4.30pm	121 (4)	10 (5)	181 (3)	4 (-)	57 (4)	15 (-)	388 (16)
4.30 – 4.45pm	85 (2)	2 (-)	90 (-)	- (-)	46 (1)	5 (-)	227 (3)
4.45 – 5.00pm	105 (1)	9 (-)	88 (5)	3 (-)	38 (1)	5 (-)	248 (7)
5.00 – 5.15pm	118 (1)	2 (-)	137 (1)	- (-)	75 (2)	13 (-)	345 (4)
5.15 – 5.30pm	100 (1)	1 (-)	115 (7)	- (-)	131 (-)	5 (-)	352 (8)
5.30 – 5.45pm	69 (-)	1 (-)	92 (2)	- (-)	14 (-)	5 (-)	181 (2)
5.45 – 6.00pm	63 (1)	1 (-)	64 (-)	1 (-)	13 (-)	3 (-)	145 (1)

Dominant vehicles in each AUSTRROADS Class

1 = Car



Class 1
Short Vehicle



Class 2
Short Vehicle Towing



Class 3
Two Axle Truck



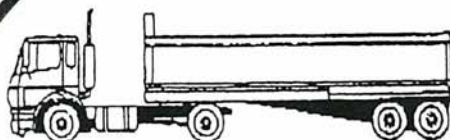
Class 4
Three Axle Truck



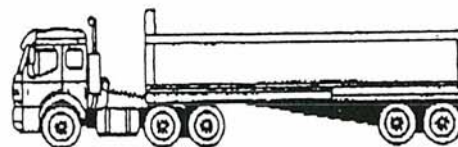
Class 5
Four Axle Truck



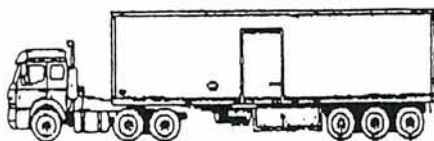
Class 6
Three Axle Articulated Vehicle



Class 7
Four Axle Articulated Vehicle



Class 8
Five Axle Articulated Vehicle



Class 9
Six Axle Articulated Vehicle



Class 10
B Double



Class 11
Double Road Train

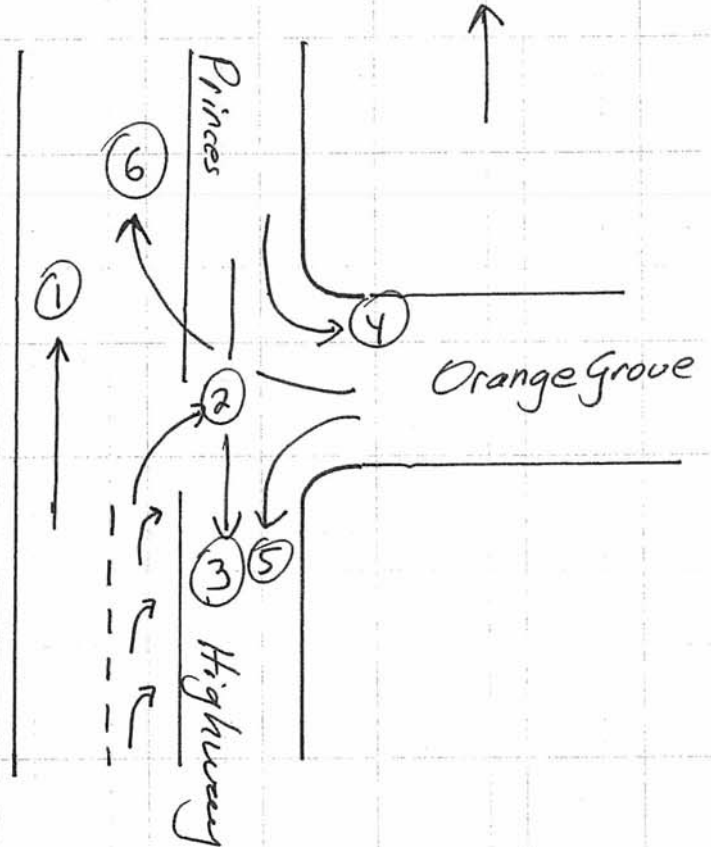


Class 12
Triple Road Train

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Unanderra

Note.
Trucks

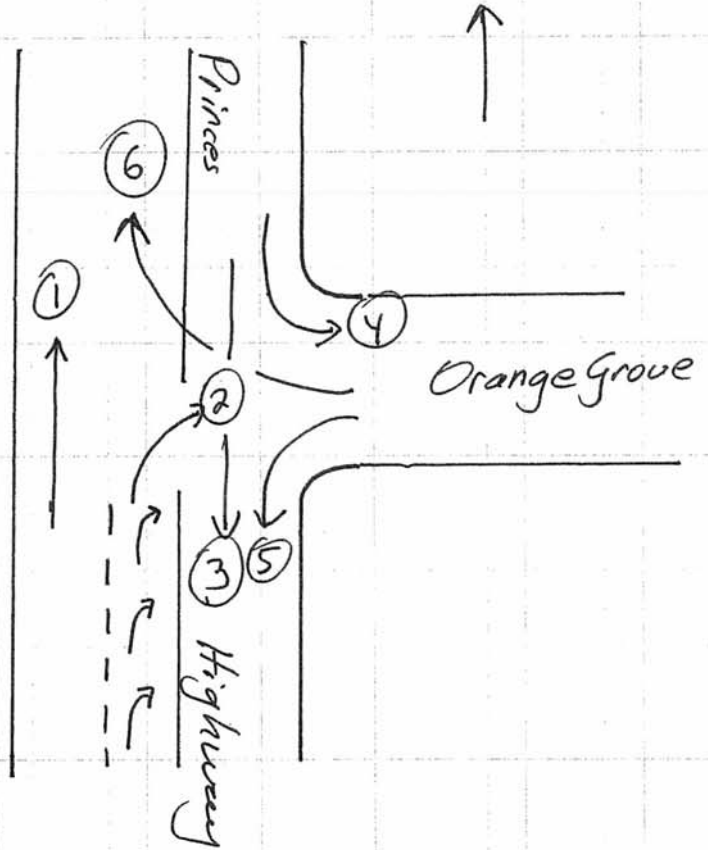


Time.	1	2	3	4	5	6
6:30am to 6:45am (110)	HT RR RR (4)	HT HT HT HT HT HT HT HT HT HT HT HT HT HT (59)	HT HT HT HT HT HT HT HT HT HT HT HT HT HT BUS (4) RR BUS	HT HT HT HT HT HT HT HT HT HT HT HT HT HT (12) (44)	HT HT HT HT HT HT HT HT HT HT HT HT HT HT (9)	HT HT HT HT HT HT HT HT HT HT HT HT HT HT (1)
6:45am to 7:00am	HT (78)	HT (52)	HT HT HT HT HT HT HT HT HT HT HT HT HT HT (55)	HT HT HT HT HT HT HT HT HT HT HT HT HT HT (6)	HT HT HT HT HT HT HT HT HT HT HT HT HT HT (6)	HT HT HT HT HT HT HT HT HT HT HT HT HT HT (1)
	RRR RSRR BUS R (9)		RRRRRR BUS RR (9)		RRR (3)	

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Unanderra

Note.
Trucks

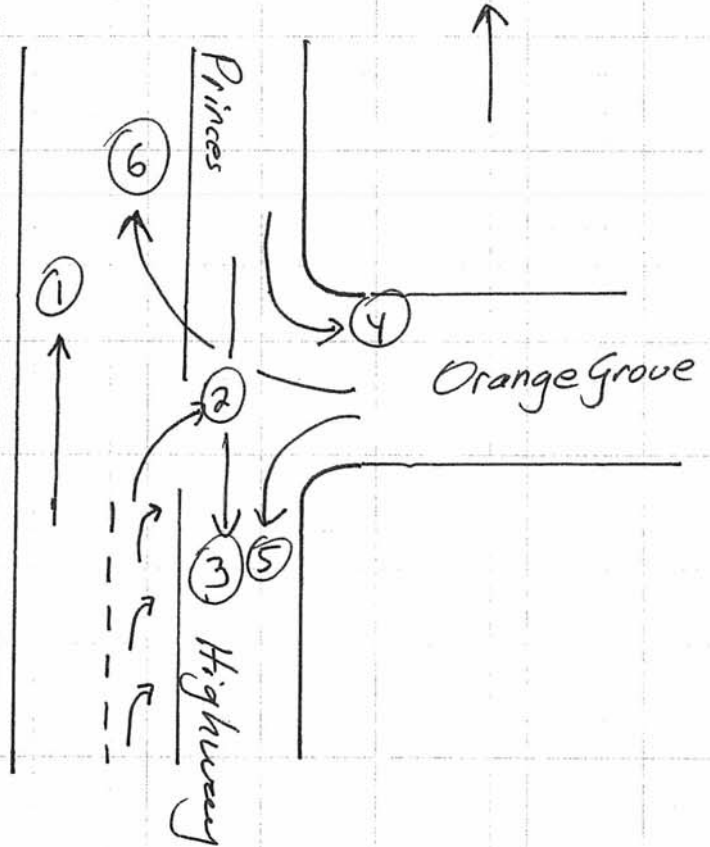


Time.	1	2	3	4	5	6
7am to 7.15am	HT HT HT HT HT HT HT HT HT HT HT HT HT HT Bus RRRR (5)	HT HT HT HT HT HT HT HT HT HT HT HT R (1)	HT HT HT HT HT HT HT HT HT HT HT Bus R (2)	HT HT HT (15) R (1)	HT HT HT (16) SRR (3)	(1)
7.15am to 7.30am	HT HT HT HT HT HT HT HT HT HT HT HT HT HT Bus Bus RRRRS (1)	HT HT HT HT HT HT HT HT HT HT (43) RRRR (4)	HT HT HT HT HT HT HT HT HT HT (70) Bus Bus RR (4)	HT HT HT (11) RR (5)	HT (3) RR (5)	(3)

DESCRIPTION

ION Intersection Count.
Car Princes Hwy - Orangegroove Ave - Unanderra

Note.
Trucks



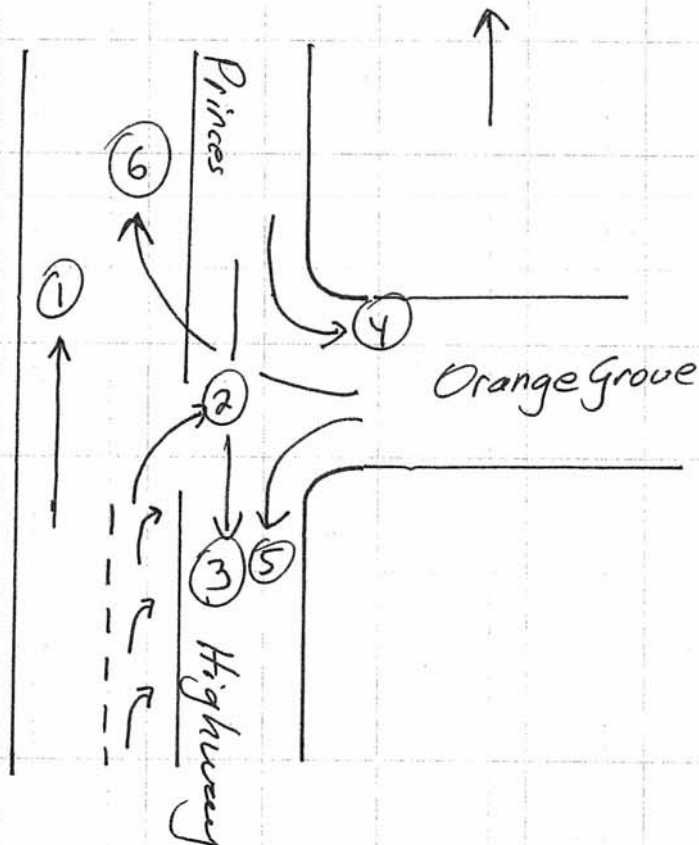
Time.	1	2	3	4	5	6.
7.30 am to 7.45	 (70) RR (2)	 (40) R (1)	 (45) R (1)	 (10) /	(2) R (1)	(1) /
7.45 to 8am	 (78) Bus RRR RRR R (2)	 (62) SRR (3)	 (64) Bus Bus R (3)	 (16) Bus	2 (11) (4) RRRR	(2)

DESCRIPTION

Intersection Count.

Car Princes Hwy - Orangethorpe Ave - Unanderra

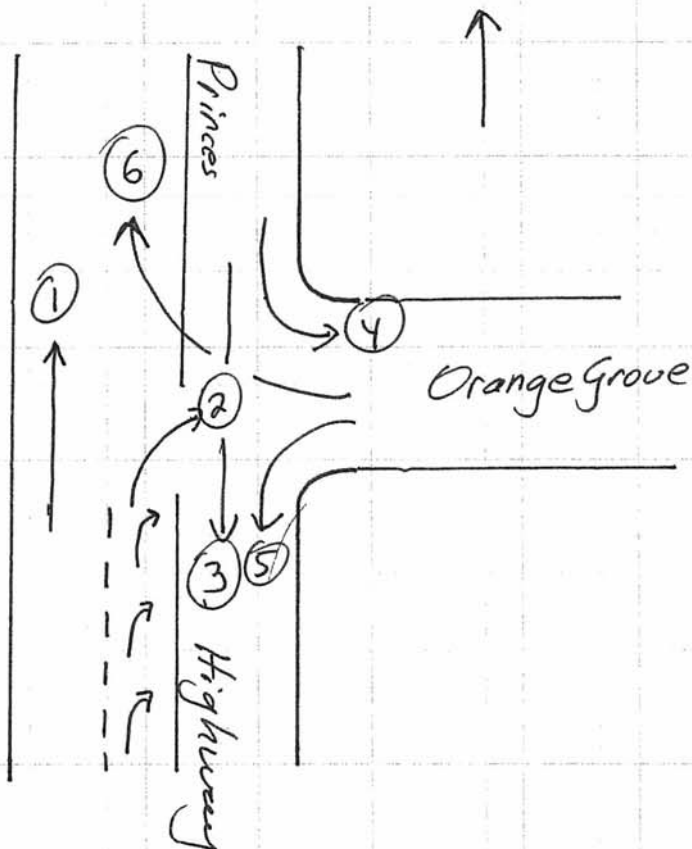
Note.
Trucks

[illegible]

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Uranderrra

Note.
Trucks

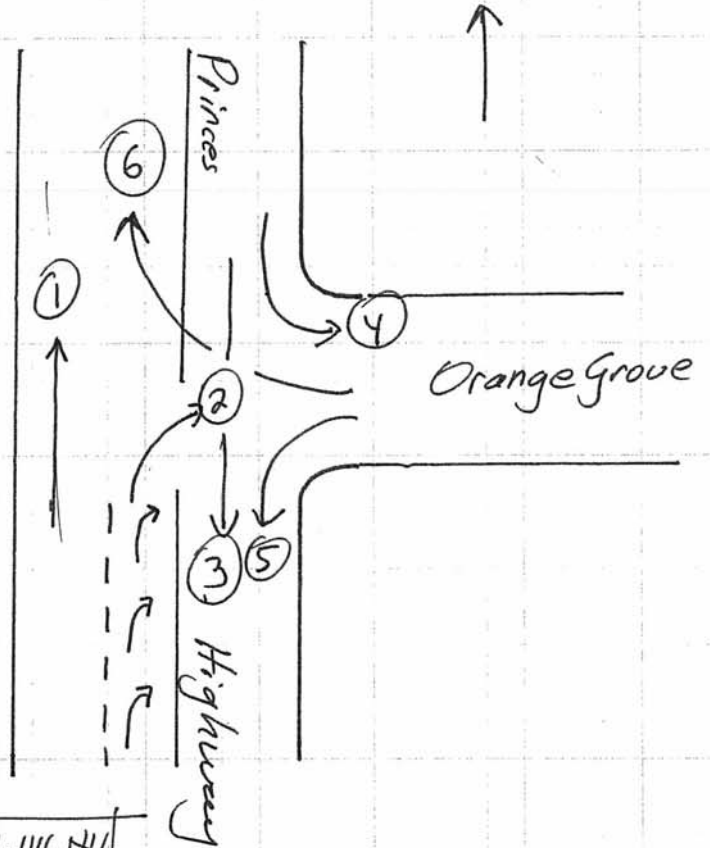


Time.	1	2	3	4	5	6
8.30am to 8.45 (140)	 R R R B U S B U S R R	 23	 B U S R R R R R R R	 12	 14	 4
8.45 to 9am (147)	 R R B U S R	 28 3	 R R S B U S R R	 6 2	 5 20 5	 3

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Unanderra

Note.
Trucks

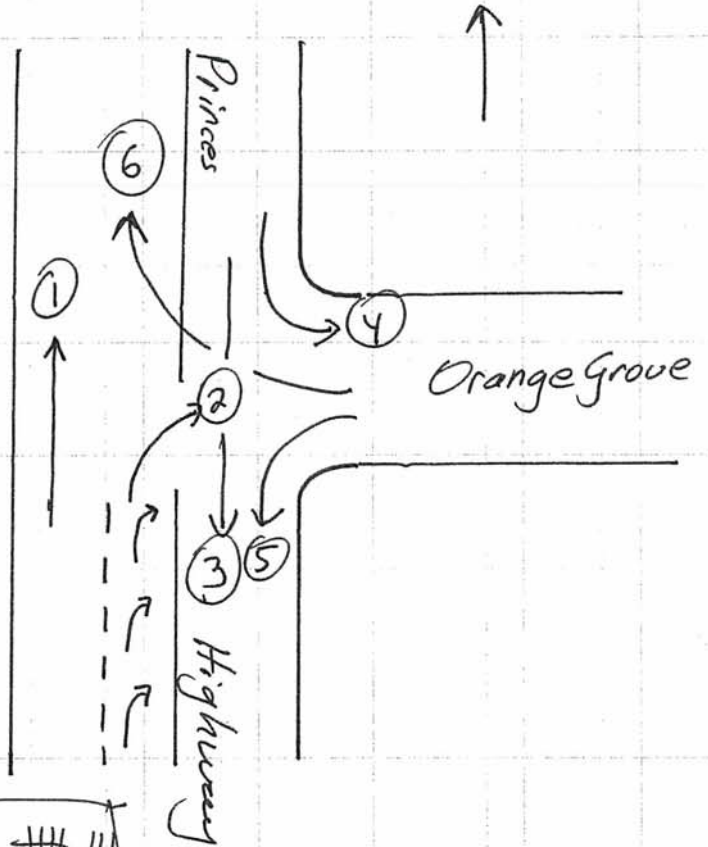


Time.	1	2	RR 3	4	5	6.
9am to 9.15	### R Bus R R R	### ### ### ### ### ### (32) (107) (14) R R S B	### R R B S R R S S R R (BUS)	### (7) (15) (15) (1) R	### ### ### (15) (8) R R S R R	### (9) (9)
9.15 to 9.30 am	### R Bus R R R	### ### ### (17) (5) R R	### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### R R R Bus	### (4) (4) (4) (4)	### (17) (9) S S R R S	### (4) (1) R

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Uranderrra

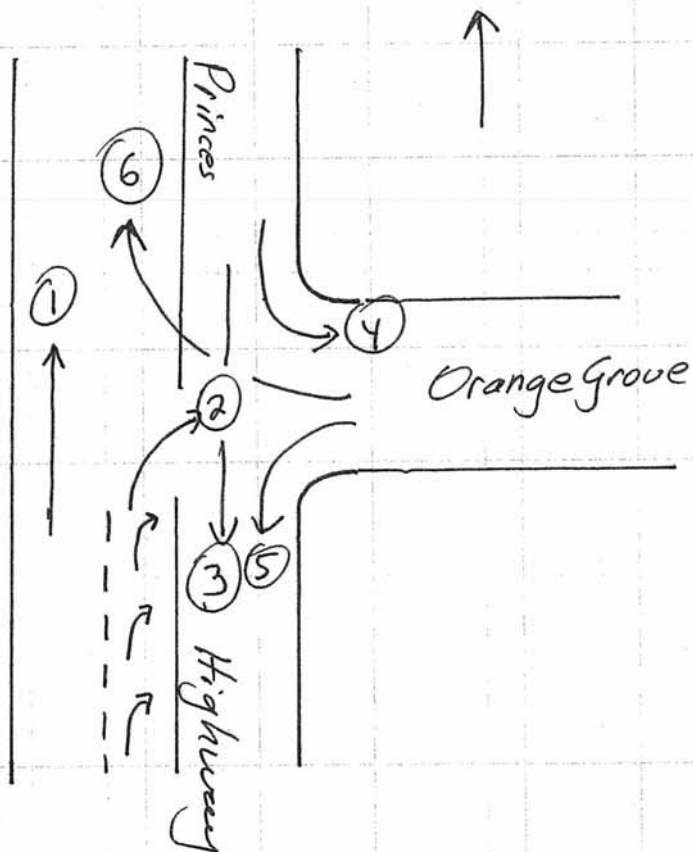
Note.
Trucks



Time.	1	2	3 (OB)	4	5	6
9.30am	### ### ### ### ### ### ### ### ### ### ### ### ### ### ###	### ### ### 1 15	### ### ### ### ### ### ### ### ### ### ### ### ### ### ###	### 4	### ### ### 11 17	### 5
9.45	### ### ### ### ### ### ### ### ### RRR 111	RRR 2	SR BUS RRRARR 9		RRR RRRRR 8	R 1
9.45	### ### ### ### ### ### ### ### ### ### ### ### ### ### ###	### ### 1 11	### ### ### ### ### ### ### ### ### ### ### ### ### ### ###	### 4	### ### ### 111 18	### 5
10am	### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### bus R bus R R R	### ### 1 11	### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### bus RRS SSRRR	### 4 150 9	### ### ### 111 18 9	### 5

ION Intersection Count.
Car Princes Hwy - Orangethorpe Ave - Chandler

Note.
Trucks



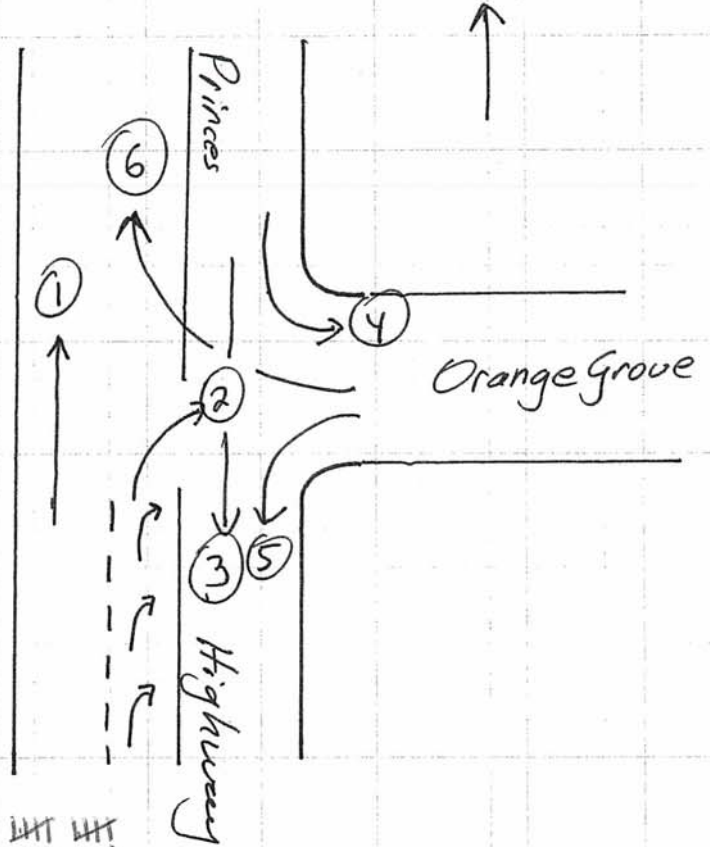
Time.	1	2	3	4	5	6.
10 am to 10.15	 R R R S R R R R R S R R	 12 R	 R R R R R R	 6 R	 11 17 4 R R R S	 5 1 R
10.15 to 10.30 am	 75 9 R R R R R R R R R R R R	 11 R	 75 1 R R R R R R R R R R R R	 4 R	 18 1 R	 19 1 R

DESCRIPTION

Intersection Count:

Car Princes Hwy - Orangethorpe Ave - Umanderra

Note. Trucks

[illegible]

ION Intersection Count.
Car Princes Hwy - Orangegroove Ave - Unanderra

The diagram shows a road network on a grid. A vertical line is labeled 'Princes' and another vertical line is labeled 'Highway'. A horizontal line is labeled 'Orange Grove'. There are six numbered nodes: 1, 2, 3, 4, 5, and 6. Node 1 is on the left, with an arrow pointing up. Node 2 is on the 'Princes' line, with an arrow pointing up to node 6 and an arrow pointing down to node 3. Node 3 is on the 'Highway' line, with an arrow pointing right to node 4. Node 4 is at the intersection of the 'Orange Grove' line and the 'Princes' line, with an arrow pointing up. Node 5 is on the 'Highway' line, with an arrow pointing right to node 4. A dashed line with arrows points from node 2 down to node 3.

INFRASTRUCTURE PROFESSIONALS Project Management, Surveying, Civil, Structural, Water, Sewer

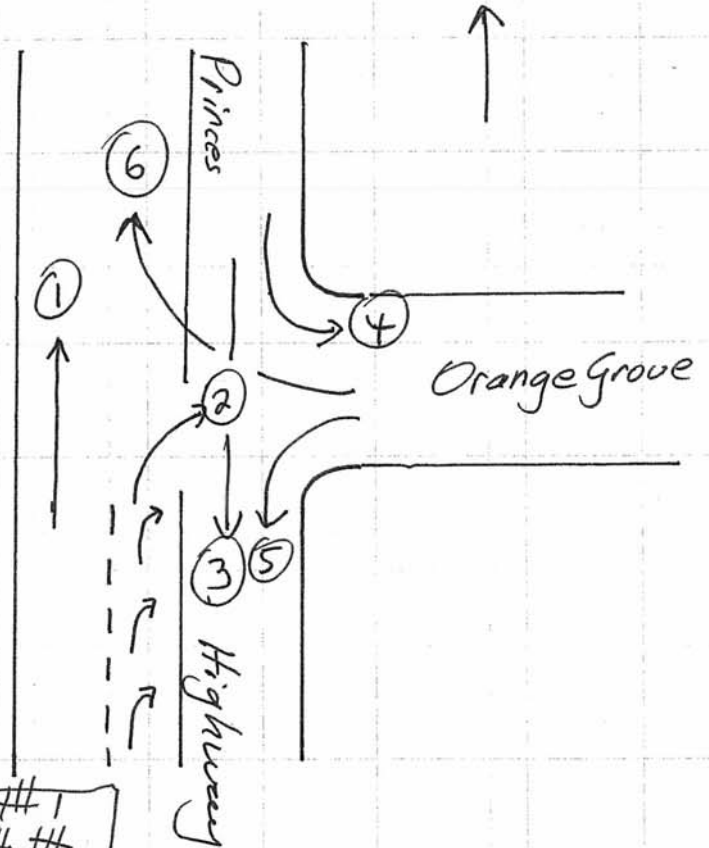
DESCRIPTION

Intersection Count.

Car Princes Hwy - Orangethorpe Ave - Umanterra

Note.
Trucks

Maximum Queen
② = 2 Cors.

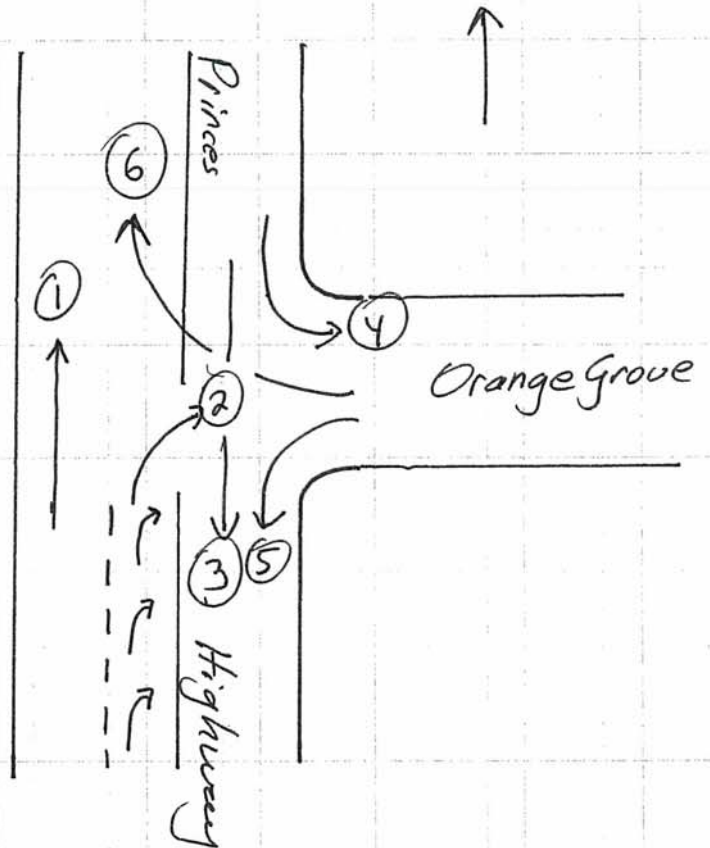


Time.	1	2	3	4	5	6.
12 noon to 12.15	### RRRR 100	### ### ### 11 (17) (4)	### Bus BUS RRRRRRR	### 1111 (9) (105) (2)	### ### ### ### 1 (26) (5)	### 111 (9) /
12.15 to 12.30	### BSRR 114	### ### 11 (12) (2)	### ### 111 ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### ### 111 (14)	### 1 (6) /	### ### ### ### 1 (21) (5)	### 111 (8) /

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Unanderra

Note.
Trucks

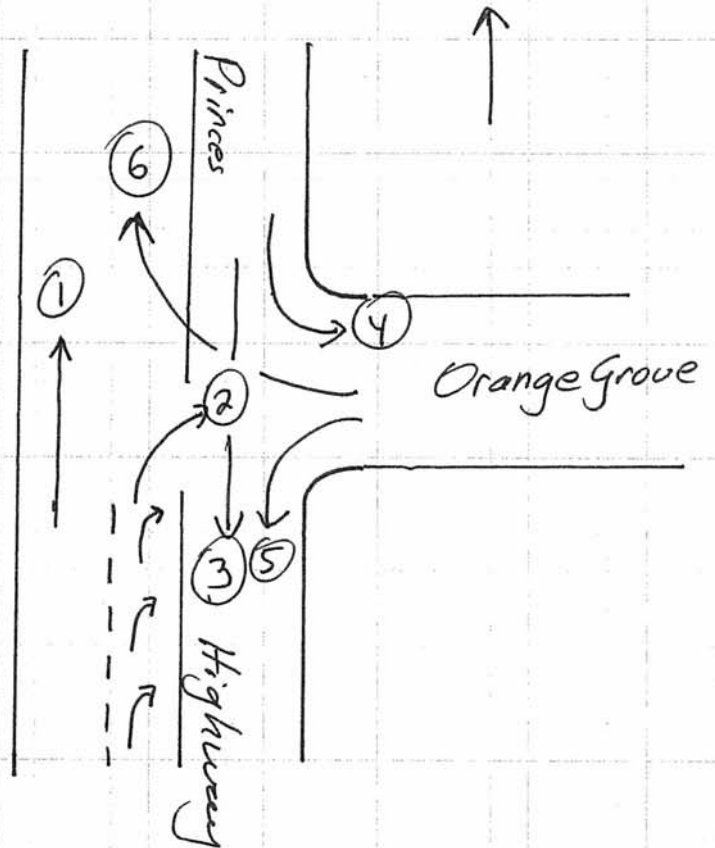


Time.	1	2	3	4	5	6.
12.30 pm to 12.45	### ### ### ### ### ### ### ### ### R (6) (1)	### (7)	### ### ### ### ### ### ### ### SR (2)	### ### ### (12) (5)	### (10) RR (2)	### (4)
12.45 to 1.00 pm	### ### ### ### ### ### ### ### ### (58) RRRR (4)	### (16) (3)	### ### ### ### ### ### (88) RRRRR (5)	### (11)	### (23) (3)	### (6) (1)

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orangegroove Ave - Uranderrra

Note.
Trucks

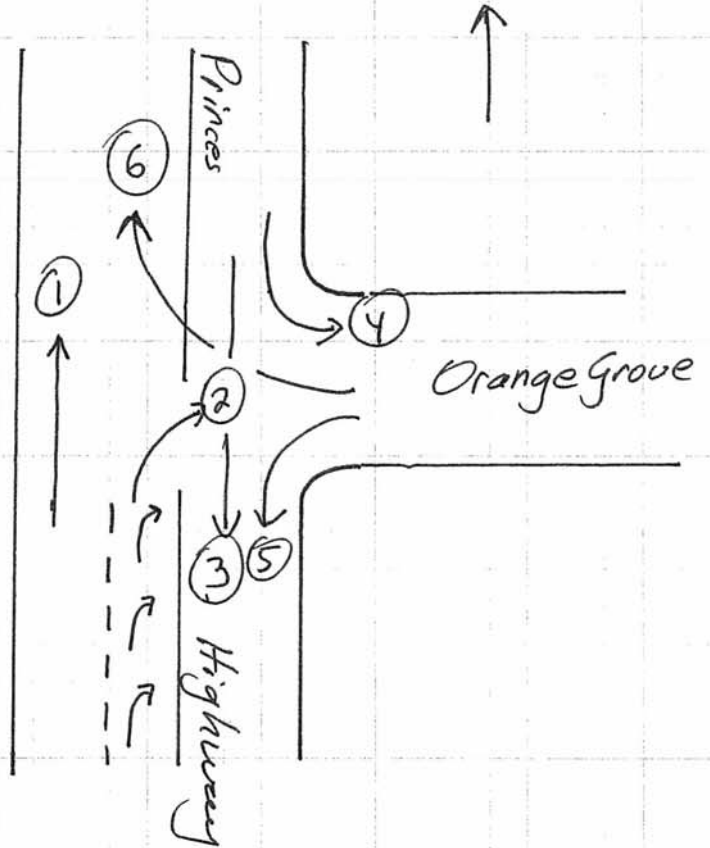


Time.	1	2	3 ^{as}	4	5	6.
1pm						
to		(13)		(2)	(17)	(1)
1.15		(105)				
		(2)		(2)	(1)	/
	RR (1)	RR (2)	RSSR (4)	RR (2)	R (1)	
1.15				1		
to		(13)		(1)	(12)	(3)
1.30pm		(104)				
	RRRRRR (6)	RRR (3)	RRRRRR (7)		RR (2)	

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Unanderra

Note.
Trucks

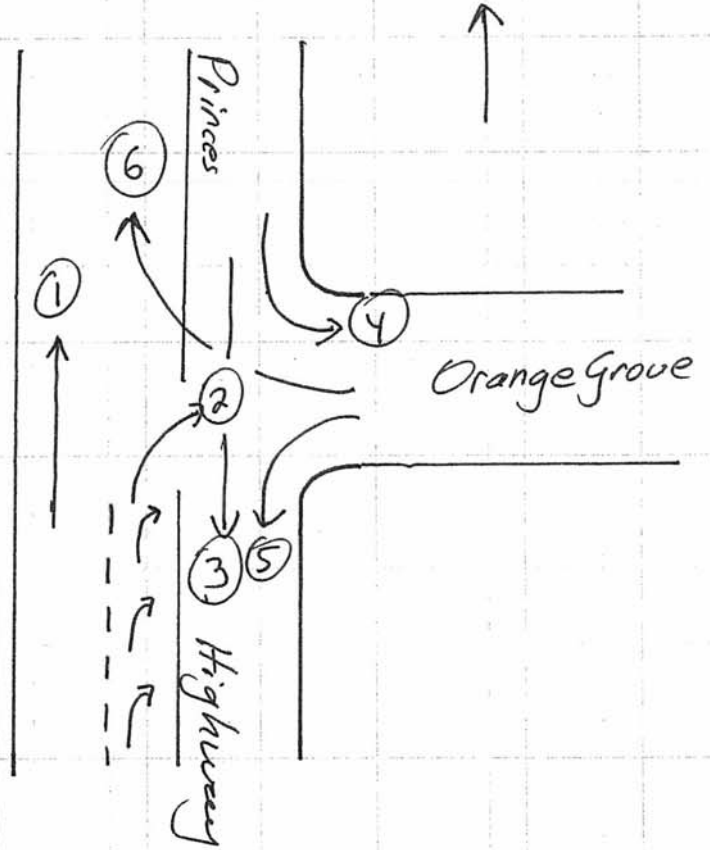


Time.	1	2	3	4	5	6.
1.30 pm to 1.45	HH RR (8) RRSRR (5)	HH HH HH HH HH (24) (8) RRRRSR	HH (11) RRRSR	HH (5) /	HH HH HH 1 (16) (2) RR	HH (3) (3)
1.45 to 2 pm	HH (115) (1) SRRRRR	HH HH HH (13) (3) RRR	HH HH HH HH HH HH HH HH HH HH HH HH HH HH HH HH HH HH HH (88) (6) SRRRRR	HH HH HH (12) (1) R	HH HH HH 1 (16) (1) S	HH HH (2) (1) S

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Uranderrra

Note.
Trucks

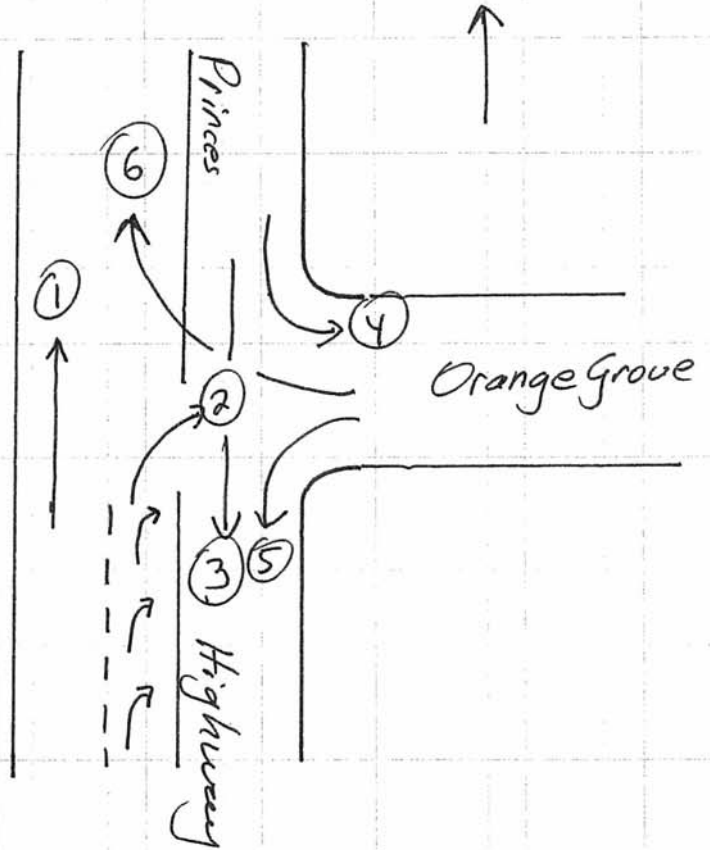


Time.	1	2	3	4	5	6
2pm to 2.15	 RRRR SRRRRR (11) (196)	 (18) (2)	 (109)	 (8) (6)	 (27) (3)	 (9)
2.15 to 2.30pm	 (13) (7) RRRRRRR	 (18) (2)	 (162) (3)	 (1) (27) (4)	 (27) (4)	 (3) (1)

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Unanderra

Note.
Trucks



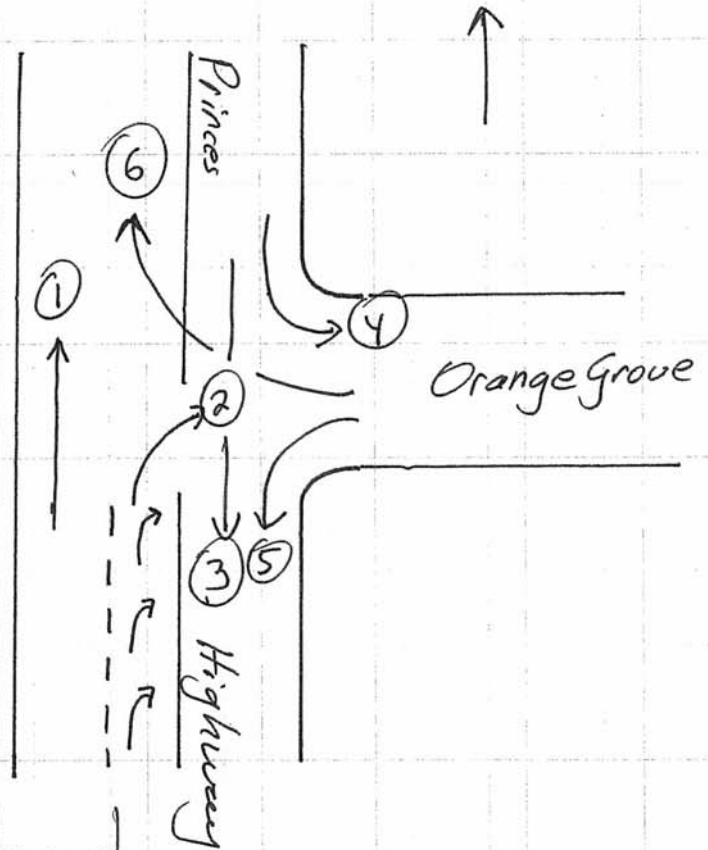
Time.	1	2	3	4	5	6
2:30 pm to 2:45	 RR (2)	 1 (16) (4)	 RRRSRS (6)	 (10) (27)	 (27)	 (8)
2:45 to 3 pm	 R-BUS R-R-BUS (132)	 (20)	 R-BUS R-R-BUS (10)	 (2)	 (32)	 (3)

DESCRIPTION

Intersection Count:

Car Princes Hwy - Orangethorpe Ave - Umanterra

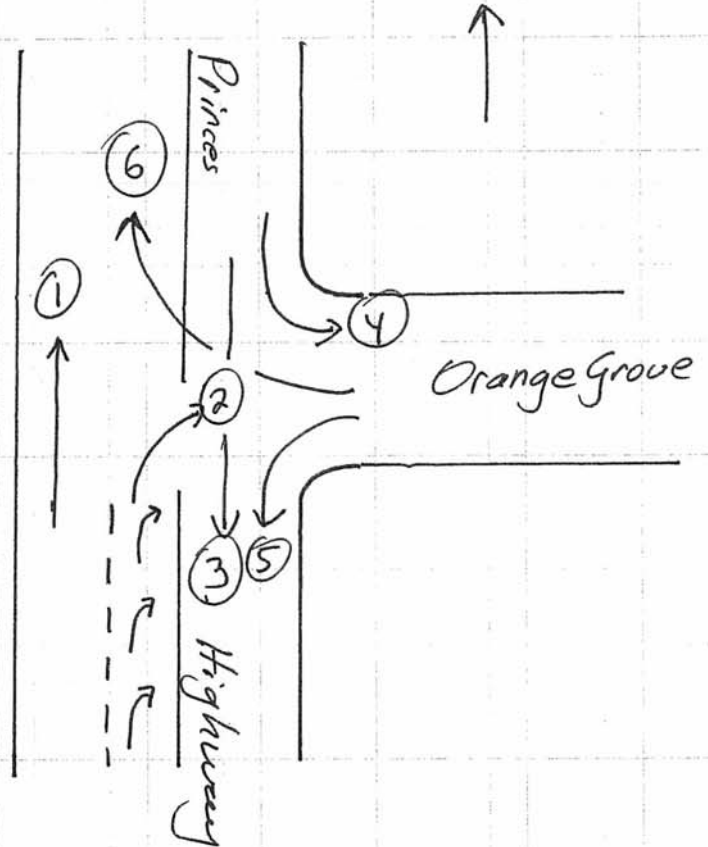
Note.
Trucks

[illegible]

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Unanderra

Note.
Trucks



Time.	1	2	3	4	5	6
4.30pm to 4.45	HH HH HH HH HH HH HH HH HH HH HH HH HH HH HH HH HH SS Bus R (2)	11 (2)	HH 90 SSR Bus R	✓	HH HH HH HH HH HH HH HH HH 46 R (1)	HH (5)
4.45 to 5pm	HH 105 R (1)	HH 1111 (9)	HH 88 (5)	3 (3)	HH HH HH HH HH HH HH HH (38)	HH (5)

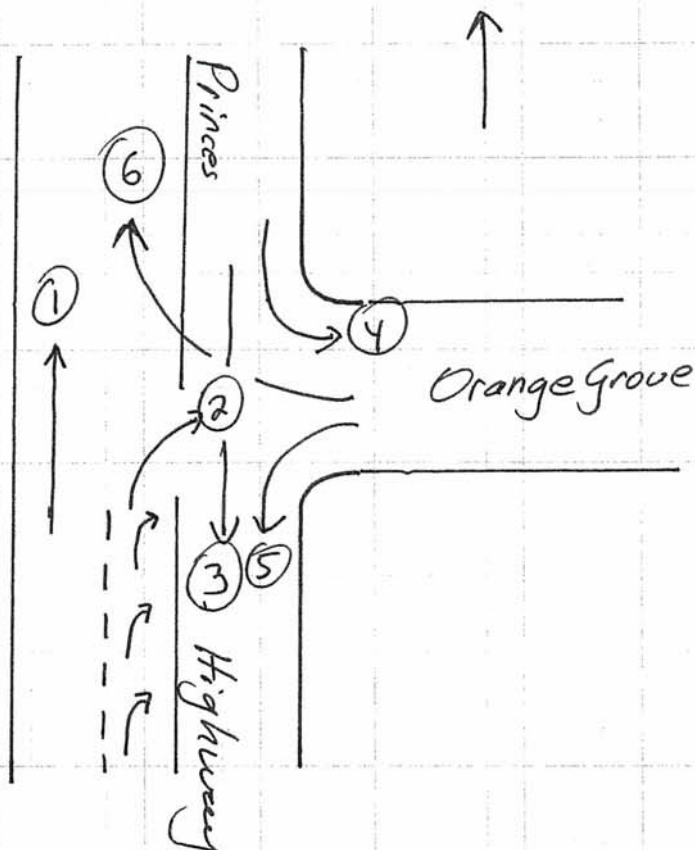
DESCRIPTION

Intersection Count.

Car Princes Hwy - Orangegrove Ave - Unanderra

Note.

Trucks

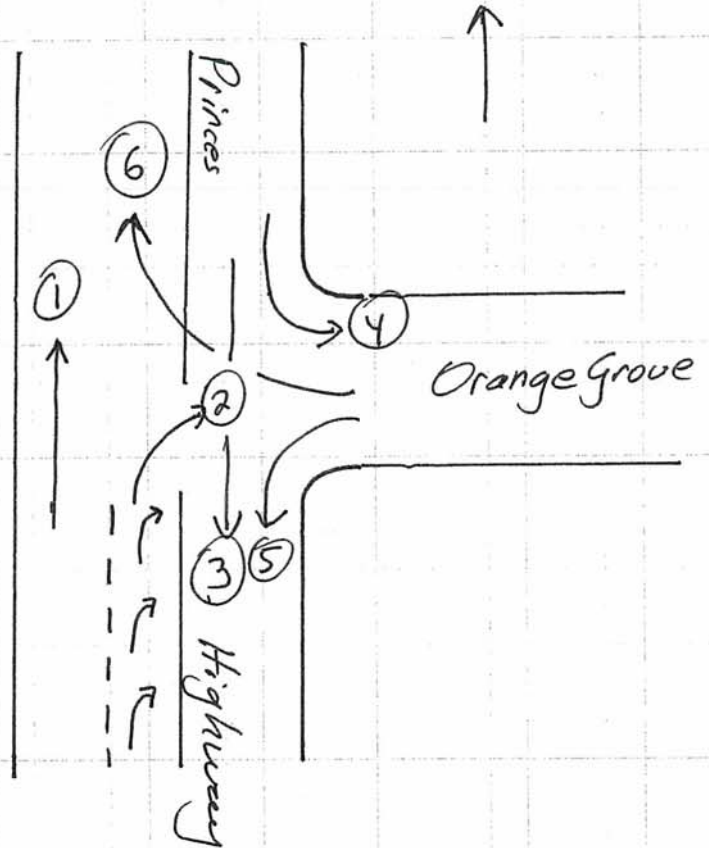


Time.	1	2	3	4	5	6.
5pm to 5-15	 <u>(118)</u> R <u>(1)</u>	 <u>(2)</u>	 S <u>(1)</u>	— ✓ <u>(137)</u>	 <u>(75)</u> RR <u>(2)</u>	 <u>(13)</u>
5-15 to 5-30pm	 <u>(100)</u> Buz <u>(1)</u>	 <u>(1)</u>	 R		 <u>(131)</u>	 <u>(5)</u>

DESCRIPTION

Intersection Count.
Car Princes Hwy - Orange Grove Ave - Uranderrra

Note.
Trucks



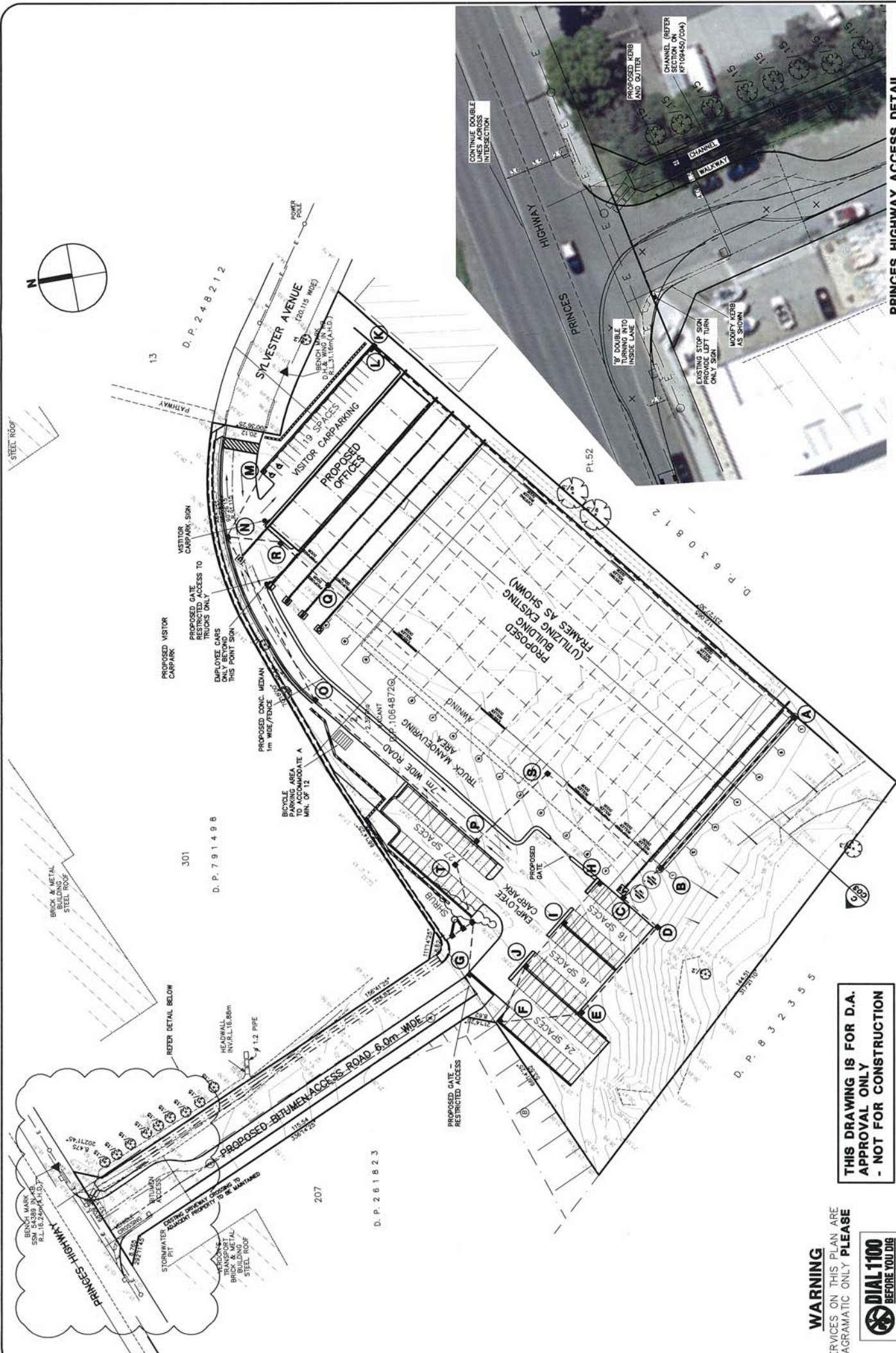
Time.	1	2	3	4	5	6.
5.30pm to 5.45	 (69)	1 (1)	 RR (91) (2)	- -	 (14)	 (5)
5.45 to 6pm	 (63) (1) Bus	1 (1)	 (64)	1 (1)	 (13)	 (3)

APPENDIX D

K F WILLIAMS & ASSOCIATES

PLAN KF109450/C07/C08

DO NOT SCALE



WARNING

**SERVICES ON THIS PLAN ARE
DIAGNOSTIC ONLY PLEASE**



**THIS DRAWING IS FOR D.A.
APPROVAL ONLY
- NOT FOR CONSTRUCTION**

PRINCES HIGHWAY ACCESS DETAIL

PRINCES
SCALE 1:250

K. F. WILLIAMS & ASSOCIATES PTY. LTD.



STATION	DATE 15-07-98	JOB No.	KE109450
PROJECT NAME A.S.B.	MAIN FLOOR	DATE 07	
DESIGNED BY	ISSUED BY	DATE 07	
CHECKED	APPROVED	DATE 07	
SCALE 1:500	DATE 1:000	DATE 07	
PROPOSED INDUSTRIAL BUILDING LOT 2 D.P. 1094872 PRINCES HWY & SYLVESTER AVE. UNANDERRA TRAFFIC MANAGEMENT PLAN ISSUED FOR D.A. APPROVAL			
			HEET 7 OF 8
			AL

[illegible]

DO NOT SCALE



WARNING

SERVICES ON THIS PLAN ARE
DIAGRAMATIC ONLY PLEASE



NOTES:-
TURNING PATHS SHOWN ARE FOR B-DOUBLE
TRUCKS.
IT HAS BEEN ASSUMED THAT THE TRUCKS WILL ENTER
THE SITE VIA SYLVESTER AVENUE ONLY, AND EXIT VIA
SYLVESTER AVENUE ONLY, TURNING NORTH OR SOUTH
THE EXIT ONTO THE PRINCES HIGHWAY IS LEFT TURN
ONLY.

LEGEND

- DENOTES EXTENT OF EXISTING EASEMENTS
- PROPOSED BOUNDARY

NO.	REVISIONS	DATE	BY	CHKD
1	ISSUED FOR D.A. APPROVAL	14-07-08		
2	LEFT TURN ONLY TURNING PATHS	14-07-08		

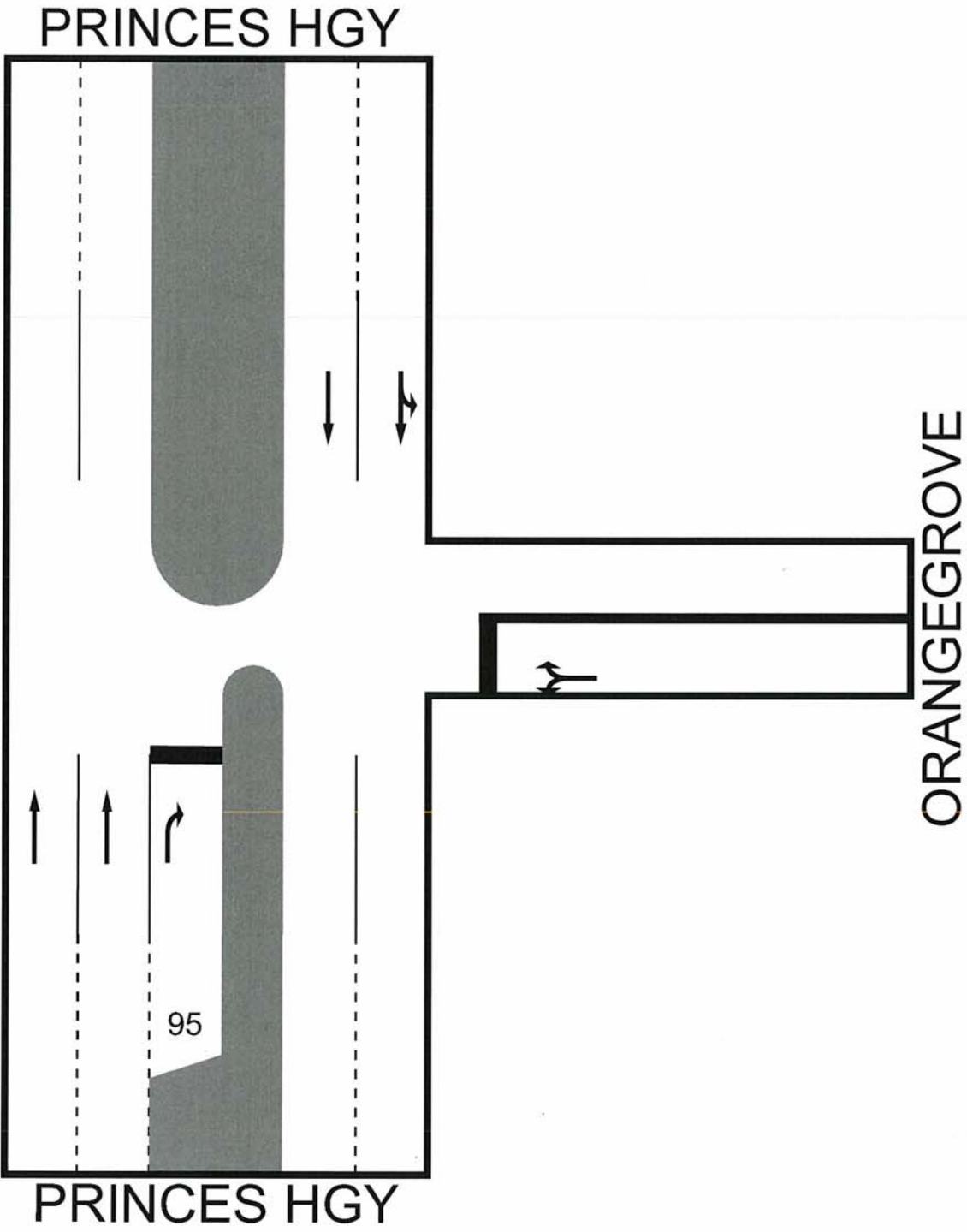


K.F. WILLIAMS & ASSOCIATES PTY. LTD.
CONSULTING ENGINEERS
88 Ashurst St. Wollongong, N.S.W. 2500
Telephone (08) 4288 7044 Fax (08) 4288 8004
Email info@kfwilliams.com.au
A.C.N. 905 504 417

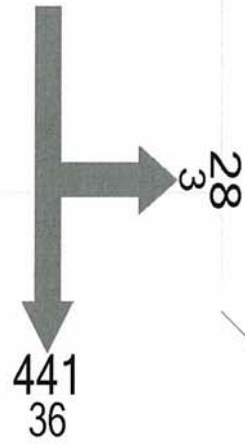
PROJECT	DATE	SCALE	BY	CHKD
PROPOSED INDUSTRIAL BUILDING LOT 2 D.P. 1084872 PRINCES HWY & SYLVESTER AVE, UNANDERRA TURNING PATHS ON SITE	14-07-08	1:2000		
DESIGNED	DATE	SCALE	BY	CHKD
UNANDERRA	14-07-08	1:2000		
APPROVED	DATE	SCALE	BY	CHKD
UNANDERRA	14-07-08	1:2000		
ISSUED FOR D.A. APPROVAL	DATE	SCALE	BY	CHKD
UNANDERRA	14-07-08	1:2000		

APPENDIX E

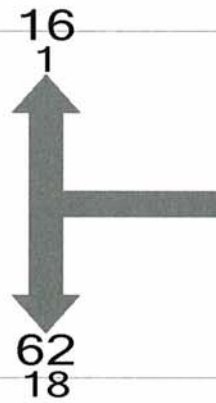
PRINCES HIGHWAY/ ORANGEGROVE AVENUE INTERSECTION SIDRA RESULTS



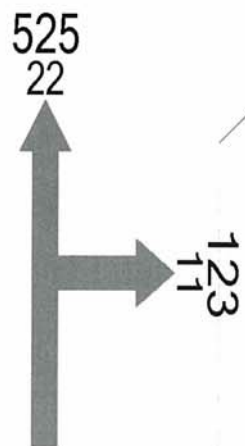
PRINCES HGY



Existing AM Peak



ORANGEGROVE



PRINCES HGY

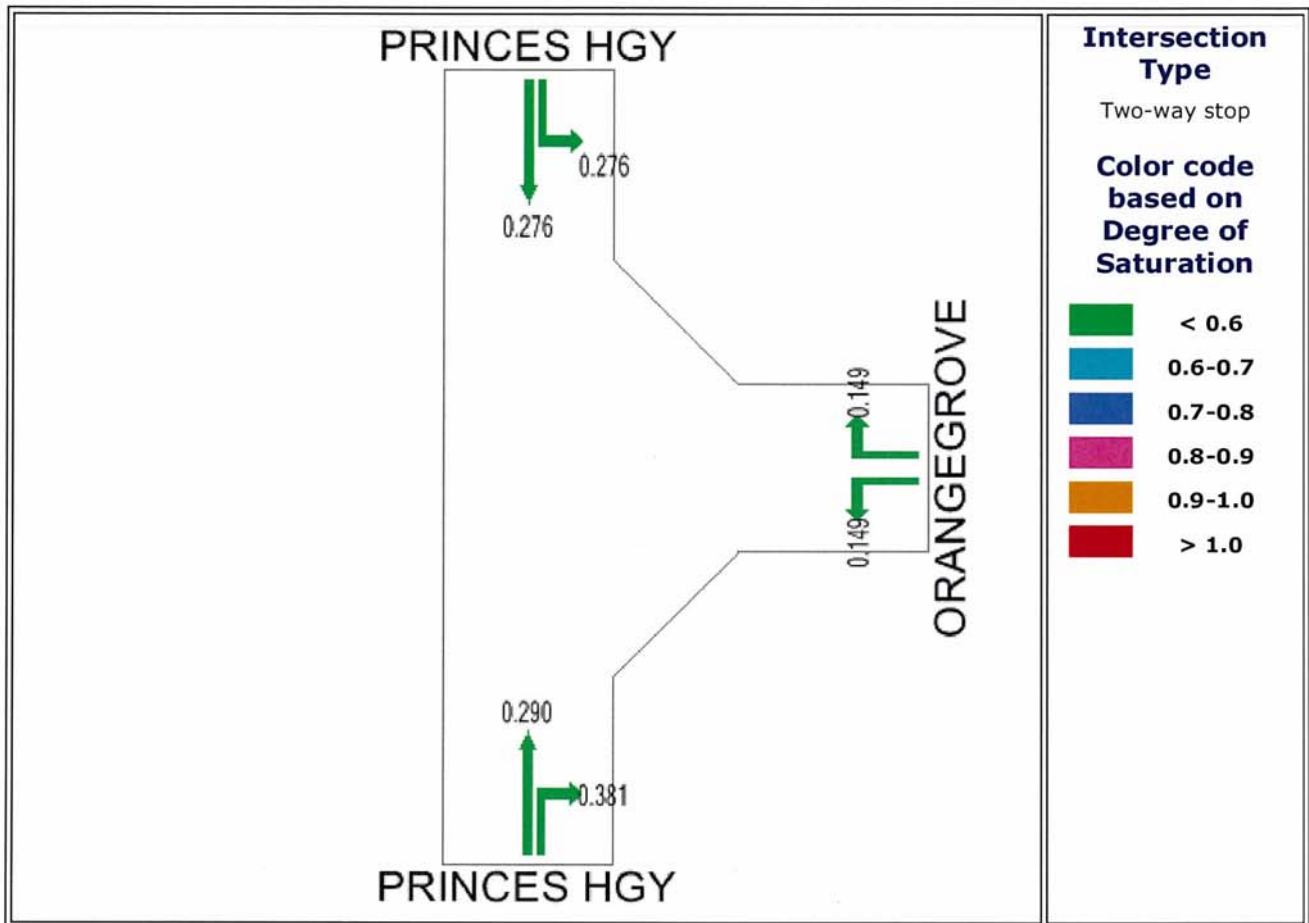


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

PRINCES HIGHWAY / ORANGEGROVE

EXISTING AM PEAK



Site: New Site - 1

Processed Oct 01, 2009 11:34:02AM

A0232, K.F.Williams and Assoc, Small Office

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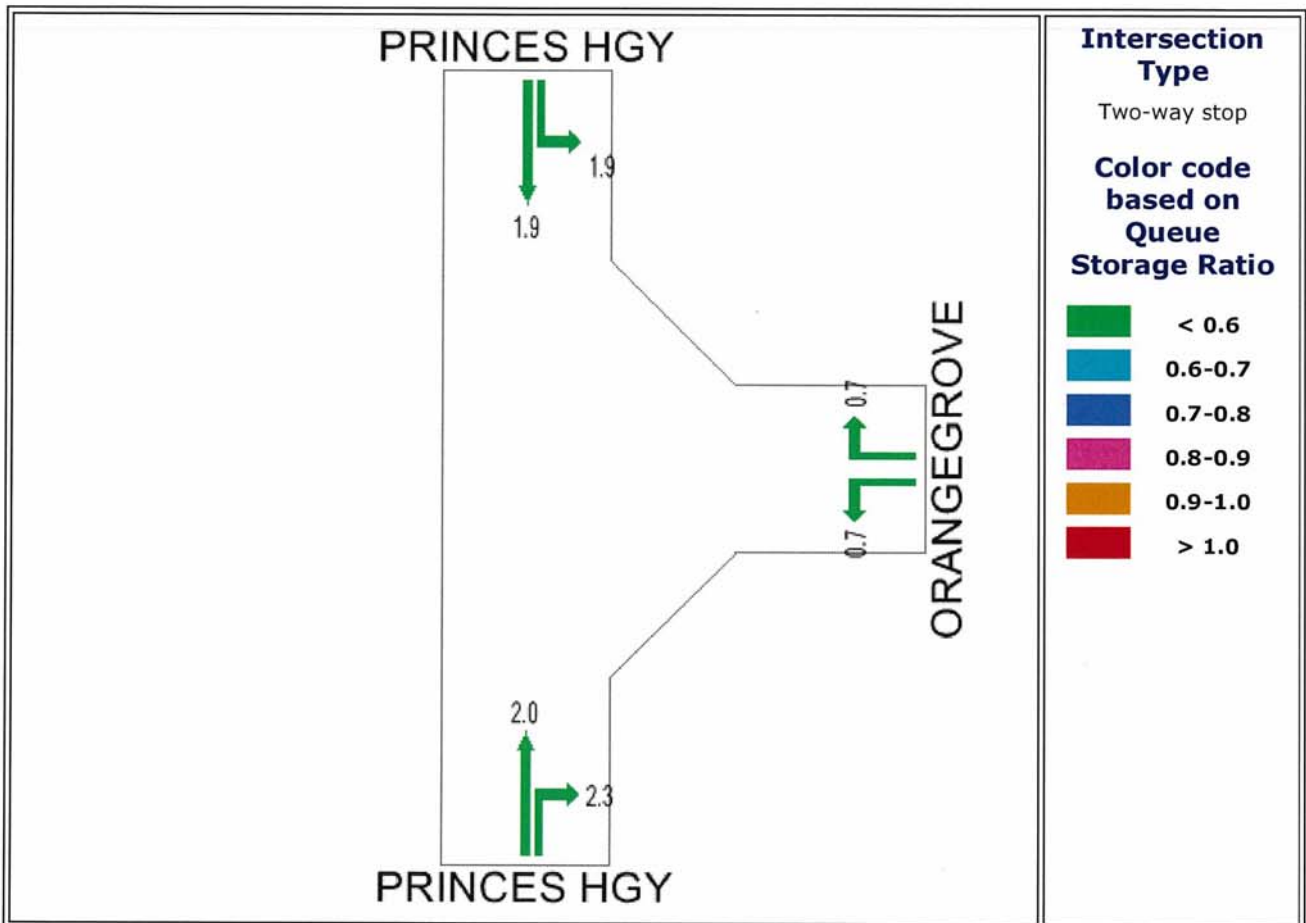
www.sidrasolutions.com

Queue

Largest 95% Back of Queue for any lane used by movement (vehicles)

PRINCES HIGHWAY / ORANGEGROVE

EXISTING AM PEAK



SIDRA SOLUTIONS

Site: New Site - 1

Processed Oct 01, 2009 11:34:02AM

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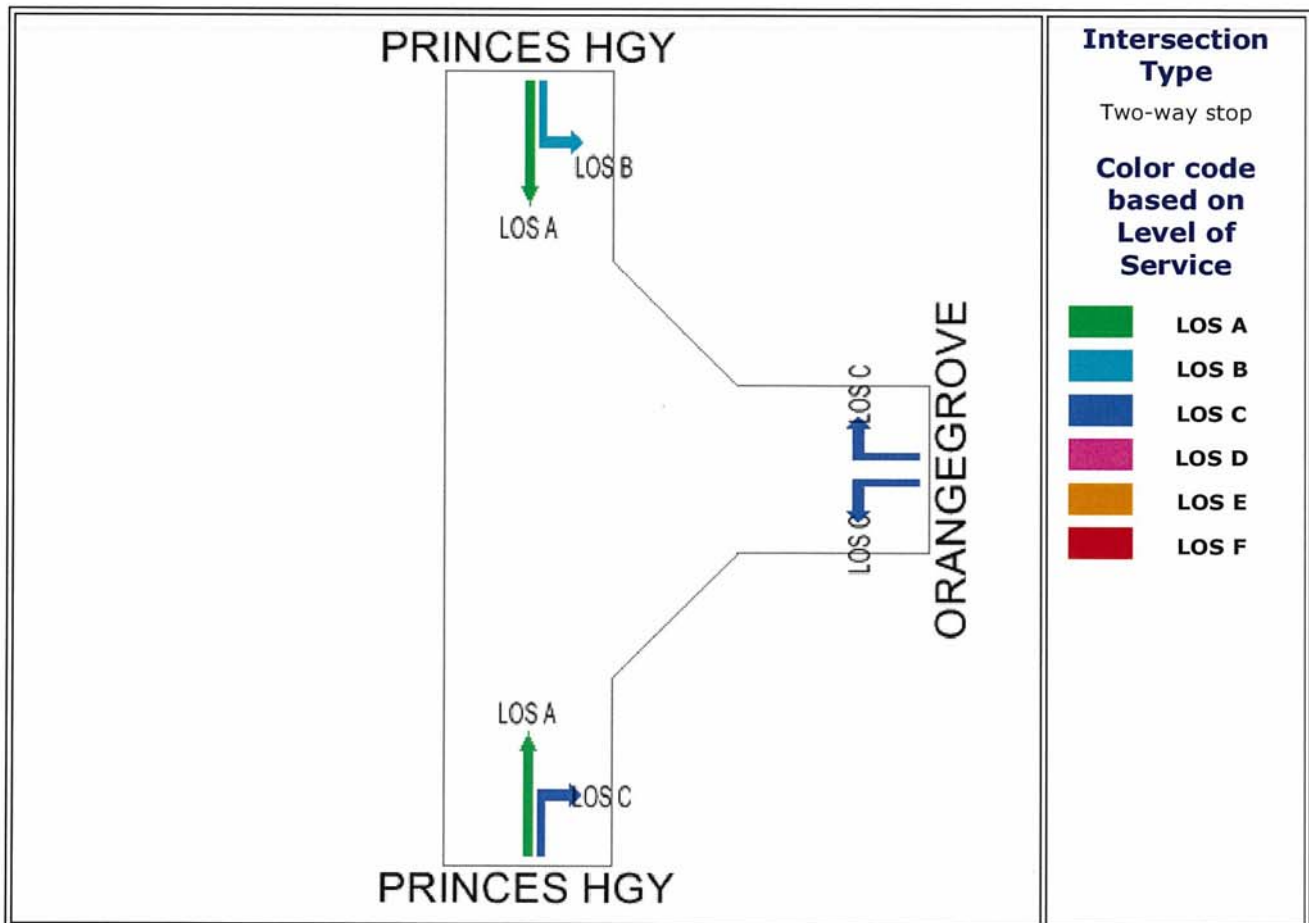


Level of Service

Based on Delay (HCM method)

PRINCES HIGHWAY / ORANGEGROVE

EXISTING AM PEAK



SIDRA SOLUTIONS

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Processed Oct 01, 2009 11:34:02AM

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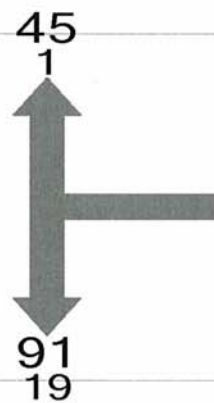
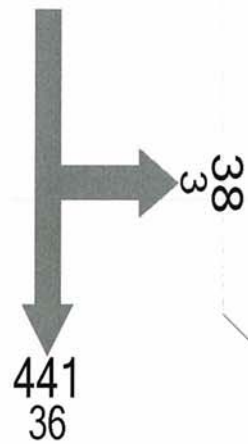
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PRINCES HGY

Predicted AM Peak



ORANGEGROVE

PRINCES HGY

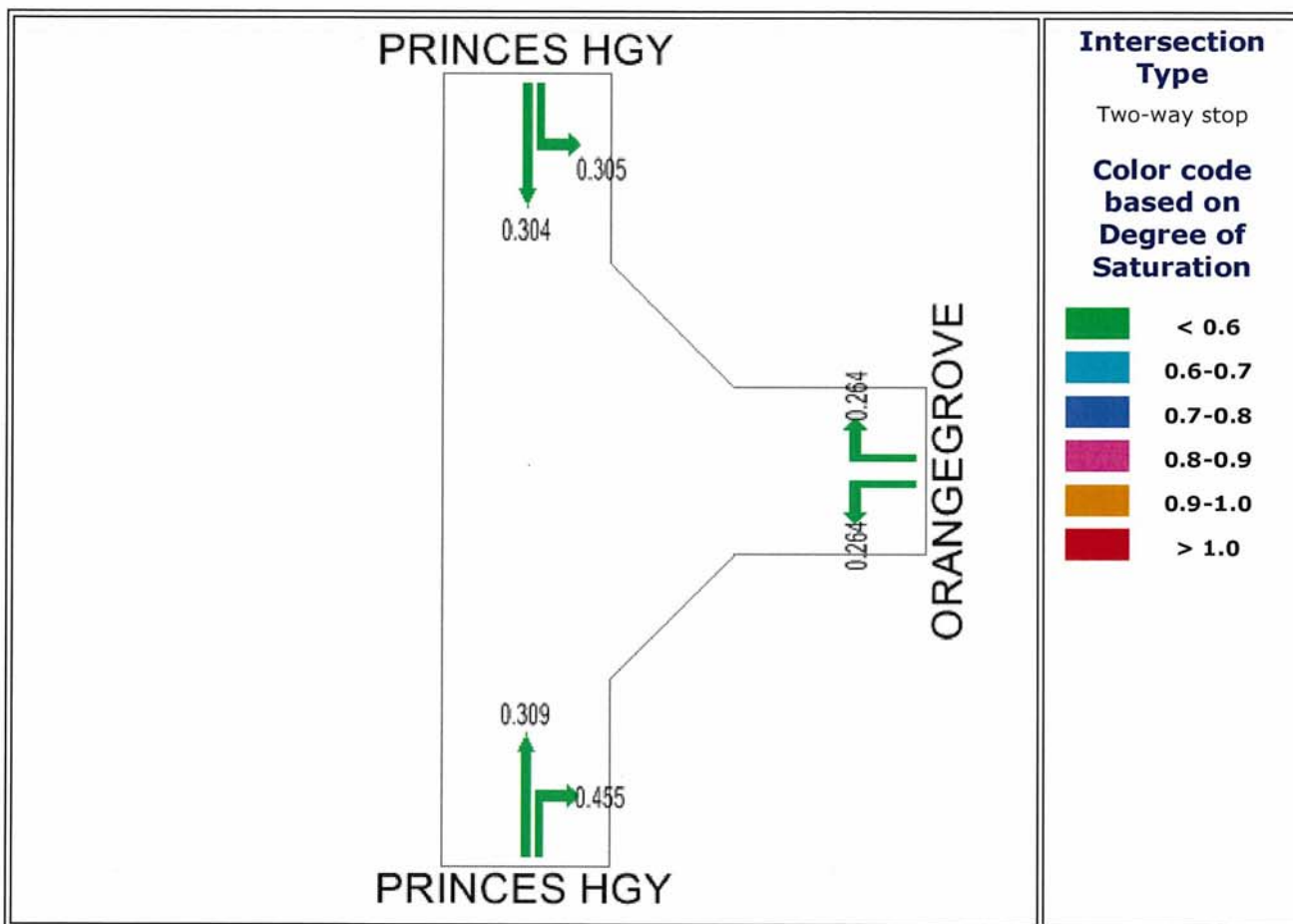


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

PRINCES HIGHWAY / ORANGEGROVE

AM PREDICTED



Site: New Site - 1
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Processed Oct 01, 2009 12:10:09PM

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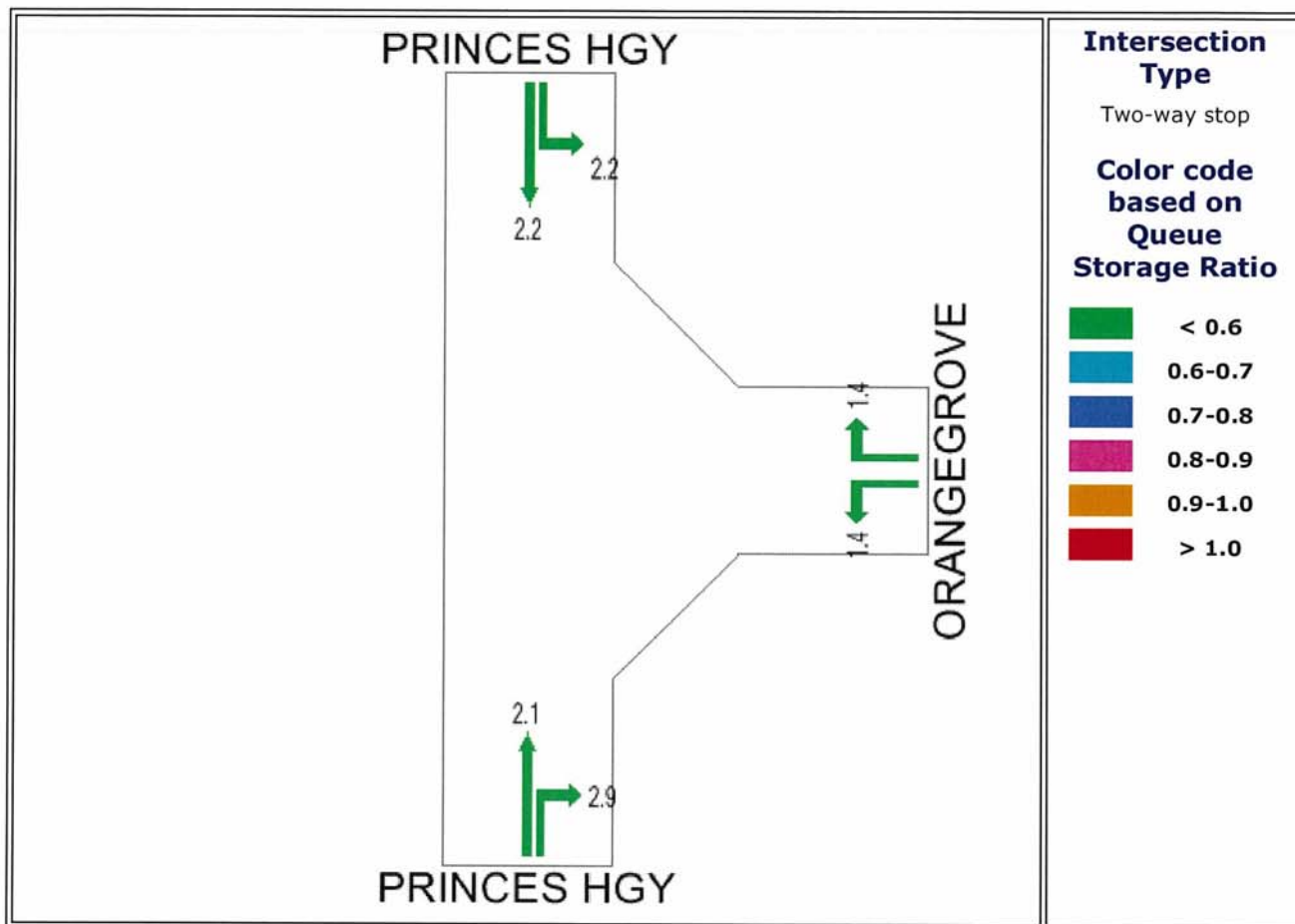
SIDRA INTERSECTION

Queue

Largest 95% Back of Queue for any lane used by movement (vehicles)

PRINCES HIGHWAY / ORANGEGROVE

AM PREDICTED



SIDRA SOLUTIONS

Site: New Site - 1
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Processed Oct 01, 2009 12:10:09PM

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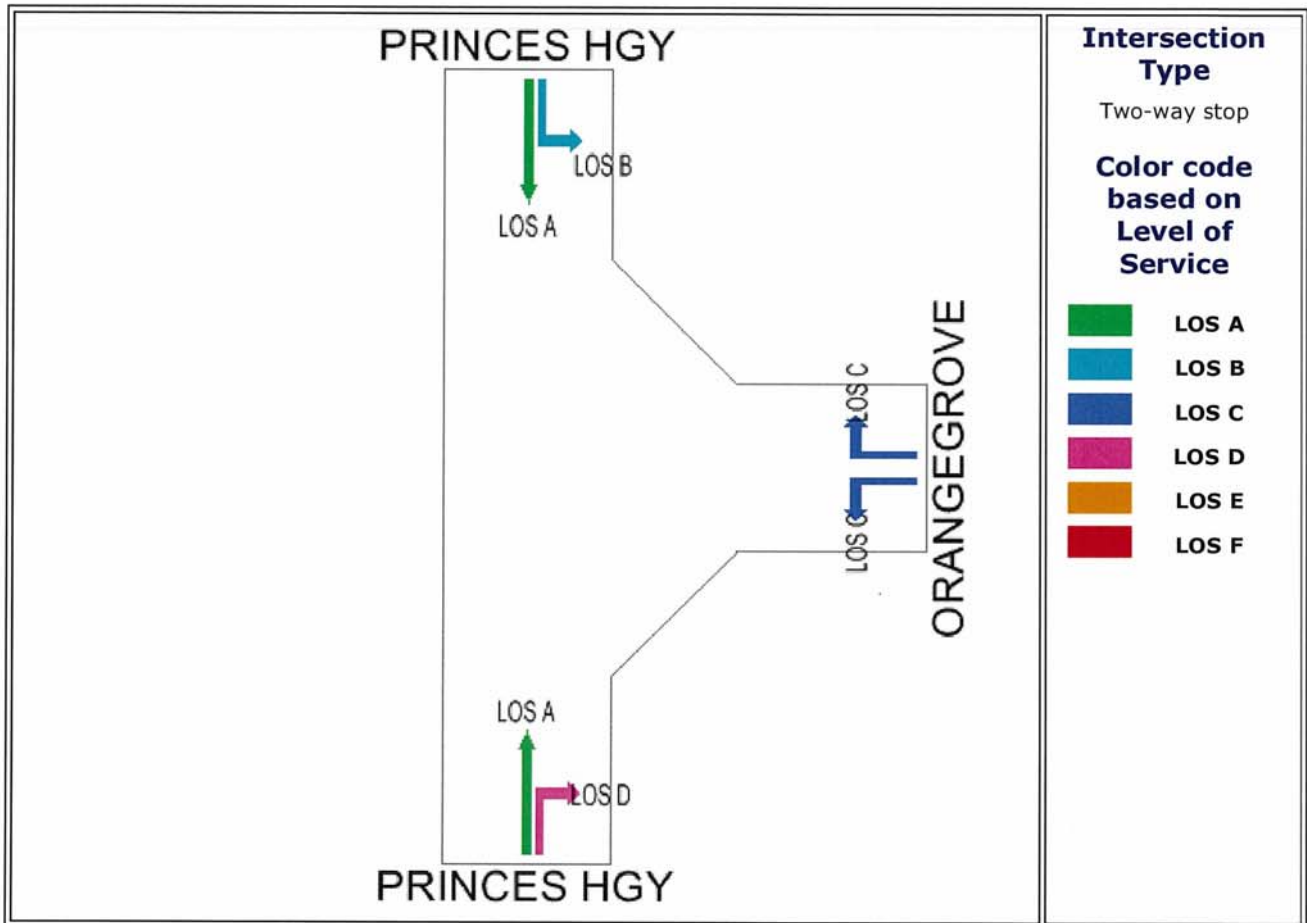


Level of Service

Based on Delay (HCM method)

PRINCES HIGHWAY / ORANGEGROVE

AM PREDICTED



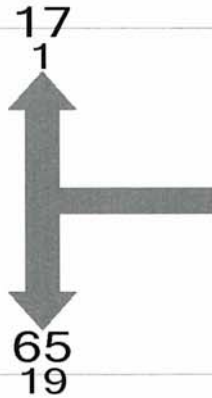
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PRINCES HGY

OREXAM 10

Existing AM Peak
in 10 years



ORANGEGROVE



PRINCES HGY

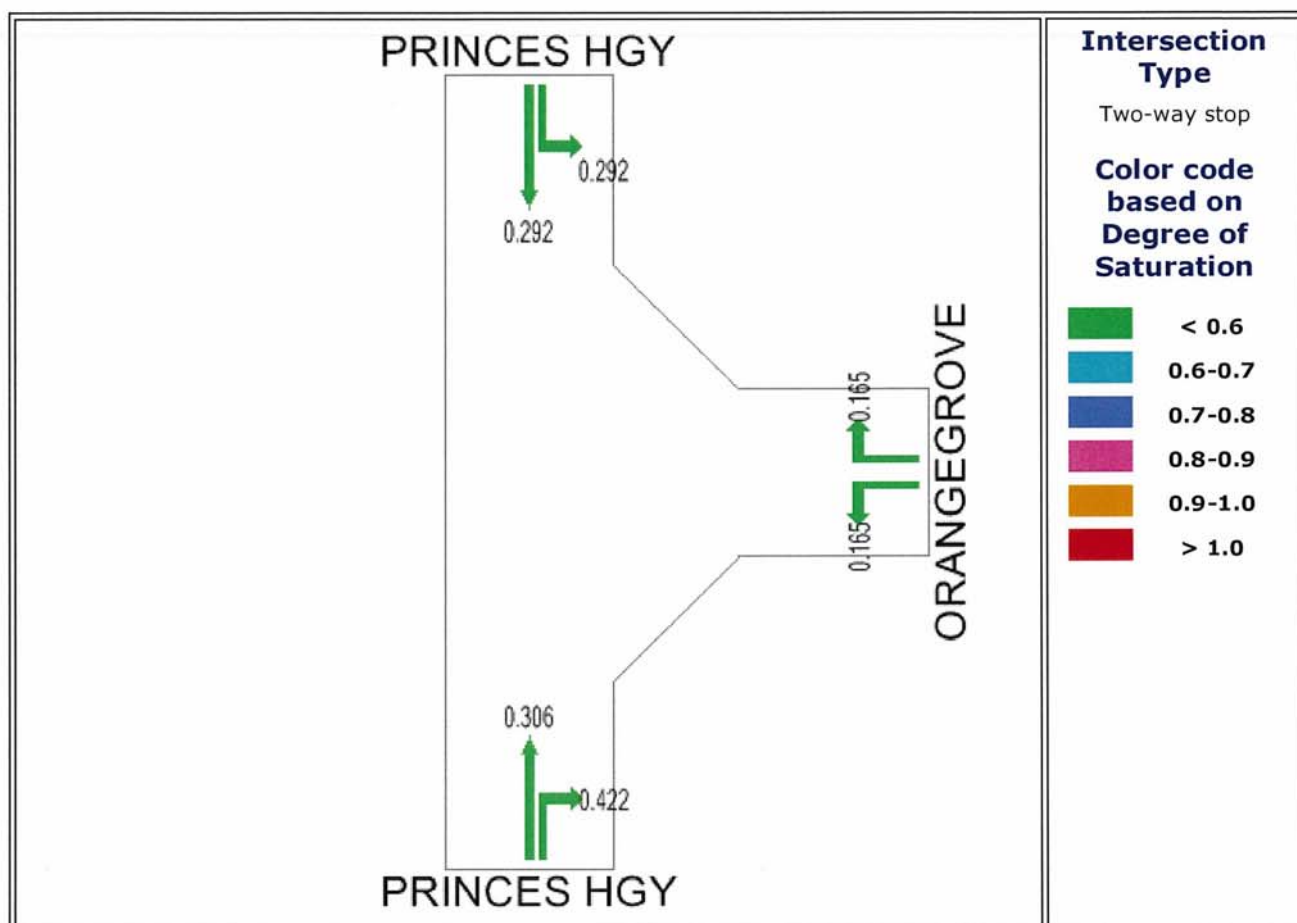


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

PRINCES HIGHWAY / ORANGEGROVE

EXISTING AM PEAK IN 10 YEARS



SIDRA SOLUTIONS

Site: New Site - 1

X:\KF109774\Civil\Documents\OREXAM10.aap

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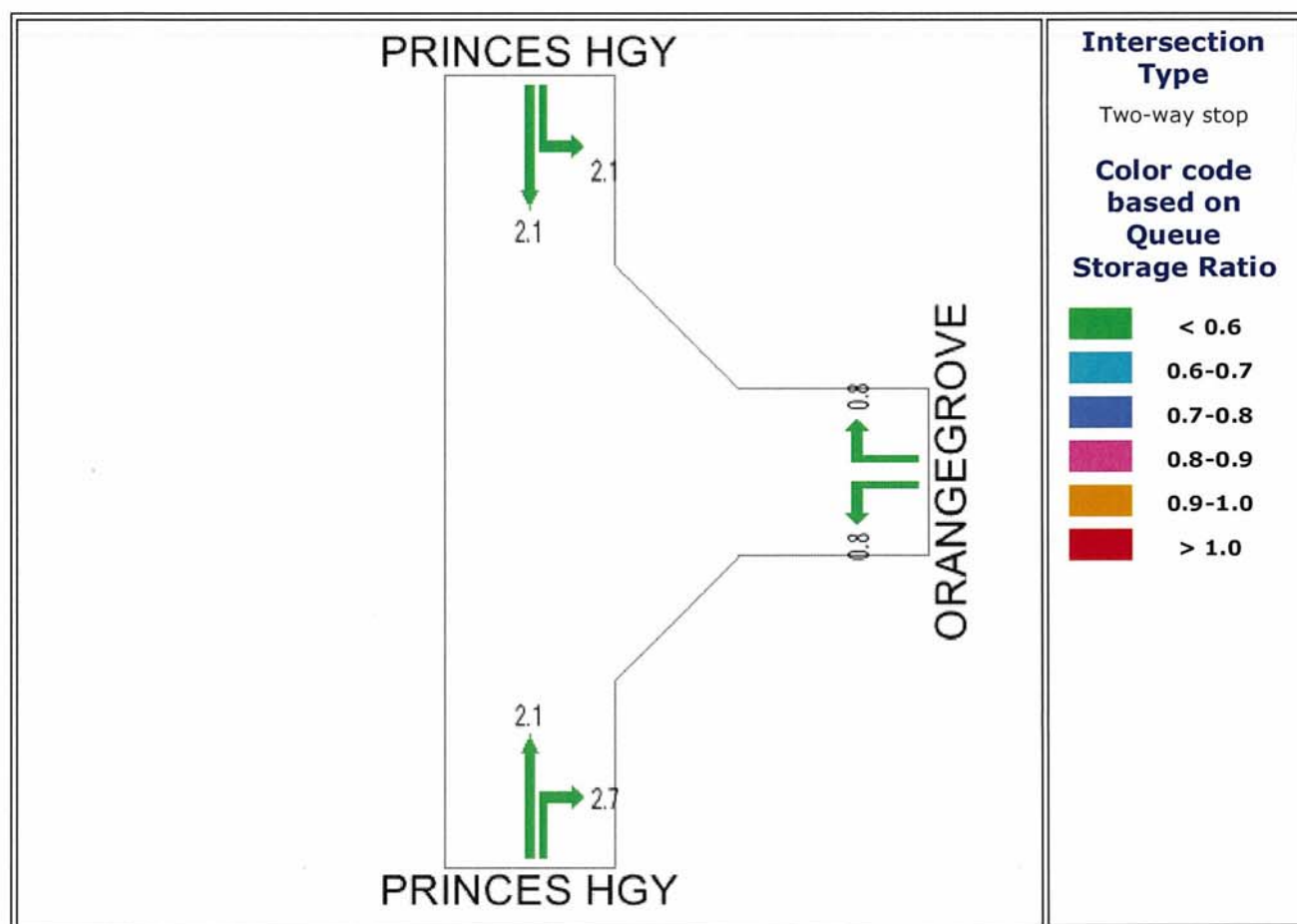


Queue

Largest 95% Back of Queue for any lane used by movement (vehicles)

PRINCES HIGHWAY / ORANGEGROVE

EXISTING AM PEAK IN 10 YEARS



SIDRA SOLUTIONS

Site: New Site - 1

X:\KF109774\Civil\Documents\OREXAM10.aap

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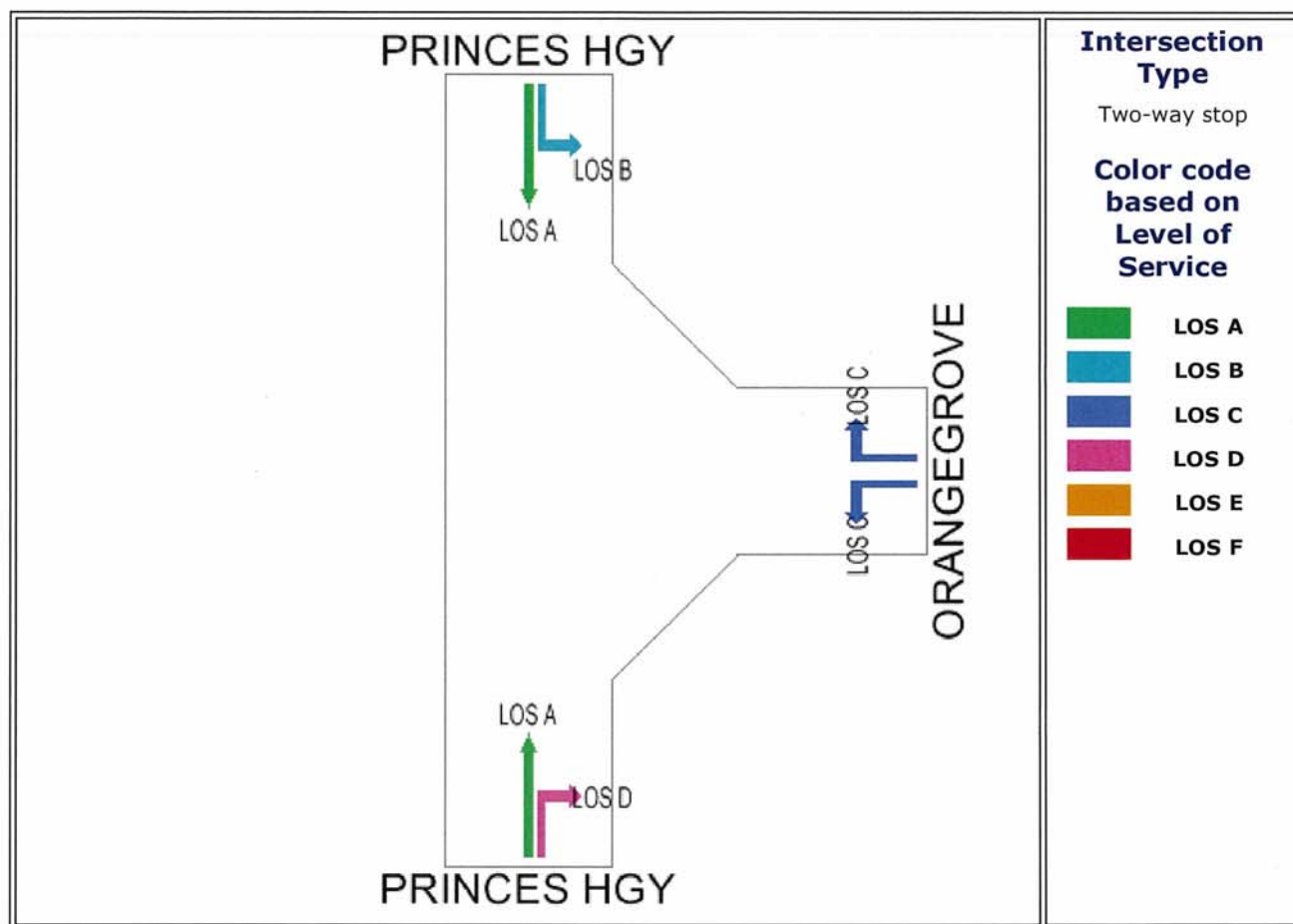
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Level of Service

Based on Delay (HCM method)

PRINCES HIGHWAY / ORANGEGROVE

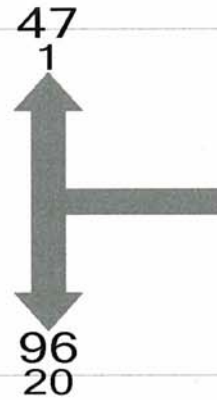
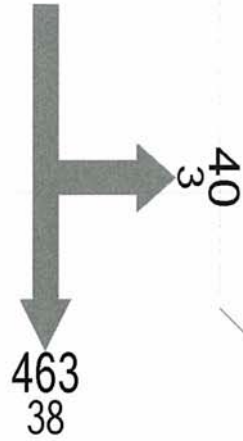
EXISTING AM PEAK IN 10 YEARS



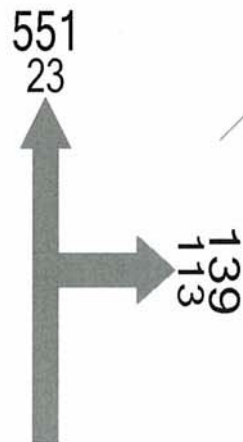
PRINCES HGY

ORAMP R10

Predicted AM in
10 yrs.



ORANGEGROVE



PRINCES HGY

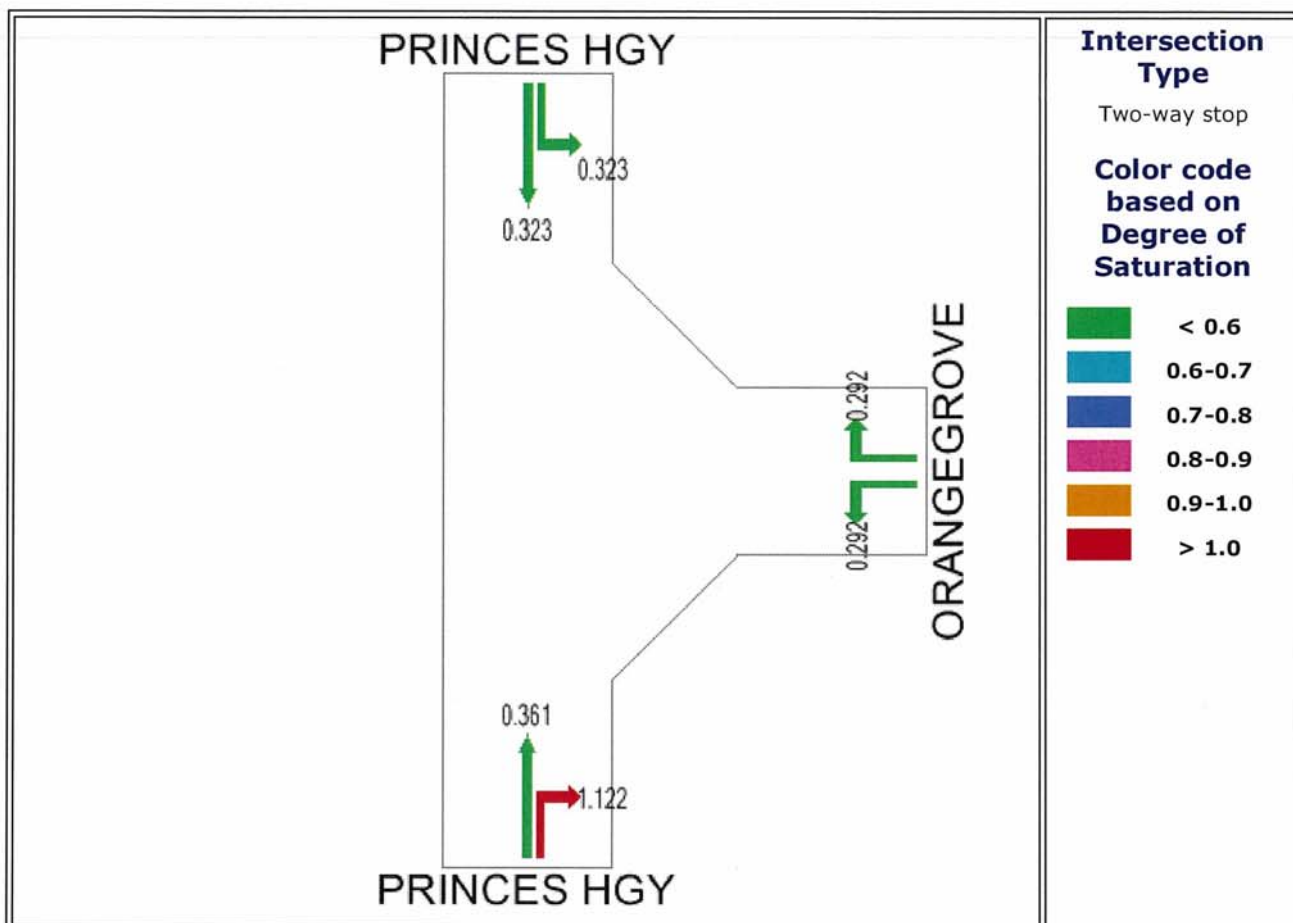


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

PRINCES HIGHWAY / ORANGEGROVE

AM PREDICTED IN 10 YEARS



SIDRA SOLUTIONS

Site: New Site - 1

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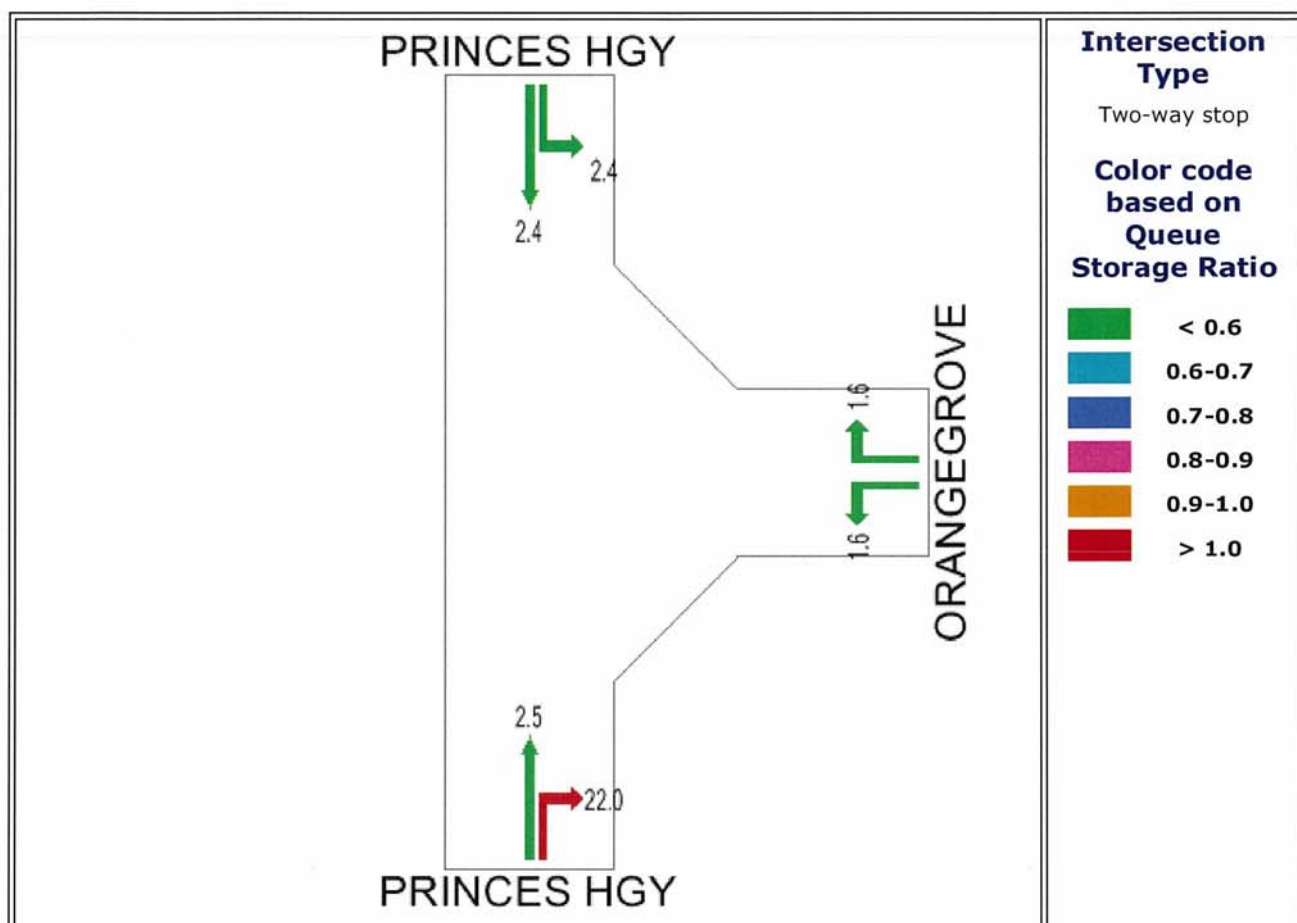
SIDRA INTERSECTION

Queue

Largest 95% Back of Queue for any lane used by movement (vehicles)

PRINCES HIGHWAY / ORANGEGROVE

AM PREDICTED IN 10 YEARS



SIDRA SOLUTIONS

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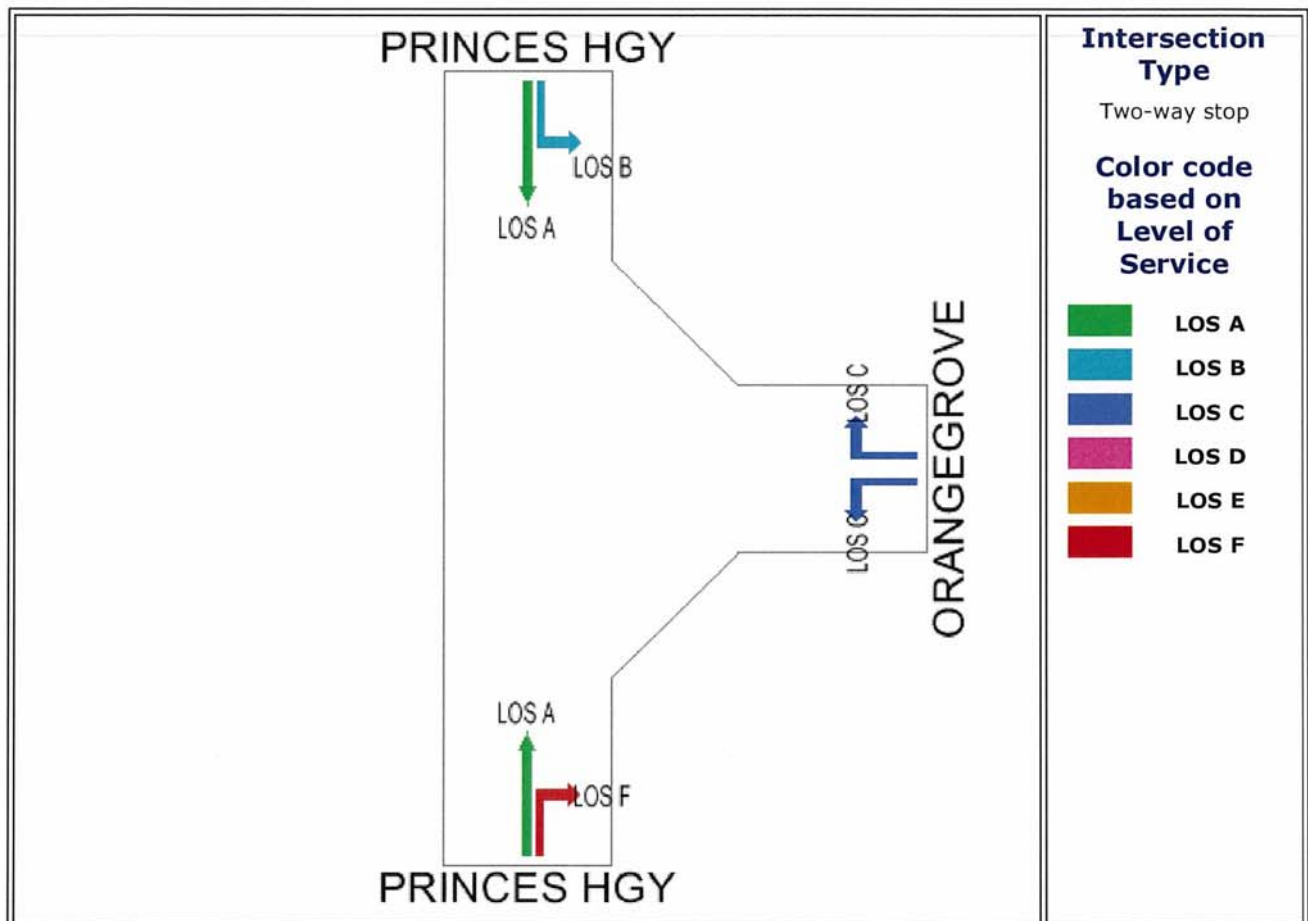
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Level of Service

Based on Delay (HCM method)

PRINCES HIGHWAY / ORANGEGROVE

AM PREDICTED IN 10 YEARS



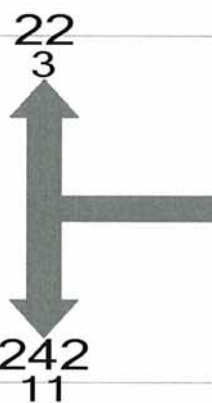
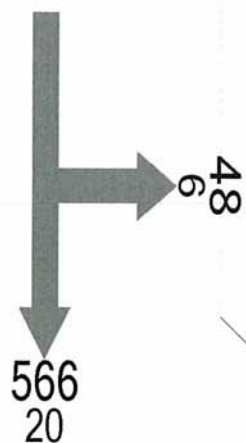
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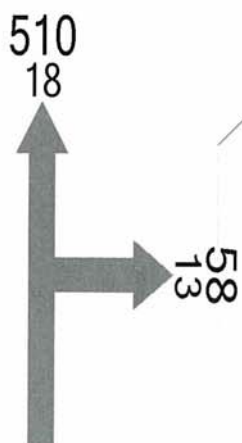
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PRINCES HGY

Existing PM Peak



ORANGEGROVE



PRINCES HGY

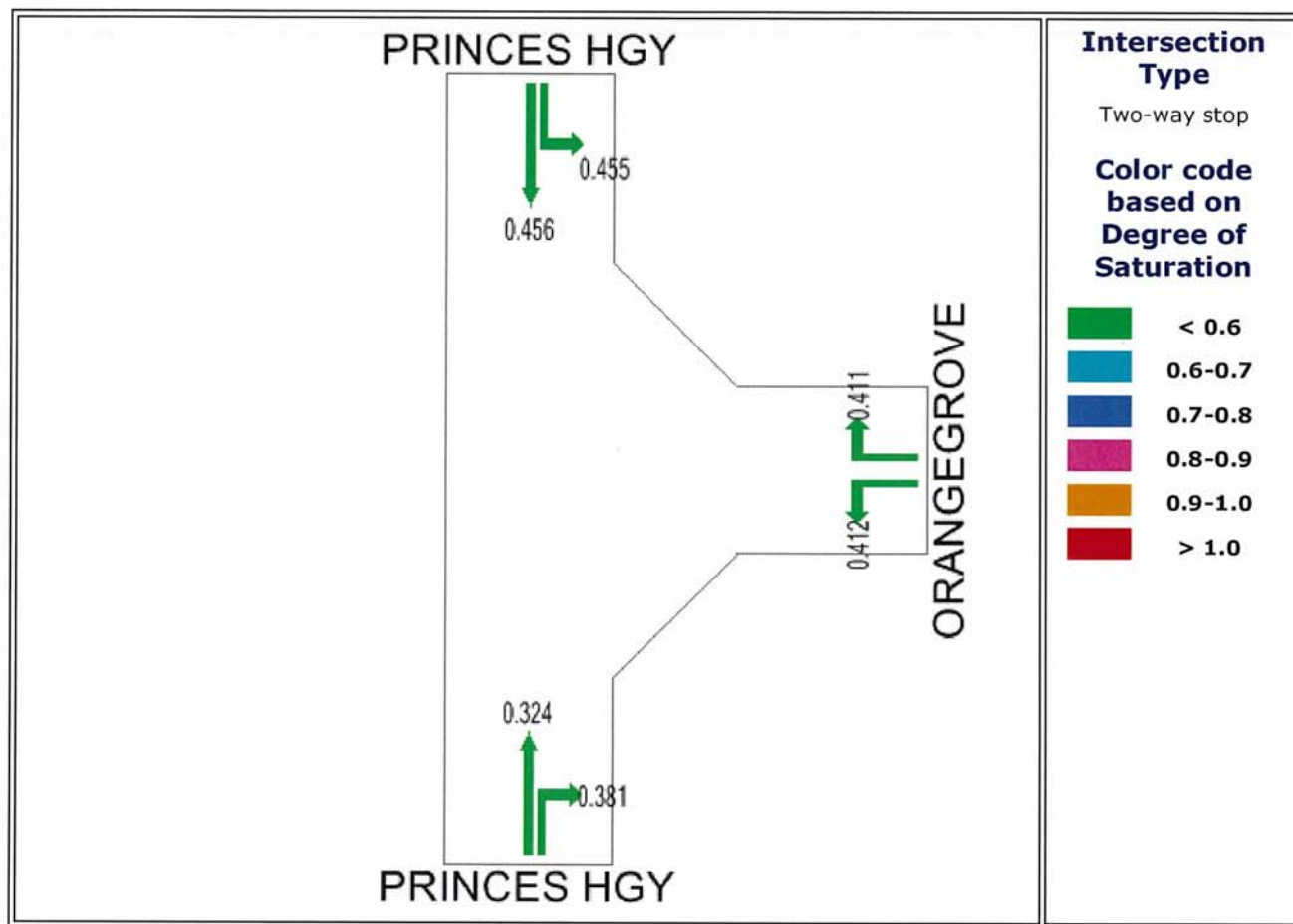


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

PRINCES HIGHWAY / ORANGEGROVE

EXISTING PM PEAK



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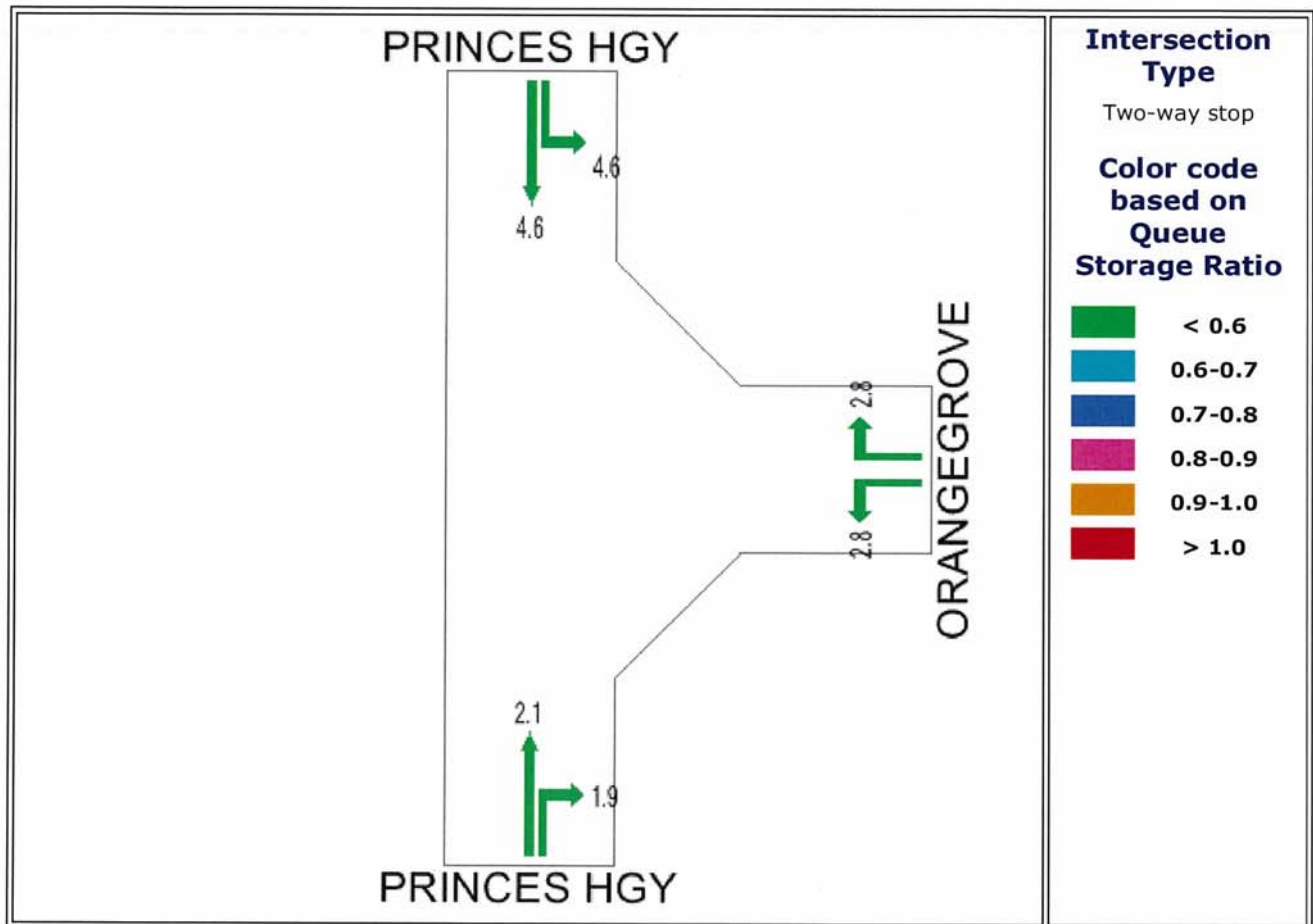
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Queue

Largest 95% Back of Queue for any lane used by movement (vehicles)

PRINCES HIGHWAY / ORANGEGROVE

EXISTING PM PEAK



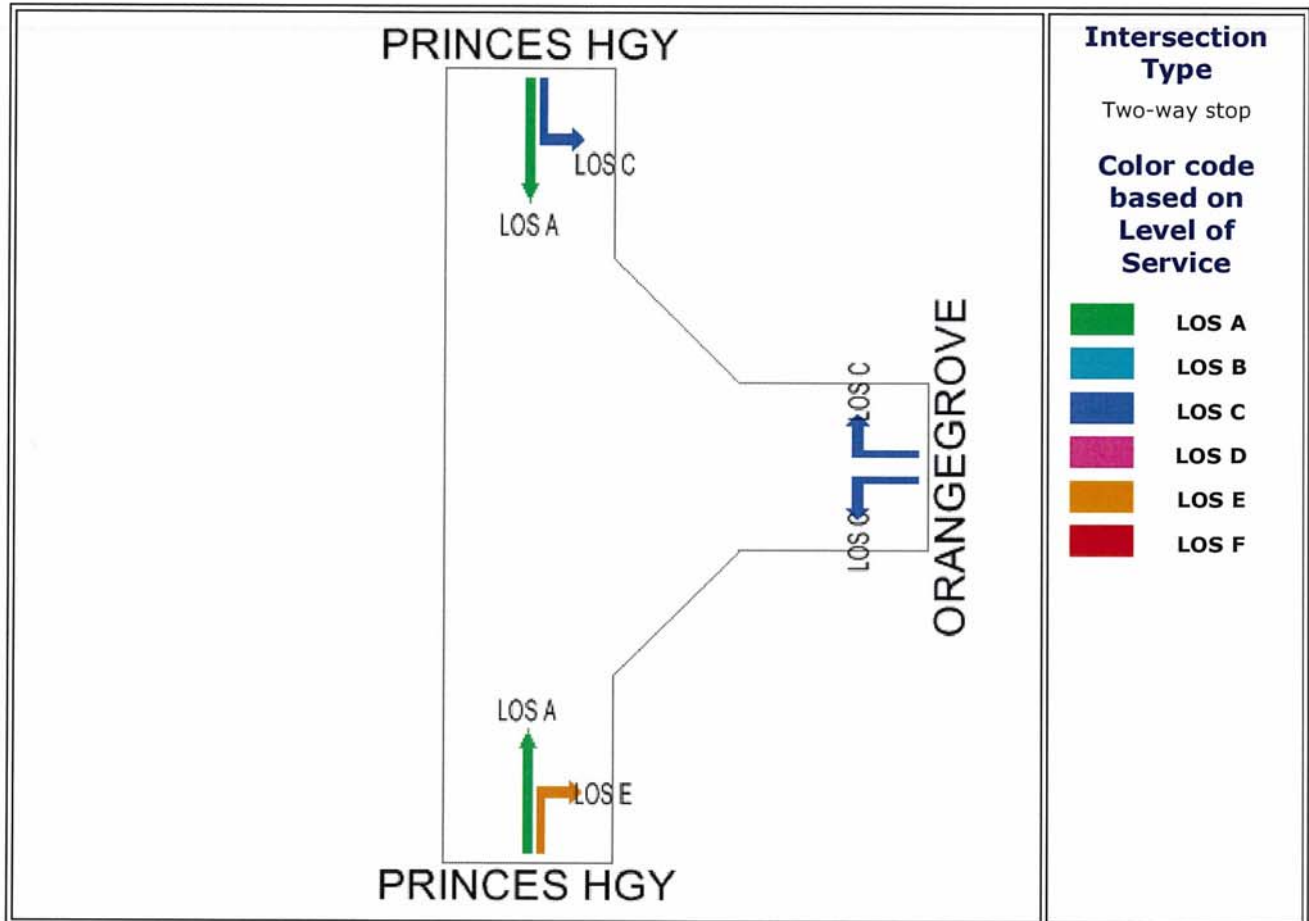
SIDRA INTERSECTION

Level of Service

Based on Delay (HCM method)

PRINCES HIGHWAY / ORANGEGROVE

EXISTING PM PEAK

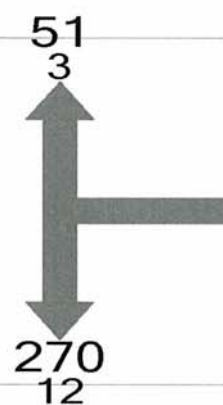
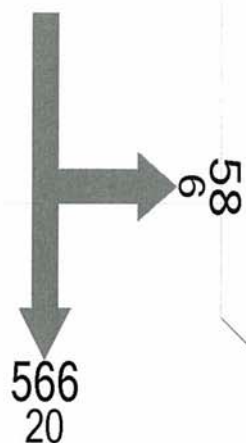


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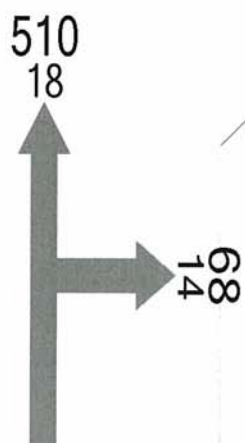
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PRINCES HGY

*predicted PM
Peak.*



ORANGEGROVE



PRINCES HGY

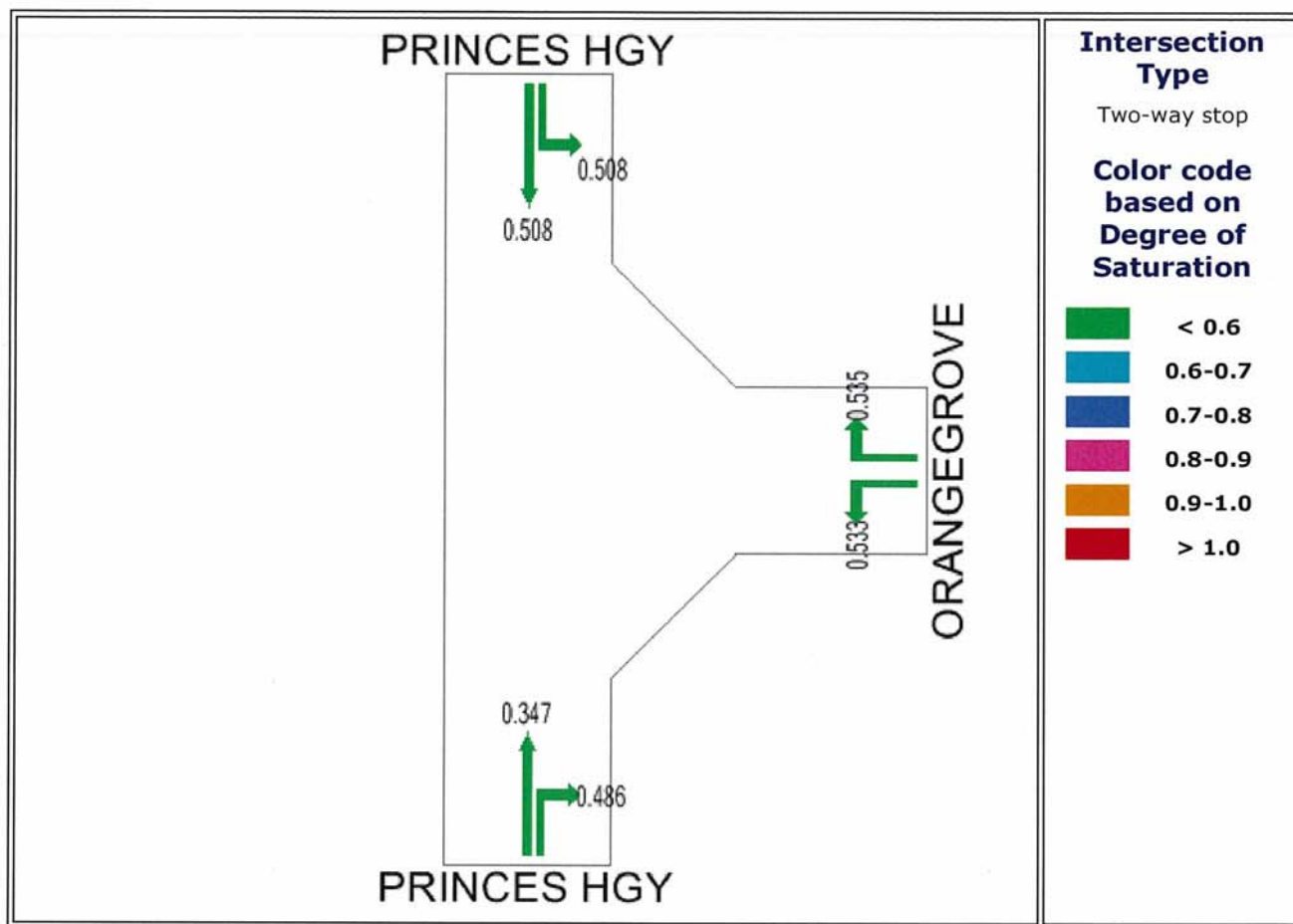


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

PRINCES HIGHWAY / ORANGEGROVE

PREDICTED PM PEAK



Site: New Site - 1
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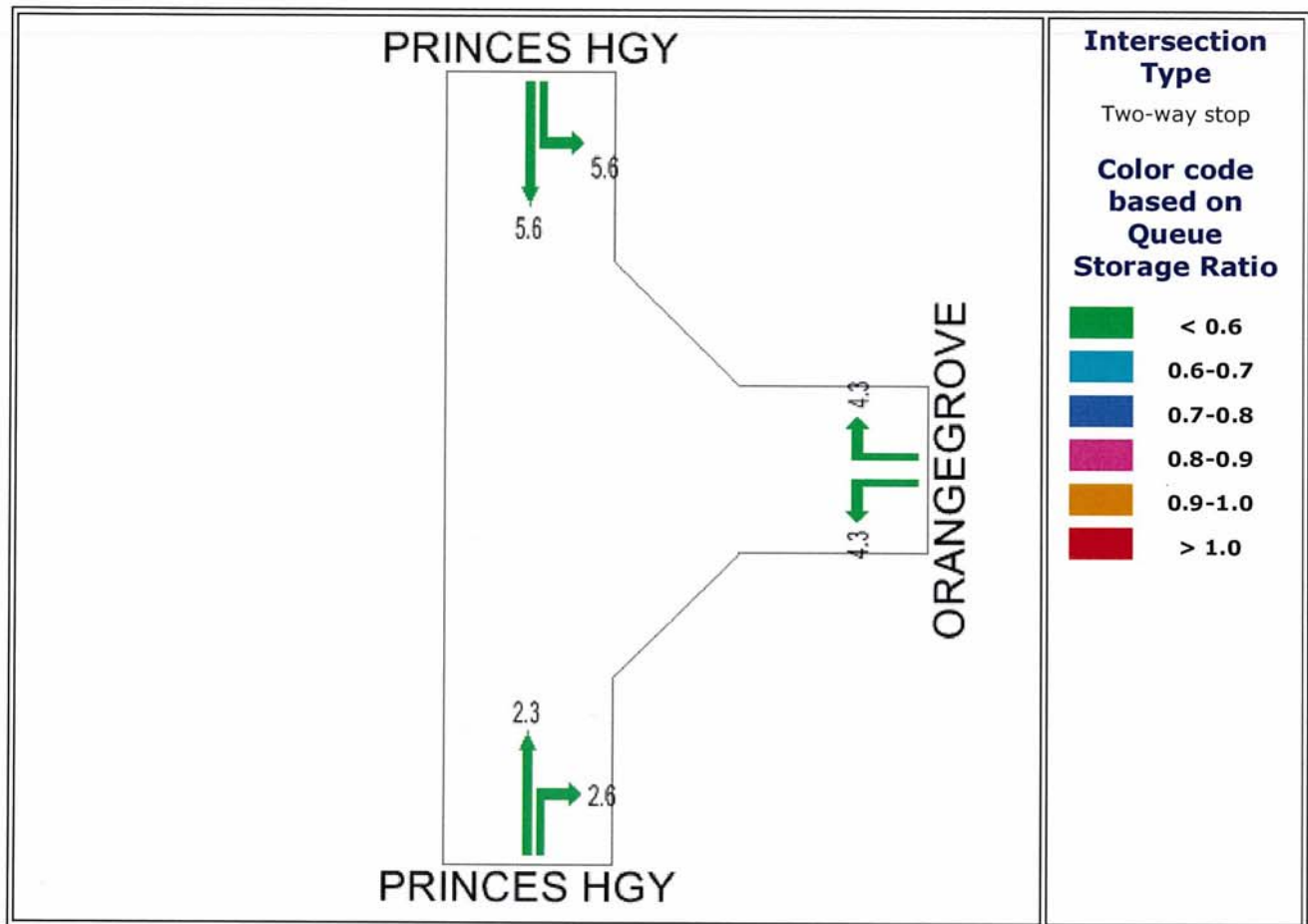
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Queue

Largest 95% Back of Queue for any lane used by movement (vehicles)

PRINCES HIGHWAY / ORANGEGROVE

PREDICTED PM PEAK



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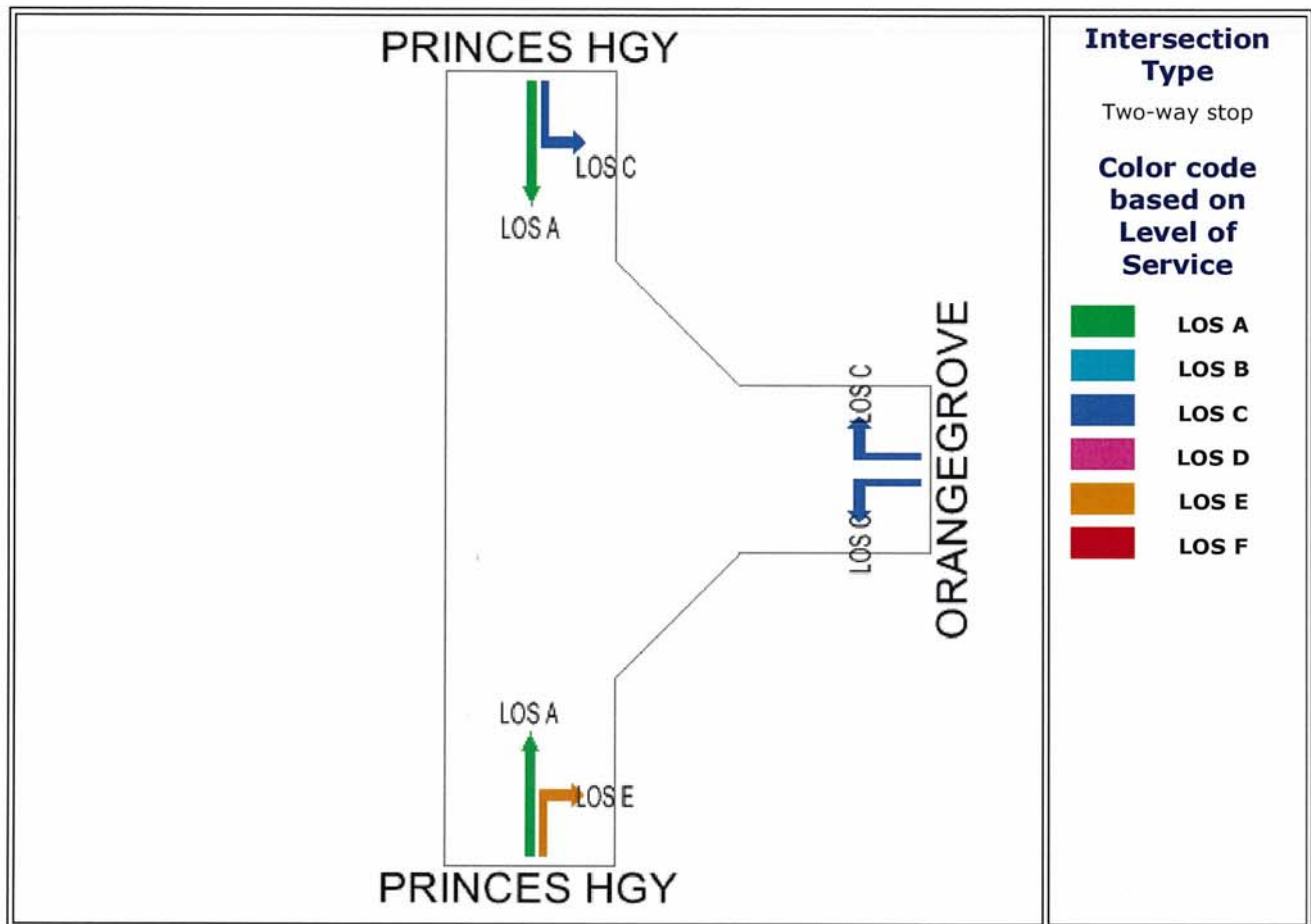
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Level of Service

Based on Delay (HCM method)

PRINCES HIGHWAY / ORANGEGROVE

PREDICTED PM PEAK



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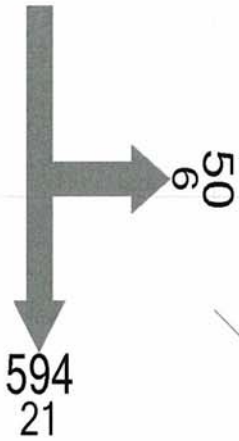
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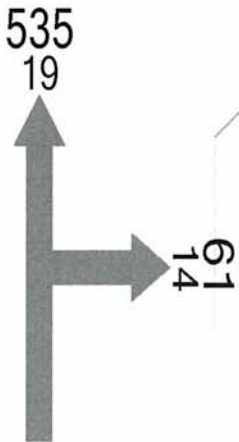
PRINCES HGY

OREX PM 10

Existing PM Peak
in 10 years.



ORANGEGROVE



PRINCES HGY

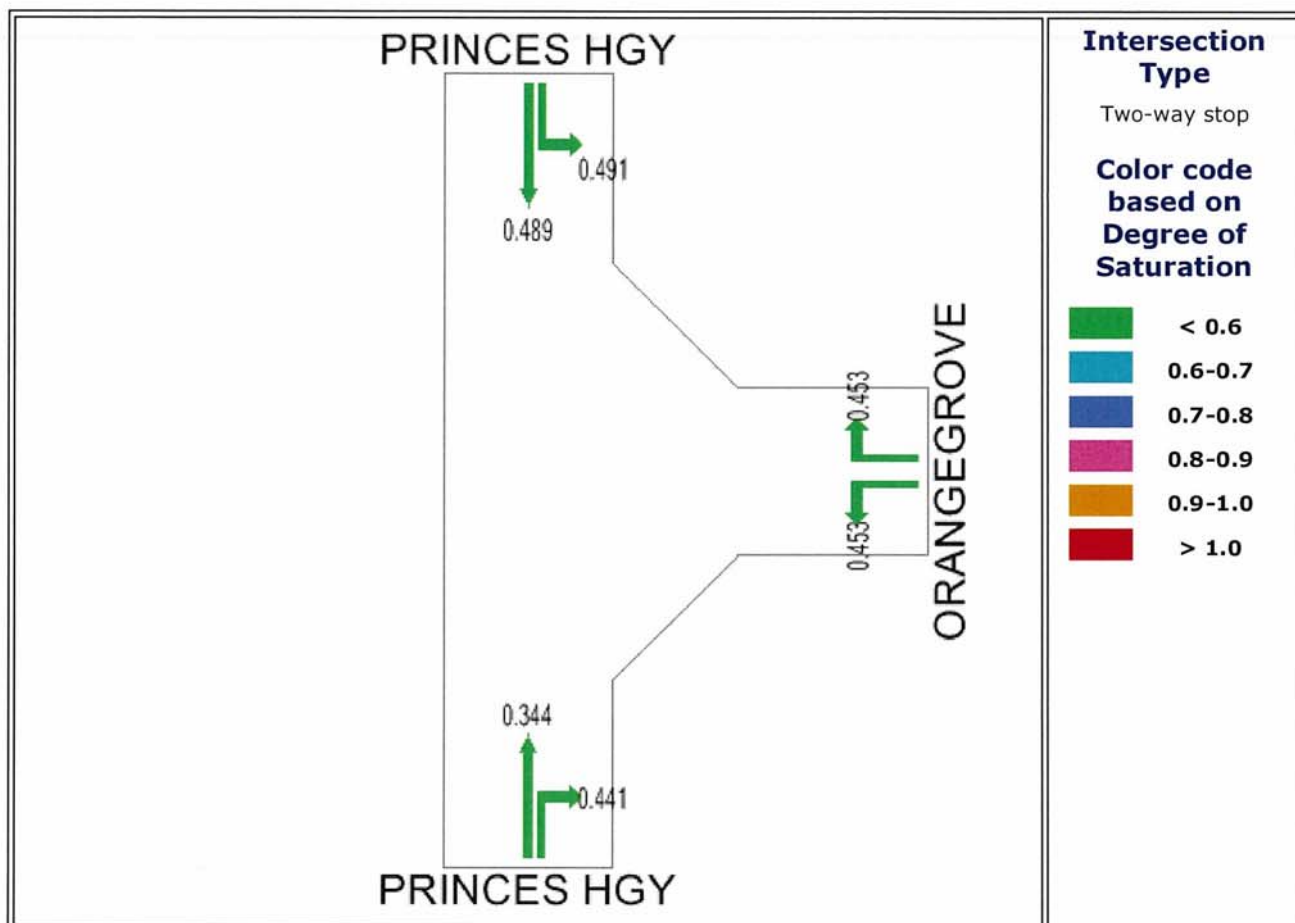


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

PRINCES HIGHWAY / ORANGEGROVE

EXISTING PM PEAK IN 10 YEARS



SIDRA SOLUTIONS

Site: New Site - 1

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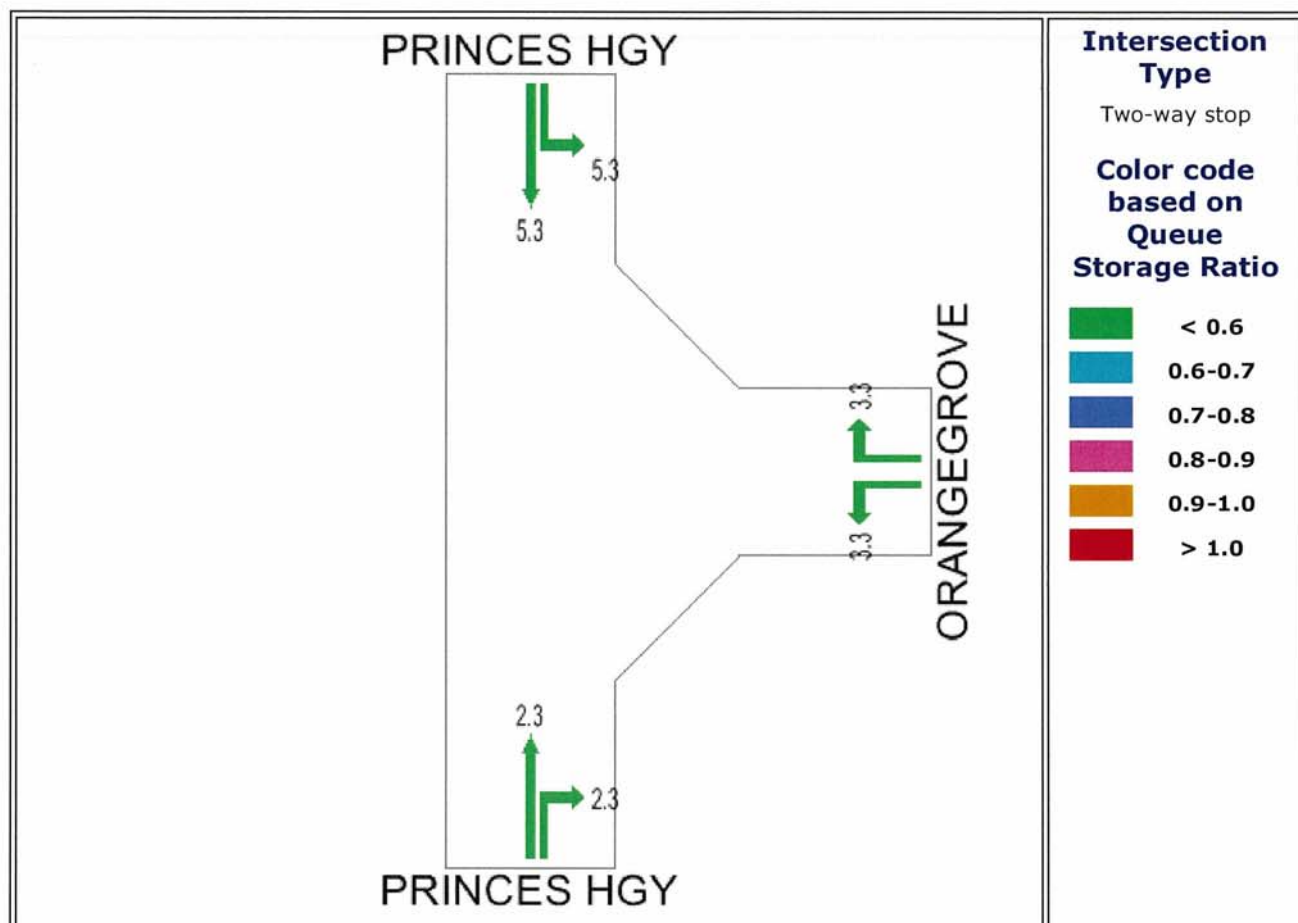


Queue

Largest 95% Back of Queue for any lane used by movement (vehicles)

PRINCES HIGHWAY / ORANGEGROVE

EXISTING PM PEAK IN 10 YEARS



SIDRA SOLUTIONS

Site: New Site - 1

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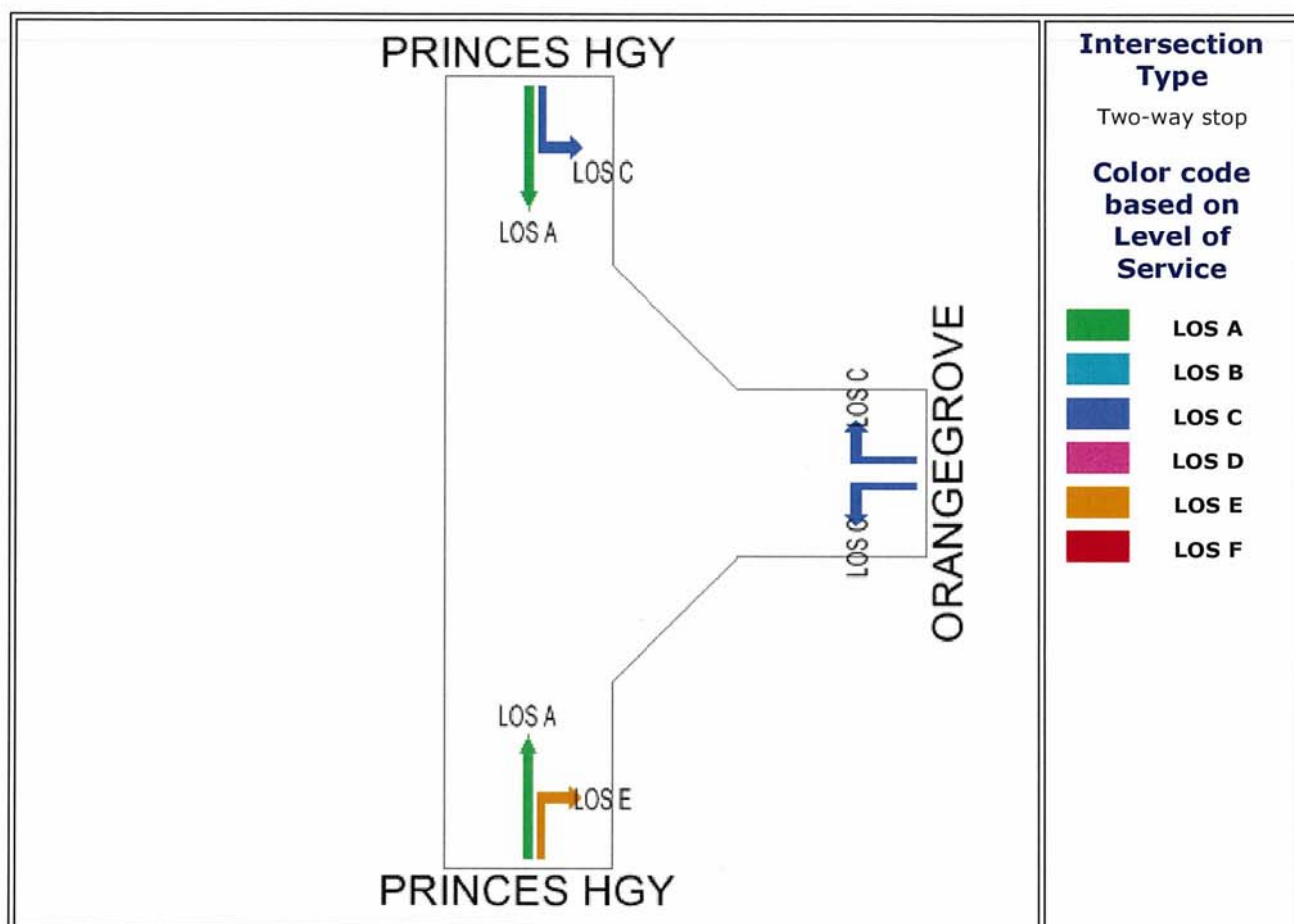
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Level of Service

Based on Delay (HCM method)

PRINCES HIGHWAY / ORANGEGROVE

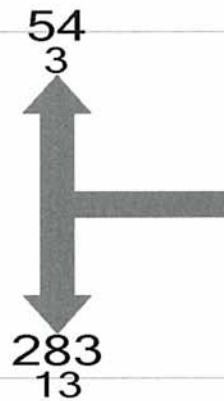
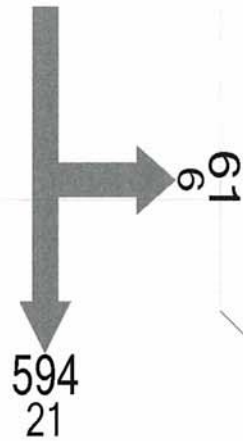
EXISTING PM PEAK IN 10 YEARS



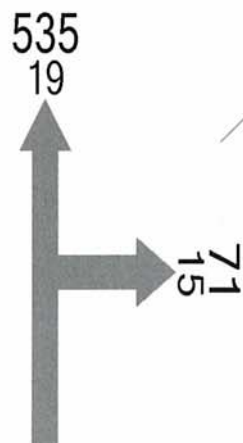
PRINCES HGY

OR PM PR 10

Predicted PM Peak
in 10 years.



ORANGEGROVE



PRINCES HGY

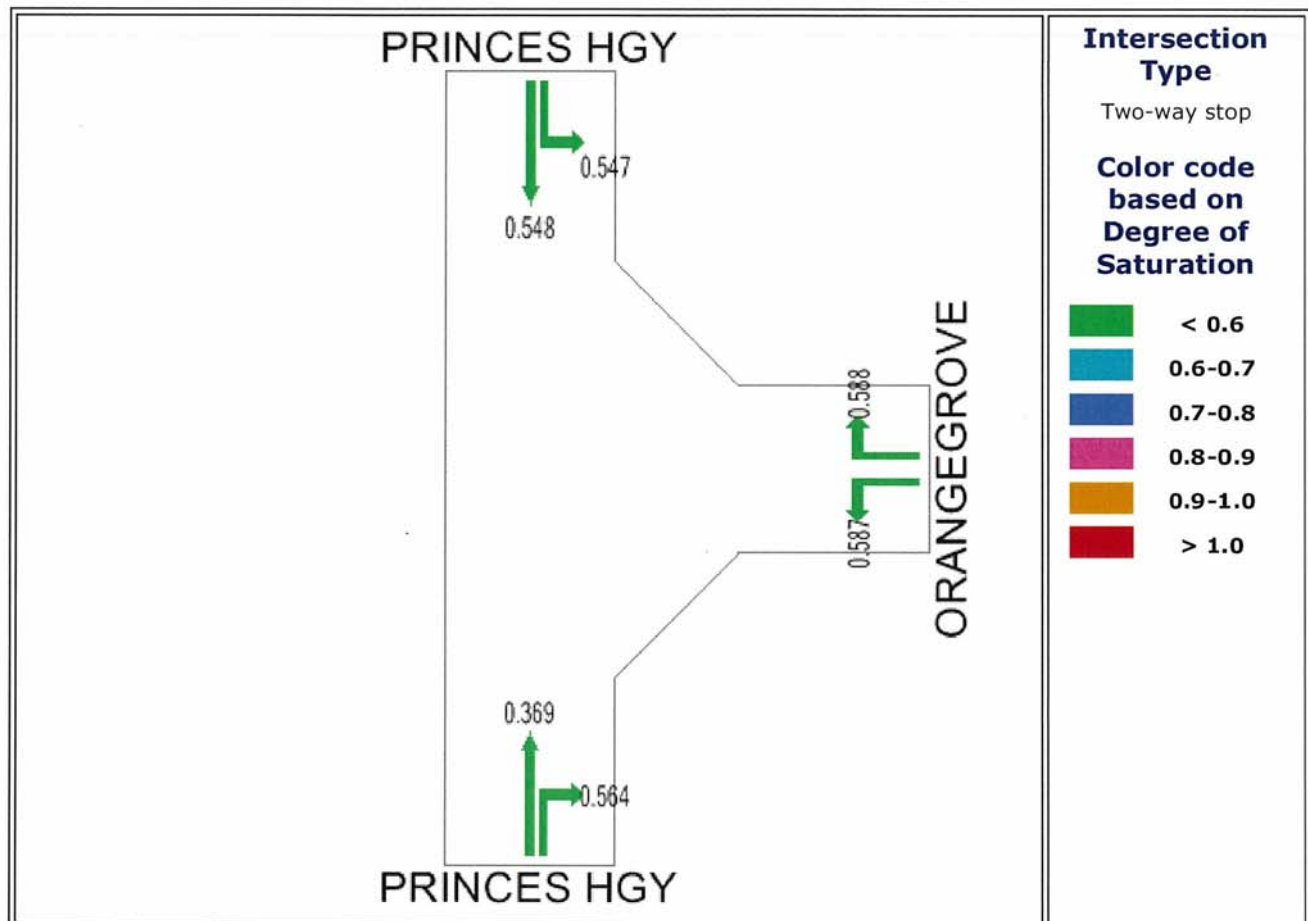


Degree of Saturation

Demand Volume / Capacity (v/c) ratio

PRINCES HIGHWAY / ORANGEGROVE

PREDICTED PM PEAK IN 10 YEARS



SIDRA SOLUTIONS

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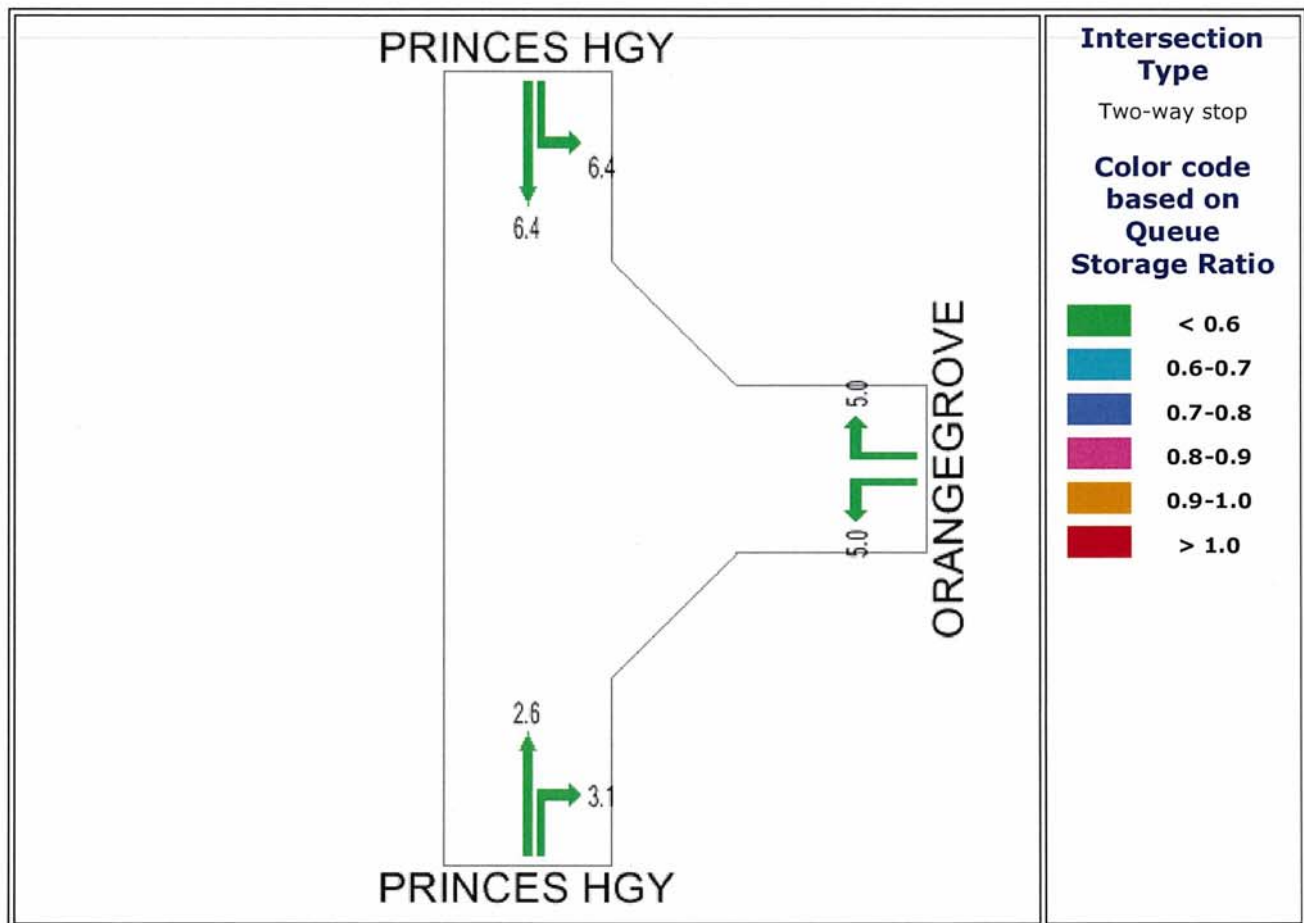


Queue

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PRINCES HIGHWAY / ORANGEGROVE

PREDICTED PM PEAK IN 10 YEARS



SIDRA SOLUTIONS

Site: New Site - 1

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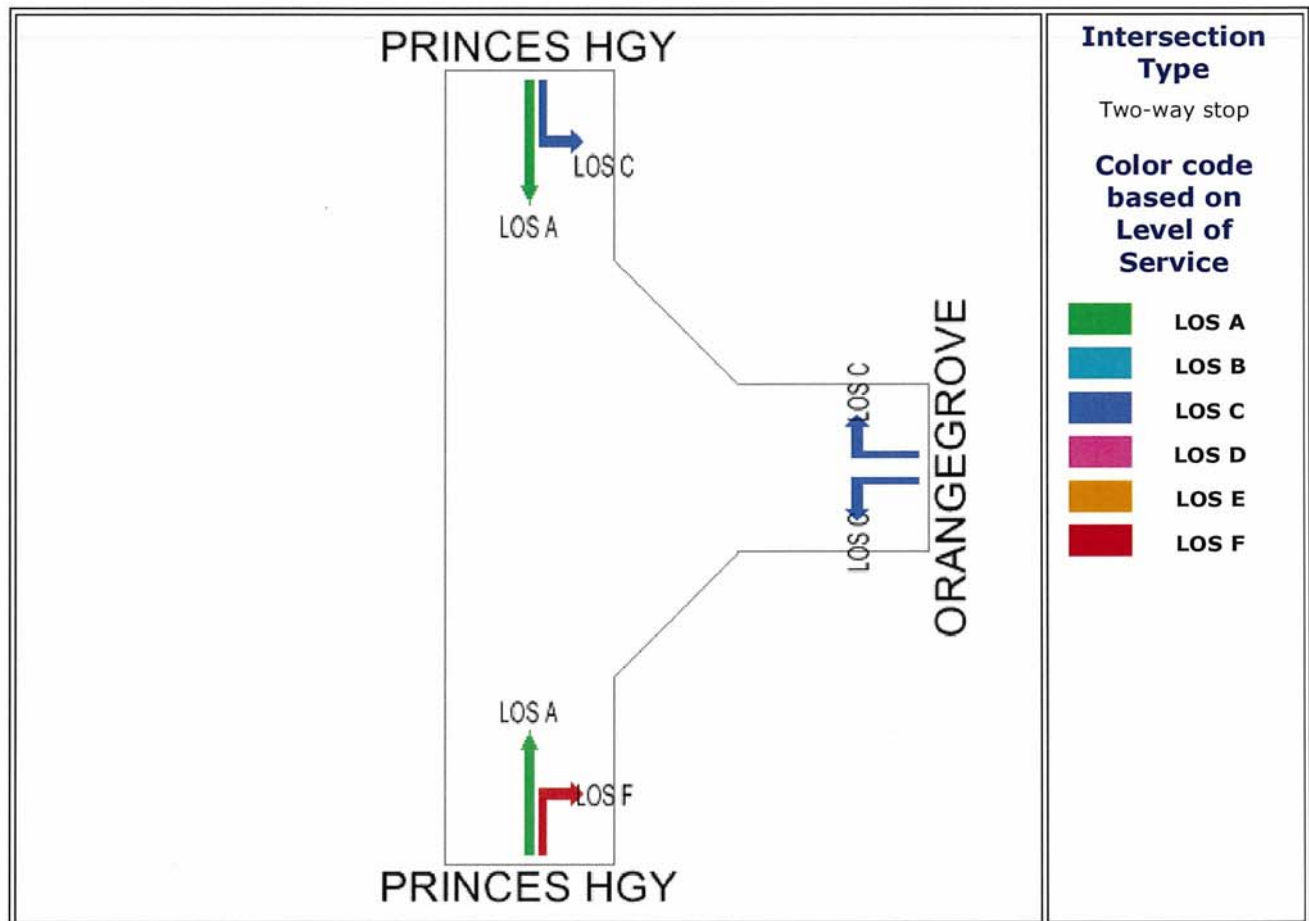


Level of Service

Based on Delay (HCM method)

PRINCES HIGHWAY / ORANGEGROVE

PREDICTED PM PEAK IN 10 YEARS



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