TREE No. 77

Species Name	Eucalyptus nicholii	Tree Height (m)	5m
Species Code	Eni	Trunk circumference (mm)	800mm
Tree Quality	Low	Canopy diameter (m)	4m
Regulated Status	No	No. of trunks	1
Health	Fair	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments			

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE No. 78

Species Name	Eucalyptus maidenii	Tree Height (m)	15m
Species Code	EUm	Trunk circumference (mm)	1700mm
Tree Quality	Medium	Canopy diameter (m)	16m
Regulated Status	To be verified by survey	No. of trunks	1
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments			

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE No. 79

Species Name	Eucalyptus cinerea	Tree Height (m)	12m
Species Code	EUc	Trunk circumference (mm)	1000mm
Tree Quality	Medium	Canopy diameter (m)	7m
Regulated Status	To be verified by survey	No. of trunks	1
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments			

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE No. 80

Species Name	Eucalyptus mannifera	Tree Height (m)	12m
Species Code	Ema	Trunk circumference (mm)	1700mm
Tree Quality	Medium	Canopy diameter (m)	12m
Regulated Status	No	No. of trunks	1
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments			

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE No. 83

Species Name	Gleditsia triacanthos	Tree Height (m)	5m
Species Code	GLt	Trunk circumference (mm)	800mm
Tree Quality	Medium	Canopy diameter (m)	7m
Regulated Status	To be verified by survey	No. of trunks	1
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments			

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE No. 84

Species Name	Eucalyptus maidenii	Tree Height (m)	14m
Species Code	EUm	Trunk circumference (mm)	1800mm
Tree Quality	Medium	Canopy diameter (m)	11m
Regulated Status	To be verified by survey	No. of trunks	1
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments			

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE No. 86

Species Name	Fraxinus oxycarpa 'Raywood'	Tree Height (m)	6m
Species Code	FRo	Trunk circumference (mm)	1100mm
Tree Quality	Medium	Canopy diameter (m)	11m
Regulated Status	To be verified by survey	No. of trunks	1
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments			

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE No. 87

Species Name	Eucalyptus nicholii	Tree Height (m)	11m
Species Code	Eni	Trunk circumference (mm)	1100mm
Tree Quality	Medium	Canopy diameter (m)	9m
Regulated Status	To be verified by survey	No. of trunks	1
Health	Fair	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	Asymmetrical canopy. Species can be prone to limb drop		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

GROUP NO. GA

Species Name	Eucalyptus mixed species	Tree Height (m)	12-14m
Species Code	GA EUC	Trunk circumference (mm)	1000-1200mm
Tree Quality	Medium	Canopy diameter (m)	6-10m
Regulated Status	No	No. of trunks	1-2 per tree
Health	Good	Structural Defects / Decay	Yes
Past damage disturbance	No	Disease / Pest infestation	No
Comments	13 trees in group, some with poor unions at base.		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE No. GROUP B

Species Name	Eucalyptus mixed species	Tree Height (m)	13-14
Species Code	GB EUC	Trunk circumference (mm)	400-900mm
Tree Quality	Medium	Canopy diameter (m)	5-7m
Regulated Status	No	No. of trunks	1-2 per tree
Health	Fair	Structural Defects / Decay	Yes
Past damage disturbance	No	Disease / Pest infestation	No
Comments	15 trees in group. Site conditions are not suitable for this species		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP C

Species Name	Eucalyptus mixed species	Tree Height (m)	7-19m
Species Code	GC EUC	Trunk circumference (mm)	800-2000mm
Tree Quality	Medium	Canopy diameter (m)	5-12m
Regulated Status	No	No. of trunks	1-2
Health	Fair to Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	10 trees, including 1 dead tree. Group of Eucs includes 1 No. Acacia		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP D

Species Name	Eucalyptus mixed species	Tree Height (m)	7-19m
Species Code	GD EUC	Trunk circumference (mm)	800-2000mm
Tree Quality	Medium	Canopy diameter (m)	5-12m
Regulated Status	No	No. of trunks	1-2 per tree
Health	Fair to Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	24 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP E

Species Name	Eucalyptus mixed species	Tree Height (m)	10-15m
Species Code	GE EUC	Trunk circumference (mm)	700-2300mm
Tree Quality	Medium	Canopy diameter (m)	3-11m
Regulated Status	No	No. of trunks	1-3
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	45 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP F

Species Name	Eucalyptus mixed species	Tree Height (m)	25m average
Species Code	GF EUC	Trunk circumference (mm)	1000-2800mm
Tree Quality	High	Canopy diameter (m)	7-20m
Regulated Status	To be verified by survey	No. of trunks	1
Health	good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	9 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP G

Species Name	Eucalyptus mixed species	Tree Height (m)	8-17m average
Species Code	GG EUC	Trunk circumference (mm)	500-2700mm
Tree Quality	Medium	Canopy diameter (m)	5-13m
Regulated Status	No	No. of trunks	1-4 per tree
Health	Fair	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	51 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP H

Species Name	Eucalyptus mixed species	Tree Height (m)	9-17m average
Species Code	GH EUC	Trunk circumference (mm)	500-2700mm
Tree Quality	High	Canopy diameter (m)	6-13m
Regulated Status	No	No. of trunks	1-4 per tree
Health	Fair	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	48 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP I

Species Name	Eucalyptus mixed species	Tree Height (m)	8-15m average
Species Code	GI EUC	Trunk circumference (mm)	500-2000mm
Tree Quality	Medium	Canopy diameter (m)	3-9m
Regulated Status	No	No. of trunks	1-2 per tree
Health	Fair	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	59 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP J

Species Name	Eucalyptus mixed species	Tree Height (m)	8-15m average
Species Code	GJ EUC	Trunk circumference (mm)	500-2000mm
Tree Quality	High	Canopy diameter (m)	3-9m
Regulated Status	No	No. of trunks	1-3 per tree
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	59 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP K

Species Name	Eucalyptus mixed species	Tree Height (m)	19m average
Species Code	GK EUC	Trunk circumference (mm)	1000-2000mm
Tree Quality	Medium	Canopy diameter (m)	6-13m
Regulated Status	To be verified by survey	No. of trunks	1 per tree
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	6 trees in group, 1 dead tree		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP L

Species Name	Eucalyptus mixed species	Tree Height (m)	6-14m average
Species Code	GL EUC	Trunk circumference (mm)	600-2200mm
Tree Quality	Medium	Canopy diameter (m)	4-8m
Regulated Status	Yes	No. of trunks	1 per tree
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	17 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP M

Species Name	Eucalyptus mixed species	Tree Height (m)	6-11m average
Species Code	GM EUC	Trunk circumference (mm)	600-1100mm
Tree Quality	High	Canopy diameter (m)	2-10m
Regulated Status	No	No. of trunks	1 per tree
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	34 trees in group. Trees provide a buffer to residential area		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP N

Species Name	Eucalyptus mixed species	Tree Height (m)	7-11m average
Species Code	GN EUC	Trunk circumference (mm)	600-1100mm
Tree Quality	Medium	Canopy diameter (m)	3-10m
Regulated Status	No	No. of trunks	1 per tree
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	41 trees in group. Trees provide a buffer to residential area.		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP J

Species Name	Eucalyptus mixed species	Tree Height (m)	8-15m average
Species Code	GJ EUC	Trunk circumference (mm)	500-2000mm
Tree Quality	High	Canopy diameter (m)	3-9m
Regulated Status	No	No. of trunks	1-3 per tree
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	59 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP J

Species Name	Eucalyptus mixed species	Tree Height (m)	8-15m average
Species Code	GJ EUC	Trunk circumference (mm)	500-2000mm
Tree Quality	High	Canopy diameter (m)	3-9m
Regulated Status	No	No. of trunks	1-3 per tree
Health	Good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	59 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP F

Species Name	Eucalyptus mixed species	Tree Height (m)	25m average
Species Code	GF EUC	Trunk circumference (mm)	1000-2800mm
Tree Quality	High	Canopy diameter (m)	7-20m
Regulated Status	To be verified by survey	No. of trunks	1
Health	good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	9 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

TREE GROUP F

Species Name	Eucalyptus mixed species	Tree Height (m)	25m average
Species Code	GF EUC	Trunk circumference (mm)	1000-2800mm
Tree Quality	High	Canopy diameter (m)	7-20m
Regulated Status	To be verified by survey	No. of trunks	1
Health	good	Structural Defects / Decay	No
Past damage disturbance	No	Disease / Pest infestation	No
Comments	9 trees in group		

ASSESSMENT DETAILS

Assessor	Redbox Design Group
Date of Assessment	March 2021

Appendix B – Tree Assessment Plan and Inventory

FRASER PRIMARY SCHOOL

TREE ASSESSMENT - FINAL ISSUE

DRAWING REGISTER

LANDSCAPE WORKS

DWG#	TITLE	DATE	REVISION
1658 - 000	COVER PAGE	07.06.21	B
1658 - 100	TREE ASSESSMENT LEGEND AND SITE PLAN	07.06.21	B
1658 - 101	TREE ASSESSMENT PLAN 1	07.06.21	B
1658 - 102	TREE ASSESSMENT PLAN 2	07.06.21	B
1658 - 103	TREE ASSESSMENT PLAN 3	07.06.21	B
1658 - 104	TREE ASSESSMENT SCHEDULE 1	07.06.21	B
1658 - 105	TREE ASSESSMENT SCHEDULE 2	07.06.21	B

LOCATION PLAN

1:2000@A1 1:4000@A3

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ACT Government
Environment, Planning and Sustainable Development

LEGEND

BLOCK BOUNDARY

SITE BOUNDARY

TREE IDENTIFICATION

5 Emf M	TREE NUMBER
5 Emf M	TREE IDENTIFICATION CODE
5 Emf M	TREE QUALITY RATING

SUPPLEMENTARY NOTES

(REGU)	REGULATED
(TCCS)	TCCS TREE

TREE QUALITY ASSESSMENT

An overall assessment of the quality of the tree and its relative importance for retention within an urban context

Low [L]
A tree that:Is of poor, structure or health, is in decline; and which has limited potential to contribute to the landscape.

Medium [M]
A tree that: Is of reasonable form, structure and health; and whose presence contributes to the landscape but not as significantly as high / exceptional quality.

High [H]
A tree that: Is of good form, structure and health; is without significant defect; and which has the potential to make a significant contribution to the landscape

Exceptional [E]
A tree or group of trees that: Has natural or cultural heritage importance; or has high aesthetic value and will have a major contribution to the surrounding landscape; or is of outstanding form and condition and is excellent example of the species; or has significant scientific value, including ecological importance.

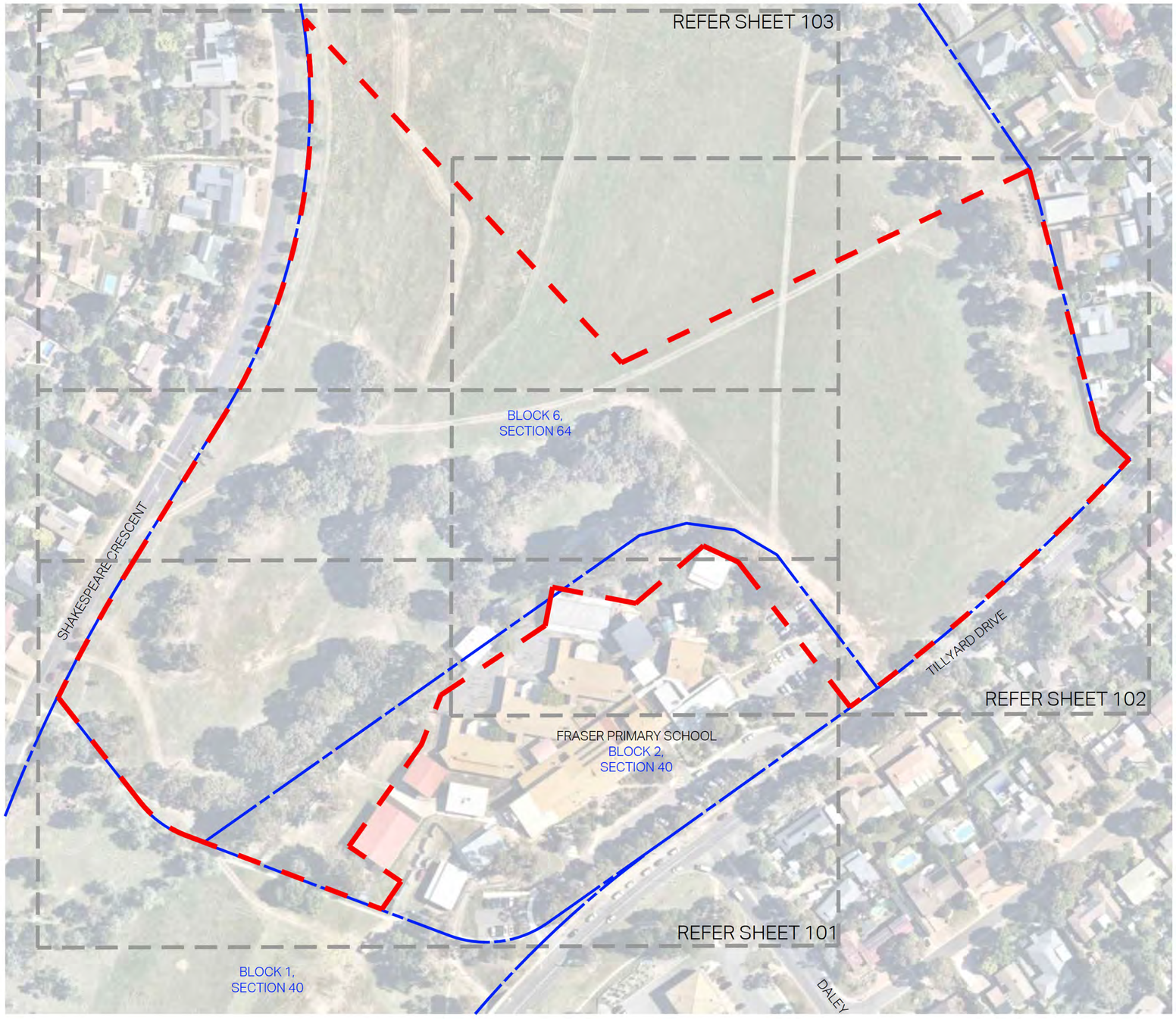
TREE ASSESSMENT SPECIES LIST

Code	Species
ACb	*Acacia baileyana*
CAc	*Callistemon citrinus*
Ccu	*Casuarina cunninghamiana*
EUb	*Eucalyptus bicostata*
EUc	*Eucalyptus cinerea*
EUm	*Eucalyptus maidenii*
Ema	*Eucalyptus mannifera*
Eme	*Eucalyptus melliodora*
Eni	*Eucalyptus nicholii*
EUp	*Eucalyptus polyanthemos*
Esi	*Eucalyptus sideroxylon*
EUs	*Eucalyptus stellulata*
Evi	*Eucalyptus viridis*
FRe	*Fraxinus excelsior*
FRo	*Fraxinus oxycarpa* 'Raywood'
GLt	*Gleditsia triacanthos*
Plc	*Pistacia chinensis*

GROUP: Mixed Eucalyptus Typical Species

EUb	*Eucalyptus bicostata*
EUc	*Eucalyptus cinerea*
EUm	*Eucalyptus maidenii*
Ema	*Eucalyptus mannifera*
Eme	*Eucalyptus melliodora*
Eni	*Eucalyptus nicholii*
EUp	*Eucalyptus polyanthemos*
Esi	*Eucalyptus sideroxylon*
EUs	*Eucalyptus stellulata*
Evi	*Eucalyptus viridis*

SITE PLAN



NOTES
No survey provided, all tree located by aerial imagery. Exact location to be confirmed / verified by survey.

* Status of Regulated / TCCS trees to be confirmed by survey due to uncertainty of boundary location

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REV	ISSUE	DATE	DRN	CHK
B	FINAL ISSUE	07.06.21	HR	KK
A	FOR INFORMATION	30.03.21	RS	KK

NORTH
SCALE 1:1000@A1 | 1:2000@A3
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PROJECT
FRASER PRIMARY SCHOOL
TREE ASSESSMENT

PROJECT No.	SHEET	ISSUE
1658	100	B

TREE ASSESSMENT
Legend & Site Plan

JOINS SHEET 103

NOTES
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BLOCK 6,
SECTION 64

FRASER PRIMARY SCHOOL
BLOCK 2,
SECTION 40

SHAKESPEARE CRESCENT

4 FRo M
3 FRo L
2 FRo L
1 FRo L
18 FRo L
19 Evi L
21 Eme M
20 Eme M
GA EUC M
GG EUC M
GH EUC M
GI EUC M
GJ EUC H
GK EUC M*
GL EUC M*
GB EUC M
GC EUC L
GD EUC M *
GE EUC M *
GF EUC H*
33 Ema L
38 EUb H*
36 EUb H*
35 EUb H*
30 Ccu M
31 EUp M
32 Ccu M
29 EUp M
28 Ccu L
27 EUp M
26 Ccu M
24 EUm L
23 EUb M
25 EUp L
37 EUb H*
34 EUb H*
84 EUm M*
83 GLt M*
86 FRo M
REGU
87 FRo L
REGU
39 Ema L*
79 EUc M*
78 EUm M*
80 Ema M
REGU
77 Eni L
REGU
76 CAc L
REGU
74 EUm L *
75 EUm M*
73 EUm L*
72 Eni M
REGU
71 EUb M
REGU
70 EUc L
REGU
69 EUc M
REGU
22 EUb H *
62 Ema M
REGU
64 Ema M
65 Ema M
68 EUm M
REGU
67 Ema M
REGU
66 EUm M
REGU
63 Ema M
REGU

JOINS SHEET 102

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A	FOR INFORMATION	30.03.21	RS	KK

NORTH
SCALE 1:500@A1 | 1:1000@A3
0 5 10 15 20 25m

PROJECT
FRASER PRIMARY SCHOOL
TREE ASSESSMENT

PROJECT No.	SHEET	ISSUE
1658	101	B

TREE ASSESSMENT
Plan 1

JOINS SHEET 103

BLOCK 6,
SECTION 64

GM EUC H

GN EUC M

GJ EUC H

33 Ema L

GI EUC M

38 EUb H*

36 EUb H*

35 EUb H*

GK EUC M*

30 Ccu M

31 EUp M

32 Ccu M

Jp M

37 EUb H*

34 EUb H*

GL EUC M*

26 Ccu M

86 FRo M
REGU

84 EUm M*

87 FRo L
REGU

39 Ema L*

p L

83 GLt M*

H*

79 EUc M*

JOINS SHEET 101

40 Ema M*

41 Ema M*

42 Ema M*

TILLYARD DRIVE

205

203

201

199

207

200

198

196

194

192

190

188

186

61

15

NOTES

No survey provided, all tree located by aerial imagery. Exact location to be confirmed / verified by survey.

* Status of Regulated / TCCS trees to be confirmed by survey due to uncertainty of boundary location

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NORTH

SCALE 1:500@A1 | 1:1000@A3

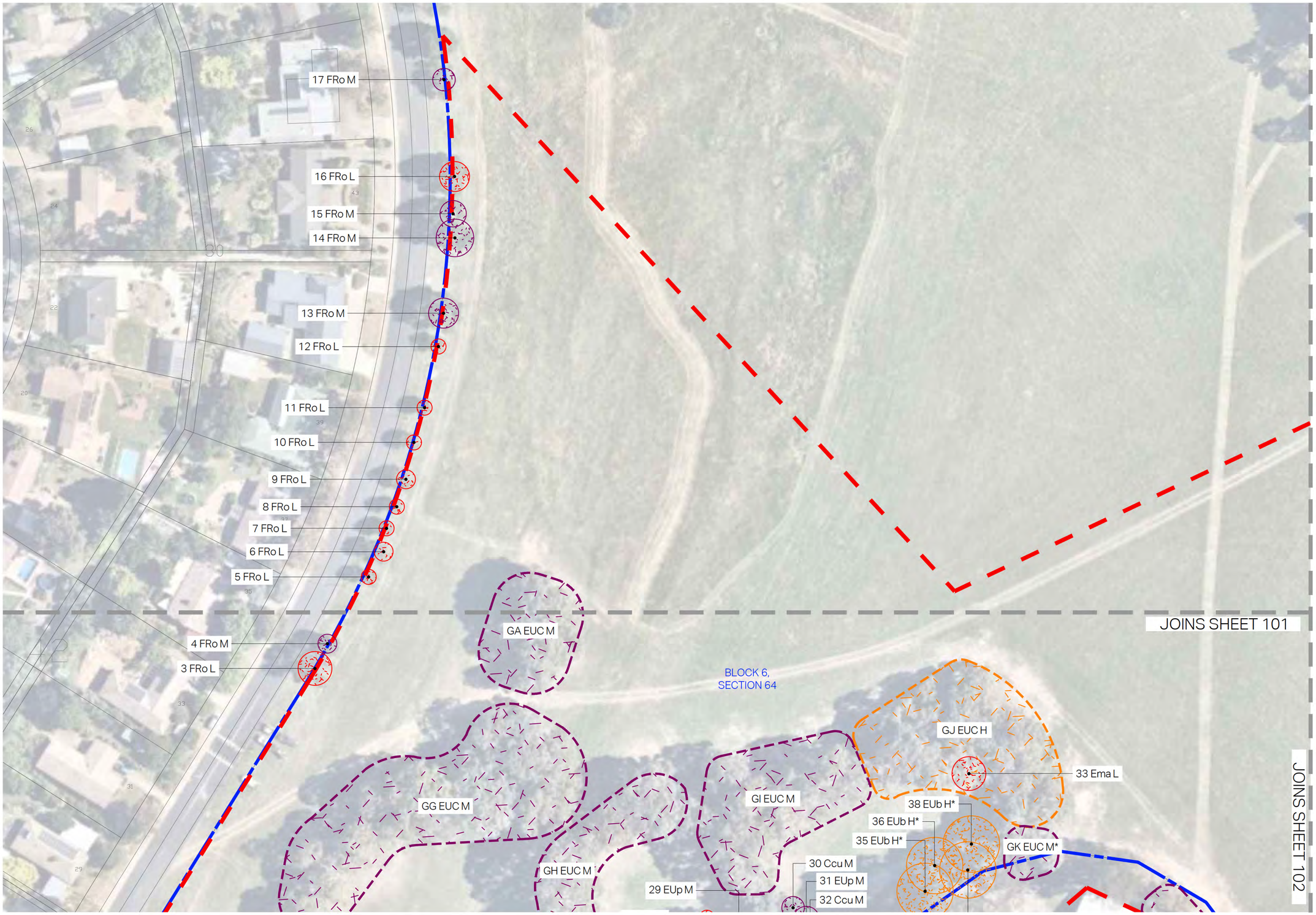
0 5 10 15 20 25m

PROJECT

FRASER PRIMARY SCHOOL
TREE ASSESSMENT

PROJECT No.	SHEET	ISSUE
1658	102	B

TREE ASSESSMENT
Plan 2



NOTES

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REV	ISSUE	DATE	DRN	CHK
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A	FOR INFORMATION	29.03.21	RS	KK

NORTH

SCALE 1:500@A1 | 1:1000@A3

0 5 10 15 20 25m

PROJECT

FRASER PRIMARY SCHOOL
TREE ASSESSMENT

PROJECT No.	SHEET	ISSUE
1658	103	B

TREE ASSESSMENT
Plan 3

Tree Number	Species	Height (m)	Trunk circumference (mm)	Tree canopy (dia)	Number of Trunks	General Tree Health (D,P,F,G,E)	Structural defects/ Decay (Y/N)	Past Damage or Disturbance (Y,N)	Disease/ Infestation (Y/N)	Tree Quality (E,H,M,L)	Regulated Tree (REGU) or TCCS Tree (TCCS)	Comments
1	*Fraxinus oxycarpa* 'Raywood'	5	700	4	3	F	N	N	N	L	TCCS	
2	*Fraxinus oxycarpa* 'Raywood'	5	600	4	1	F	N	N	N	L	TCCS	
3	*Fraxinus oxycarpa* 'Raywood'	10	1000	9	1	F	N	N	N	L	TCCS	Large dead branches
4	*Fraxinus oxycarpa* 'Raywood'	6	600	5	1	G	N	N	N	M	TCCS	
5	*Fraxinus oxycarpa* 'Raywood'	5	600	4	1	F	N	N	N	L	TCCS	
6	*Fraxinus oxycarpa* 'Raywood'	6	700	5	1	G	N	N	N	L	TCCS	Small scar at 1.5m
7	*Fraxinus oxycarpa* 'Raywood'	5	600	4	1	G	N	N	N	L	TCCS	
8	*Fraxinus oxycarpa* 'Raywood'	5	600	4	1	G	N	N	N	L	TCCS	
9	*Fraxinus oxycarpa* 'Raywood'	5	800	5	1	G	N	N	N	L	TCCS	
10	*Fraxinus oxycarpa* 'Raywood'	4	600	4	1	G	N	N	N	L	TCCS	Scar 1.3 - 1.5m
11	*Fraxinus oxycarpa* 'Raywood'	4	500	4	1	G	N	N	N	L	TCCS	
12	*Fraxinus oxycarpa* 'Raywood'	4	500	4	1	G	N	N	N	L	TCCS	
13	*Fraxinus oxycarpa* 'Raywood'	10	1100	8	1	G	N	N	N	L	TCCS	
14	*Fraxinus oxycarpa* 'Raywood'	8	900	10	1	G	N	N	N	L	TCCS	
15	*Fraxinus oxycarpa* 'Raywood'	9	900	7	1	G	N	N	N	L	TCCS	
16	*Fraxinus oxycarpa* 'Raywood'	6	900	8	1	P	N	N	N	L	TCCS	
17	*Fraxinus oxycarpa* 'Raywood'	6	900	6	1	G	N	N	N	L	TCCS	
18	*Fraxinus oxycarpa* 'Raywood'	4	600	2	1	F	N	N	N	L	TCCS	
19	*Eucalyptus viridis*	8	1000	9	1	P	Y	N	N	L	TCCS	Dying
20	*Eucalyptus melliodora*	13	1300	11	1	G	N	N	N	M	TCCS	Poor union
21	*Eucalyptus melliodora*	13	1100	11	1	G	N	N	N	M	TCCS	
22	*Eucalyptus bicostata*	23	2400	13	1	G	Y	N	N	H	REGU	Active hollow at 5m
23	*Eucalyptus bicostata*	15	1300	10	1	F	N	N	N	M	TCCS	
24	*Eucalyptus maidenii*	15	2800	14	1	F	Y	N	N	L	TCCS	Poor union at 1.4m
25	*Eucalyptus polyanthemos*	8	1000	4	2	P	N	N	N	L	TCCS	
26	*Casuarina cunninghamiana*	8	700	5	1	F	N	N	N	M	TCCS	
27	*Eucalyptus polyanthemos*	11	1900	13	1	G	N	N	N	M	TCCS	
28	*Casuarina cunninghamiana*	5	4000	4	1	F	N	N	N	P	TCCS	
29	*Eucalyptus polyanthemos*	12	1000	9	1	G	N	N	N	M	TCCS	
30	*Casuarina cunninghamiana*	8	800	6	1	G	N	N	N	M	TCCS	
31	*Eucalyptus polyanthemos*	9	1000	7	1	G	N	N	N	M	TCCS	
32	*Casuarina cunninghamiana*	10	800	8	1	G	N	N	N	M	TCCS	
33	*Eucalyptus mannifera*	12	2100	9	1	P	Y	N	N	L	TCCS	Fungal fruiting bodies in rot at 1-2m
34-38	Refer Group O										*	
39	*Eucalyptus mannifera*	7	1300	5	1	F	Y	N	N	L	*	Dieback
40	*Eucalyptus mannifera*	10	900	7	1	G	N	N	N	M	*	
41	*Eucalyptus mannifera*	11	900	8	1	G	N	N	N	M	*	
42	*Eucalyptus mannifera*	10	900	7	1	G	N	N	N	M	*	
43	*Eucalyptus mannifera*	10	1200	10	1	G	N	N	N	M	REGU	
44	*Eucalyptus mannifera*	8	1200	11	1	G	N	N	N	M	REGU	
45	*Eucalyptus mannifera*	5	1000	5	1	F	N	N	N	L	REGU	
46	*Eucalyptus mannifera*	8	1300	9	1	G	N	N	N	M	REGU	Bird box ties affecting tree
47	*Eucalyptus nicholii*	12	1900	9	1	F	N	N	N	L	REGU	A dangerous species
48	*Eucalyptus mannifera*	14	1300	8	1	G	N	N	N	M	REGU	
49	*Eucalyptus nicholii*	17	2400	13	1	G	N	N	N	M	REGU	A dangerous species
50	*Eucalyptus mannifera*	7	1300	9	1	G	N	N	N	M	REGU	
51	*Eucalyptus mannifera*	9	1100	7	1	G	N	N	N	M	REGU	
52	*Eucalyptus stellulata*	4	600	8	1	F	N	N	N	L		Poor form
53	*Casuarina cunninghamiana*	14	900	5	1	F	N	N	N	M	REGU	Low leafiness
54	*Casuarina cunninghamiana*	14	1000	7	1	F	N	N	N	M	REGU	Low leafiness
55	*Eucalyptus mannifera*	13	1700	11	1	G	N	N	N	M	REGU	
56	*Eucalyptus mannifera*	13	1300	9	1	G	N	N	N	M	REGU	
57	*Eucalyptus mannifera*	11	1100	6	1	G	N	N	N	M	REGU	
58	*Eucalyptus mannifera*	13	1600	9	1	G	N	N	N	M	REGU	
59	*Eucalyptus mannifera*	14	1000	5	1	G	N	N	N	M	REGU	
60	*Eucalyptus mannifera*	14	900	5	1	F	N	N	N	L	REGU	
61	*Eucalyptus mannifera*	14	1200	8	1	G	N	N	N	M	REGU	
62	*Eucalyptus mannifera*	14	1000	9	1	G	N	N	N	M	REGU	
63	*Eucalyptus mannifera*	14	1000	10	1	G	N	N	N	M	REGU	
64	*Eucalyptus mannifera*	6	900	8	1	G	N	N	N	M		
65	*Eucalyptus mannifera*	8	1000	7	1	G	N	N	N	M	REGU	
66	*Eucalyptus maidenii*	18	1900	12	1	G	Y	N	N	M	REGU	Poor union at 6m, active hollow REMOVE as a safety hazard in this situation
67	*Eucalyptus mannifera*	12	1400	10	1	G	N	N	N	M	REGU	
68	*Eucalyptus mannifera*	13	2200	16	1	G	N	N	N	M	REGU	
69	*Eucalyptus cinerea*	9	1100	7	1	F	N	N	N	M	REGU	
70	*Eucalyptus cinerea*	5	600	4	1	F	N	N	N	L	REGU	
71	*Eucalyptus bicostata*	9	1100	7	1	G	N	N	N	M	REGU	
72	*Eucalyptus nicholii*	11	1100	9	1	F	N	N	N	M	REGU	A dangerous species, asymmetrical canopy
73	*Eucalyptus maidenii*	16	2300	15	1	F	Y	N	N	L	*	Poor union at 1.6m, leaning
74	*Eucalyptus maidenii*	17	2100	11	1	F	Y	N	N	L	REGU	Poor union at 2m
75	*Eucalyptus maidenii*	10	1600	13	1	G	N	N	N	M	*	
76	*Callistemon citrinus*	4	300	2	1	F	N	N	N	L	REGU	
77	*Eucalyptus nicholii*	5	800	4	1	F	N	N	N	L	REGU	A dangerous species
78	*Eucalyptus maidenii*	15	1700	16	1	G	N	N	N	M	*	
79	*Eucalyptus cinerea*	12	1000	7	1	G	N	N	N	M	*	
80	*Eucalyptus mannifera*	12	1700	12	1	G	N	N	N	M	REGU	
81	*Pistacia chinensis*	5	1200	5	1	G	N	N	N	M	REGU	
82	*Pistacia chinensis*	5	900	5	1	G	N	N	N	M		
83	*Gleditsia triacanthos*	5	800	7	1	G	N	N	N	M	*	
84	*Eucalyptus maidenii*	14	1800	11	1	G	N	N	N	M	*	

NOTES

No survey provided, all tree located by aerial imagery. Exact location to be confirmed / verified by survey.

* Status of Regulated / TCCS trees to be confirmed by survey due to uncertainty of boundary location

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BUSH FIRE: NGH
PLANNER: WSP

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ACT Government
Environment, Planning and Sustainable Development

REV	ISSUE	DATE	DRN	CHK
B	FINAL ISSUE	07.06.21	HR	KK
A	FOR INFORMATION	30.03.21	RS	KK

NORTH

SCALE 1:500@A1 | 1:1000@A3

0 5 10 15 20 25m

PROJECT

FRASER PRIMARY SCHOOL
TREE ASSESSMENT

PROJECT No.	SHEET	ISSUE
1658	104	B

TREE ASSESSMENT
Schedule 1

Tree Number	Species	Height (m)	Trunk circumference (mm)	Tree canopy (dia)	Number of Trunks	General Tree Health (D,P,F,G,E)	Structural defects/ Decay (Y/N)	Past Damage or Disturbance (Y,N)	Disease/ Infestation (Y/N)	Tree Quality (E,H,M,L)	Regulated Tree or TCCS Tree (open space or verge)	Comments
85	*Fraxinus oxycarpa* 'Raywood'	5	1300	4	3	G	N	N	N	M	REGU	
86	*Fraxinus oxycarpa* 'Raywood'	6	1100	11	1	G	N	N	N	M	REGU	
87	*Fraxinus oxycarpa* 'Raywood'	5	900	8	1	F	N	N	N	L	REGU	Low leafiness
88	*Fraxinus oxycarpa* 'Raywood'	12	1900	16	1	G	N	N	N	M	REGU	
89	*Fraxinus oxycarpa* 'Raywood'	6	1000	4	1	F	N	N	N	L	REGU	
90	*Fraxinus oxycarpa* 'Raywood'	8	1000	7	1	F	N	N	N	L	REGU	Low leafiness
91	*Fraxinus oxycarpa* 'Raywood'	4	600	4	1	F	N	N	N	L		Poor form
92	*Gleditsia triacanthos*	4	500	3	1	F	N	N	N	L		
93	*Gleditsia triacanthos*	4	500	3	1	F	N	N	N	L		
94	*Fraxinus excelsior*	4	600	7	1	G	N	N	N	M		
95	*Fraxinus oxycarpa* 'Raywood'	4	400	4	1	G	N	N	N	M		
96	*Fraxinus oxycarpa* 'Raywood'	4	400	3	1	G	N	N	N	M		
97	*Fraxinus oxycarpa* 'Raywood'	5	600	4	2	G	N	N	N	M		
98	*Eucalyptus sideroxylon*	5	600	2	1	G	N	N	N	M		
99	*Eucalyptus mannifera*	13	1500	9	1	G	N	N	N	M	REGU	
100	*Eucalyptus nicholii*	13	1200	8	1	P	N	N	Y	L	REGU	A dangerous species
101	*Eucalyptus nicholii*	13	1200	11	1	F	N	N	N	L	REGU	A dangerous species
102	*Eucalyptus nicholii*	13	1100	9	1	F	N	N	N	L	REGU	A dangerous species
103	*Eucalyptus nicholii*	9	1000	10	1	F	N	N	N	L	REGU	A dangerous species
104	*Eucalyptus nicholii*	15	1700	12	1	F	N	N	N	L	REGU	A dangerous species
105	*Eucalyptus nicholii*	12	1700	10	1	F	N	N	N	L	REGU	A dangerous species
106	*Eucalyptus nicholii*	13	1600	11	1	F	N	N	N	L	REGU	A dangerous species
107	*Eucalyptus nicholii*	10	1100	10	1	F	N	N	N	L	REGU	A dangerous species
108	*Eucalyptus nicholii*	7	900	5	1	F	N	N	N	L		A dangerous species
109	*Eucalyptus nicholii*	12	1500	11	1	F	N	N	N	L	REGU	A dangerous species
110	*Eucalyptus nicholii*	13	1500	11	1	F	N	N	N	L	REGU	A dangerous species, mistletoe
111	*Eucalyptus nicholii*	14	1700	9	1	P	N	N	N	L	REGU	A dangerous species
112	*Eucalyptus nicholii*	9	900	3	1	F	N	N	N	L		A dangerous species
113	*Eucalyptus nicholii*	13	1400	11	1	F	N	N	N	L	REGU	A dangerous species
114	*Eucalyptus nicholii*	15	1400	7	1	F	N	N	N	L	REGU	A dangerous species, unstable
115	*Eucalyptus nicholii*	7	900	5	1	F	N	N	N	L	REGU	A dangerous species, leaning onto road
116	*Gleditsia triacanthos*	6	1100	7	1	G	N	N	N	M	REGU	Pollarded
117	*Gleditsia triacanthos*	6	1300	7	1	G	N	N	N	M	REGU	Pollarded

Tree Number	Species	Height (m)	Trunk circumference (mm)	Tree canopy (dia)	Number of Trunks	General Tree Health (D,P,F,G,E)	Structural defects/ Decay (Y/N)	Past Damage or Disturbance (Y,N)	Disease/ Infestation (Y/N)	Tree Quality (E,H,M,L)	Regulated Tree or TCCS Tree (open space or verge)	Comments
GA	*Mixed eucalypts*	12-14	1000-2000	6-10	1-2	G	Y	N	N	M	TCCS	13 trees, poor unions at base
GB	*Mixed eucalypts*	13-14	900-1100	5-7	1-2	F	Y	N	N	M	TCCS	15 trees, unsuitable species for this site
GC	Mixed eucalypts, No.1 *Acacia baileyana*	8-11	700-1200	5-9	1-2	F	Y	N	N	L	TCCS	10 trees, 1 dead tree
GD	Mixed eucalypts	7-19	800-2000	5-12	1-2	F-G	N	N	N	M	*	24 trees
GE	Mixed eucalypts	10-15	700-2300	3-11	1-3	G	N	N	N	M	*	45 trees
GF	Mixed eucalypts	25	1000-2800	7-20	1	G	N	N	N	H	*	9 trees
GG	Mixed eucalypts	8-17	500-2700	5-13	1-4	F	N	N	N	M	TCCS	51 trees
GH	Mixed eucalypts	9-17	500-2700	6-13	1-4	F	N	N	N	M	TCCS	48 trees
GI	Mixed eucalypts	8-15	500-2000	3-9	1-2	G	N	N	N	M	TCCS	34 trees
GJ	Mixed eucalypts	8-15	500-2000	3-9	1-3	G	N	N	N	H	TCCS	59 trees
GK	Mixed eucalypts	19	1000-2000	6-13	1	F	N	N	N	M	*	6 trees, 1 dead tree
GL	Mixed eucalypts	6-14	600-2200	4-8	1	F	N	N	N	M	*	17 trees
GM	Mixed eucalypts	6-11	600-1100	2-10	1	G	N	N	N	H	TCCS	34 trees
GN	Mixed eucalypts	7-11	600-1100	3-10	1	G	N	N	N	M	TCCS	41 trees

NOTES

No survey provided, all tree located by aerial imagery. Exact location to be confirmed / verified by survey.

* Status of Regulated / TCCS trees to be confirmed by survey due to uncertainty of boundary location

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ACT Government
Environment, Planning and Sustainable Development

REV	ISSUE	DATE	DRN	CHK
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NORTH

SCALE 1:500@A1 | 1:1000@A3

0 5 10 15 20 25m

PROJECT

FRASER PRIMARY SCHOOL
TREE ASSESSMENT

PROJECT No.	SHEET	ISSUE
1658	105	B

TREE ASSESSMENT
Schedule 2

[redacted]

16th June, 2021

ATTENTION:
MINISTER YVETTE BERRY
DAVID MATTHEWS -EXECUTIVE OFFICER

[redacted] we are writing to you to on behalf of parents at Fraser Primary School about an issue relating to access, health and safety.

The Directorates 'Future of Education' notes that 'the number of Canberra public school students increases by about 3% each year, and the government continues to plan strategically for this growth'. Fraser Primary poses a challenge to this in terms of the exponential growth that far exceeds the Directorates anticipated overall percentage increase.

Over the past 4 years, our school was a recipient of three demountable buildings, one to replace an old preschool demountable and a further two required to respond to the rapid growth over the past 5 years of approximately 30% in student numbers, an issue well known within the Directorate. These demountables have supported the temporary placement of approximately 80 Year 2 students.

[redacted]

As we understand the issue, the growth at Fraser is well-known within the Directorate, with expected growth rates being regularly raised by the School Executive. The ongoing growth is also recognised within the school community and accommodation of this growth is a matter of increasing interest and concern.

The strong growth of students has been achieved entirely within the Fraser catchment, and with forecast developments and increased infill and densification, growth will continue so there is a real need for building solutions that serve the school now and into the future, to enhance the wellbeing of students and support the social fabric within our community.

We understand that the long-term plan for the school is to extend the fence on the north-western side of the school and add permanent structures. [redacted] Consultation of the aerial view of the school reveals that the children are already running out of green spaces with every new building that is added within the current boundary and it would be welcomed by the school community if this planned extension of the school grounds could be brought forward as early as practicable.

[redacted]

Thank you for your consideration of this important matter. If you would like any further information or clarification, please contact [redacted]

SINCERELY,

[redacted]

ACT GOVERNMENT | EDUCATION DIRECTORATE

JULY 2021

FRASER PRIMARY SCHOOL

PLANNING REPORT

wsp

Question today
Imagine tomorrow
Create for the future

Fraser Primary School
Planning Report

ACT Government | Education Directorate

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wsp com

REV	DATE	DETAILS
A	05 May 2021	Structure issue
B	16 June 2021	Draft report

	NAME	DATE	SIGNATURE
Prepared by:	[redacted]	16 June 2021	
Reviewed by:	[redacted]		
Approved by:			

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Fraser Primary School is a thriving government school with 85 Pre-School enrolments and 529 P-6 enrolments It is in the northwest of Belconnen at Block 2, Section 40, Fraser Its primary student catchment comprises the suburbs of Fraser, Charnwood, Dunlop and Flynn The school currently has a compact site area of 2 6 hectares Several Relocatable Learning Centres (RLCs, or transportables) have been incrementally incorporated into the school to keep pace with enrolment demand This has significantly reduced the overall recreation and outdoor learning and play space on school grounds While the school does have an oval located immediately to the south, access to the oval to this traverses a public pedestrian footpath meaning that students can only use this space under supervision by one or more teachers

The ACT Education Directorate is currently exploring the potential to replace RLCs with permanent classrooms, however this is a long-term solution which would take several years to implement and would require a larger site area to enable the school to continue to operate throughout the construction period. Ahead of any investment in permanent infrastructure, expansion of the school grounds will significantly improve the ability for the school to enable its students greater access to outdoor play space, as well to flexibly manage car parking to reduce the impact of school generated traffic on surrounding residents

The land affected by the proposed TPV comprises a portion of Block 6, Section 64, Fraser The portion of the Block is managed by TCCS and zoned NUZ3: Hills, ridges and buffer areas ("NUZ3") The balance of the Block is zoned either PRZ1: Urban Open Space or RZ1: Suburban Land zoned PRZ1 or R1Z does not form part of the proposed TPV The portion of the site affected by the proposed TPV contains scattered vegetation and lawn Under the current planning framework, use of land for a community facility (such as an education centre and/or health facility) is prohibited under the NUZ3 Alternative uses for the land in question under the current framework are therefore limited

Strategically, the provision of land for community facilities within the ACT is a priority This is articulated in the Future of Education Strategy (2018) ("the Strategy") and Strategic Plan 2018-2021 ("the Plan") They outline the Government's education strategy for 2018-2028 and Directorate's strategic framework in key areas The Strategy establishes a policy direction that informs a range of future initiatives and projects The Strategy has a principle of access:

> *"Supports for learning and wellbeing are available and provided to all students"*

Adequate school capacity and facilities in our communities are critical to ensuring all children have reasonable access to learning as the population grows The area identified under this proposal for an expansion of the area available for students at Fraser primary school will support the Government's and Directorate's strategic objectives Building on the above, the Plan includes targeted recommendations to place students at the centre of their learning, empower education professionals, create stronger learning communities and strengthen equity and quality in education The Plan includes a number of strategic goals, including ensuring schools are where students enjoy and thrive in learning The Plan identifies delivering schools for growing communities as a key action The expansion of the Fraser Primary School site will assist in making progress to deliver against this action

As a result of the above, the proposal to rezone the land from NUZ3 to CF: Community Facilities has been conceived The effect of the proposed TPV would:

- Rezone part of Block 6 Section 64 Fraser from NUZ3: Hills, ridges and buffer areas to CF: Community Facilities; and
- Amend the Fraser Precinct Code by extending the PD1 Map to include the subject land and Table 1 Prohibited Uses
- Custodianship of the land affected by the proposed TPV would also be transferred from TCCS to the Education Directorate

A request to rezone the land is required in order to facilitate the use of land for a community facility (including education centre and/or health facility) as the use of land for a community facility is prohibited on land zoned NUZ3 Therefore, an expansion of the existing Fraser Primary School beyond its physical boundaries is not feasible under the existing planning framework

Commented [WS1]: Alternative use, for example TBC with client extent of discussion of alternative uses based on outcome of meeting on Monday

As part of the due diligence phase, consultation with identified stakeholders has been undertaken Where relevant their views have been incorporated into the findings and recommendations of this report

Commented [WS2]: WSP engagement strategy dated Mar 21 provided to client Mar 21 and again Jul 21 for review/settlement

This report has been prepared in accordance with the *Scope for Planning Report* issued on the 18th of December 2020 by the Environment, Planning and Sustainable Development Directorate ("EPSDD") It includes a detailed assessment of the study area's physical features, natural features and values, and social and cultural impacts Critically, as no buildings and/or works are proposed as part of this request to rezone the land , urban design, master planning and built form considerations will be determined via a separate development application process

Commented [WS3]: Option under consideration by Education Directorate Construction of fence and/or masterplan process

It is considered that the proposed change to the Territory Plan would result in a net positive outcome for the ACT Further, that the subject land is both suitable and capable of supporting the use of land for either an education or health facility It is considered that the proposal is well resolved and will assist with the Fraser Primary School's development of permanent facilities for existing student population It will also assist with the accommodation of future growth of the school in response to population and/or demographic change (as required)

1 DESCRIPTION OF THE PROPOSED PLAN VARIATION

1.1 PROPONENT AND LESSEE DETAILS

The ACT Government Education Directorate (Education) is seeking to rezone part of Block 6 Section 64 Fraser to enable the expansion of Fraser Primary School The existing Fraser Primary School is located to the south of the portion of Block 6, Section 64 Fraser as per the below

Figure X: Existing Fraser Primary School and (approx) part of Block 6 Section 64, Fraser subject to proposed TPV (Source: Google Earth)

Commented [WS4]: Request for client – Image based on survey depicting portion of Block 6, Section 64, Fraser proposed for re-zoning Should be exact

Land forming part of the study area is currently under the custodianship of Transport Canberra and City Services ("TCCS") and comprises unleased territory land

Figure X: Custodianship map (Source: ACTmapi) Block 64, Section 6, Fraser under custodianship of TCCS

1.2 CONSULTANT AUTHORISATIONS

Consultant authorisations Declarations of compliance with any nominated standards (e g WCAG 2 0)

Commented [WS5]: To be confirmed by client

1.3 DECLARATION OF COMPLIANCE

To be confirmed by client

Commented [WS6]: To be confirmed by client

1.4 SITE LOCATION AND CHARACTERISTICS

The proposed TPV affects a portion of Block 6, Section 64, Fraser For the avoidance of doubt, when references to "the subject land" are made throughout this report, they relate only to that portion of Block 6, Section 64, Fraser affected by the proposed TPV and identified at Figure X

The subject land contains grasslands and is located to the east of the existing Fraser Primary School site

Topographically, the land is gently sloping to the north-west

Beyond the subject land to the east there are patches of significant vegetation and the residential hinterland of Fraser The vegetation is located within a 35-metre buffer to the established residential hinterland

To the west of the subject land, the surface is undulating due to stockpiled material from when Fraser was established in the 1970's This portion of the site also contains some significant trees, none of which are remnant The west of the school site also contains an overland stormwater flow grassed swale draining to Halls Creek in the north, and major sewer infrastructure below ground

To the south west of the subject land is the Fraser Oval and a walking/cycling trail

Figure 1.1 Area of Block 6, Section 64, Fraser affected by proposed TPV

Commented [WS7]: Image based on survey to be requested by WSP from client as per above imagery/notes

Current enrolment for the Fraser Primary School consists of 529 K-6 places and 85 Pre-School places This report has been prepared on an assumed expansion of 271 places to 800 K-6 places with no change to Pre-School places

The school has been developed with a series of educational buildings, outdoor play spaces (including sports courts and gardens/seating areas), maintenance outbuildings, landscaping and car parking Built form is typically single/double storey construction Buildings are set amongst mature vegetation (including trees) and low scale garden beds/planting

Car parking on site consists of:

- 77 car park spaces;
- Two (2) disabled car park spaces; and
- One (1) bus stop

The school's bus stop is located within the school's main entrance driveway, parallel adjacent to Tillyard Drive

Figure X: Existing parking on site (Source: Page 6, INDESCO Transport Impact Assessment)

Tillyard Drive provides a single carriageway, an on-road cycling route and is bounded by kerb and channel 'School Zone' speed restrictions are in place in proximity of the subject land (i e along Tillyard Drive and Shakespeare Crescent) 16 on-street 'pick u'/drop off' kerbside parking spaces are located on the western side of Tillyard Drive There are two bus stops on Tillyard Drive within 200 metres of the Fraser Primary School

Pedestrian connectivity to the existing primary school is provided via an underpass crossing on Tillyard Drive to the south of the subject land and a children's crossing on Shakespeare Crescent to the north of the subject land and nature reserve The two pedestrian connections are joined by a share path (pedestrian and cycle facilities) that runs adjacent to the school's south western boundary

Figure X: Existing pedestrian connectivity (Source: Page 5, INDESCO Transport Impact Assessment)

Community

The Priority Enrolment Area (PEA) of the Fraser Primary School encompasses the areas highlighted in yellow below and captures the following:

- Charnwood – except south of Bettington Circuit, south of Bloxham Street and continuing from the corner of Kerrigan and Dunnett Streets;
- Dunlop – north of Kerrigan Street; and
- Fraser

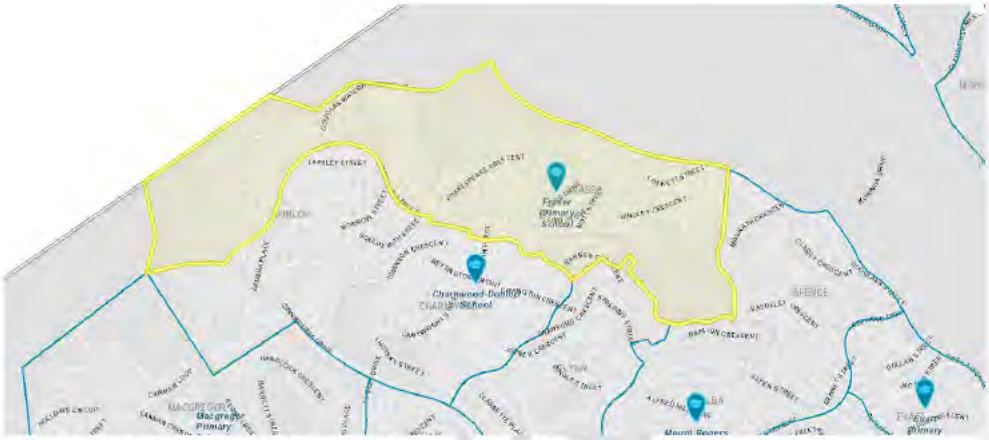

Figure X: Priority Enrolment Areas (PEA) Map (Source: ACTmapi)

ABS Statistics for those areas? Community profile?

Commented [WS8]: Client comment welcome on demographics

Community Facilities

The Fraser Primary School is proximate to the following community facilities:

- Bus services (R42, R41) that run along Tillyard Drive and Shakespeare Crescent
- Fraser Oval located to the south of the existing Fraser Primary School
- Fraser Oval Playground located to the south west of the subject land and north west of the existing Fraser Primary School;
- Local retail/commercial facilities located to the south of the site along Daley Crescent;
- Mount Rogers Reserve (and associated local trail network through Fraser and surrounds);
- Mag Place Playground;
- North Dunlop Playground;
- Dunlop Grasslands Nature Reserve; and
- Spence Oval and local shops/retail and commercial facilities (amongst others)

Figure X: Public Transport Network relative to subject land (Source: INDESCO Transport Impact Assessment)

1.5 LAND TENURE AND ADMINISTRATIVE RESPONSIBILITIES

1.6 PROPOSED DEVELOPMENT

No physical works are proposed as part of the TPV

It is proposed to rezone the land to enable an education and/or health facility use, and transfer custodianship of the land to the Education Directorate Urban design, master planning, built form and landscaping (amongst other considerations) will be resolved via a development application process for future buildings and works

- Client outstanding queries:
  - Proposed masterplan;
  - Copy of site plan/masterplan;
  - Copy of survey?
  - DA component proposed as part of TPV process?
    - Construction of fence (understand likely)
    - Construction of school building(s) (understand unlikely)

1.7 PROPOSED VARIATION

The following section outlines the existing planning framework, and the proposed territory plan variation

The study area is currently zoned NUZ3: Hills, Ridges and Buffer Areas The balance of Block 6, Section 64 is zoned a combination of NUZ3, PRZ1: Public Open Space and RZ1: Suburban The existing Fraser School site (although it is noted that the zone boundary does not align with the fence boundary) is zoned CF: Community Facilities Zone

1.7.1 NUZ3: HILLS, RIDGE AND BUFFER AREAS

The NUZ3 zoned seeks to:

a) *Conserve the environmental integrity of the hill system as a visual backdrop and a unified landscape setting for Canberra*

b) *Provide opportunities for appropriate recreational uses*

c) *Conserve the significant cultural and natural heritage resources and a diversity of natural habitats and wildlife corridors*

d) *Provide predominantly open buffer spaces for the visual separation of towns and to provide residents with easy access to hills, ridges and buffer areas and associated recreation facilities*

e) *Provide opportunities for appropriate environmental education and scientific research activities*

Figure X: Zone Map (Existing) Source: ACTmapi, Territory Plan

Commented [WS9]: Exact location of portion of Block 6, Section 64, Fraser affected by TPV to be identified by client based on survey Then used to update all maps/figures

'Community Use' which includes an 'educational establishment' are listed as 'Prohibited Development' pursuant to the NUZ3 Therefore, it is not possible to pursue an expansion of the existing educational facility (or a health facility for example) under the current framework

It is not necessary to assess the suitability of a proposal for an education facility against the Non-Urban Zones Development Code ("NUZDC") as the use is prohibited under the NUZ3

1.7.2 CFZ - COMMUNITY FACILITY ZONE

It is proposed to rezone the land to the CFZ The CFZ contains the following Zone Objectives:

a) *To facilitate social sustainability and inclusion through providing accessible sites for key government and non-government facilities and services for individuals, families, and communities.*

b) *To provide accessible sites for civic life and allow community organisations to meet the needs of the Territory's various forms of community.*

c) *To protect these social and community uses from competition from other uses.*

d) *To enable the efficient use of land through facilitating the co-location, and multi-use of community facilities, generally near public transport routes and convenience services appropriate to the use.*

e) *To encourage adaptable and affordable housing for persons in need of residential support or care.*

f) *To safeguard the amenity of surrounding residential areas against unacceptable adverse impacts including from traffic, parking, noise or loss of privacy.*

g) *Promote active living and active travel*

h) *Provide safe pedestrian and cycling access to community facilities to promote active living.*

Pursuant to the CFZ an educational establishment and health facility would trigger the Minimum Assessment Track – Merit development application process The CFZ enables a suite of other uses via the Merit Track process including (but not limited to) cultural facility, emergency services facility, indoor recreation facility, parkland and residential care accommodation

1.7.3 COMMUNITY FACILITIES DEVELOPMENT CODE

An application for buildings and works associated with an education facility and/or health facility will be subject to the Community Facilities Development Code ("CFDC") Notably, the realigned school boundary would be set back 30 metres from the existing residential hinterland This would ensure that any future development application would continue to meet R8 (minimum setback of 6 metres) and C8 (criteria-based assessment of setbacks) of the CFDC

No amendments to the Code are proposed in relation to the proposed request to rezone part of Block 6 Section 64, Fraser

Regarding the proposed construction of a fence around the boundary of the subject land, it is noted that the fencing would be constructed of XXXX This is consistent with XXXX

Commented [WS10]: Client to advise buildings/works proposed Report to be amended as required to accommodate built form considerations

1.7.4 OVERLAYS

Block 6, Section 64, Fraser is affected by the PC: Nature Reserve and PUBLAN: Public Land overlay

It is proposed to remove those overlays from the subject land as part of the proposed TPV as they are not applicable to land set aside for community use (including educational and health facilities) They would be retained on the balance of Block 6, Section 64, Fraser that is not affected by the proposed TPV

2 7 3 Fraser Precinct Map

The Fraser Precinct Map identifies that Additional prohibited development applies to Block 2 Section 40, Fraser (the existing Fraser Primary School Site) as follows:

Fraser Precinct Map (Source: Territory Plan 2008)

Table 1 – Additional prohibited development

Additional prohibited development		
Suburb precinct map label	**Zone**	**Development**
PD1	CFZ	*retirement village* *supportive housing*

Table 1 – Additional prohibited development Fraser Precinct Map (Source: Territory Plan 2008)

As noted at Section 1 7 2, the CFZ enables a suite of other uses via the Merit Track development application process In this case, the existing Fraser Precinct Map and Code prohibits development of a retirement village and supportive housing on the current Fraser Primary School site Therefore, an amendment to the Fraser Precinct Map is required to capture the new school boundary/site An amendment to the PD1 boundary will not alter the prohibited uses specified in Table 1

1.7.5 OTHER DEVELOPMENT CODES

No change to any other development codes are proposed as part of this TPV

Any proposal for an education and/or health facility will be subject to the Community and Recreation Facilities Location Guidelines General Code (amongst others)

The Parking and Vehicular Access General Code ("PVAGC") provides car parking requirements for new uses and extensions to existing uses The PVAGC specifies the following requirement for parking associated with a Pre-, Primary and High School:

- 0 8 spaces per 10 students
- 0 4 set-down/pick-up spaces per 10 students

Based on the rate noted above, car parking requirements for the assumed expansion area are as follows:

Table 12: Car Parking Assessment

Land Use	Type	Number / Size	Car parking Rate	Parking Requirement (space)
Community Facility Zone (Pre-school)	Regular (staff)	885 Students	0.8 Spaces/10 Students	71
	Set-down / Pick-up	885 Students	0.4 spaces/10 students	36
Total				**107**

Figure X: Car Parking Assessment (Source: Page 20, INDESCO Transport Impact Assessment)

INDESCO's report makes the following observations regarding car parking provision associated with any future expansion:

> *"Considering the 79 existing carparking spaces provided within the existing school area, no additional parking is required for the expansion area.*
>
> *Given the existing 16 set-down/pick-up parking spaces, 20 additional set-down/pick-up parking spaces are required to comply with the requirements of the Code.*
>
> *However, considering the existing set-down/pick-up parking demand during school peak periods, which is the cause of queue and congestion in the school driveway and Tillyard Drive, it is recommended to provide an additional set-down/pick-up parking allowance of 36 spaces along Tillyard Drive and Shakespeare Crescent"*[1].
>
> A minimum of 3 disabled parking spaces are required
>
> 3 motorcycle parking spaces are required within 200 metres of the site

Critically, this request for a TPV does not propose any physical works to the subject land or existing street network Any physical works associated with an expansion to the existing school will be subject to a separate development application Such an application would include an assessment of the design and siting of any new works and their integration with existing infrastructure

The Bicycle Parking General Code sets out the requirements for bicycle parking associated with particular uses For primary schools, the BPGC requires 1spaces per 200 students after the first 200 students and 1 student parking space per 15 students

Based on the above rate, bicycle parking requirements for the assumed expansion are as follows:

[1] Page 20, INDESCO, Transport Impact Assessment

Table 13: Bicycle Parking Assessment

Land Use	Number of Students	User Type	Bicycle Parking Rate	Bicycle Parking Requirement (space)
Primary School	885	Staff	1 space/200 students after first 200	4
		Students	1 space per 15 students	59
Total				**63**

Figure X: Bicycle Parking Assessment (Source: Page 21, INDESCO Transport Impact Assessment)

Critically, any new bicycle parking facilities associated with the assumed expansion will be subject to a separate development application The design, siting and integration of such facilities with the existing school and street network will be undertaken via a separate process

1.7.6 NATIONAL CAPTIAL PLAN

The study area is not affected by the Special Requirements under the National Capital Plan Therefore, no change to the NCP is required as part of the proposed TPV

1.7.7 TPV SUMMARY

The effect of the proposed TPV is described below in Table 1 1

Table 1.1 TPV Summary for part Block 6 Section 64 Fraser

CURRENT	PROPOSED
Zoning	
— NUZ3: Hills, ridges and buffer areas — PRZ1: Public open space (balance of Block not affected by proposed TPV) — RZ1: Suburban (balance of Block not affected by proposed TPV)	CF: Community Facilities
Overlay	
— Pc: Nature Reserve — PUBLAN: Public land	Removal of Pc: Nature Reserve and PUBLAN: Public Land overlays
Use	
— Public open space / parkland	School Health facility
Precinct Code	
Fraser Precinct Map	Extension of the PD1 Map to include Table 1 Prohibited Uses

2 JUSTIFICATION FOR THE PLANNING POLICY CHANGES

2.1 STRATEGIC NEED FOR THE TPV

The ACT Government has identified the provision of community facilities (including education facilities) to meet existing and future demand as a priority in the Future of Education Strategy, ACT Education Department Strategic Plan (2018-2021), ACT Wellbeing Framework and the ACT Planning Strategy This driver is filtered through other government policies and initiatives The ACT Planning Strategy outlines the strategic direction for the city The strategy identifies possible future urban expansion within the Fraser Primary School catchment, on the blocks currently occupied by the CSIRO Ginninderra Field Station (i e the subject land)

Commented [WS11]: TBC with client

In response to the strategic demand identified for additional community facilities, the proposed TPV seeks to expand the current community facility site into Block 6 Section 64 Fraser This will enable the expansion of Fraser Primary School, which is currently over student capacity Ultimately, it is anticipated that any development of the expanded school site would include new classrooms, administration facilities, hall, play spaces and parking Options for the potential co-location of other community facilities (or other uses permitted under the CFZ) like healthcare are also likely to be explored At this stage, the exact development footprint and master plan for the study area/realigned boundary l has not been developed

More broadly, the additional land will also provide the potential for future reconfiguration of school buildings and improve the flow of students throughout the site

As a consequence of the proposed rezoning, further mechanical changes are required:

- The new site boundary will need to be established
- The existing PC: Nature Reserve and PUBLAN: Public Land overlays will be removed from that part of the study area affected by the proposal
- The land will need to be transferred into the custodianship of the Education Directorate
- The Fraser Precinct Map will need to be amended to include that component of the study area proposed for rezoning

2.2 COMMUNITY CONTEXT

Ensuring every Canberran has good access to community facilities and opportunities for social interaction is a key feature of liveable, inclusive and resilient communities Social infrastructure encompasses all the facilities, services and networks that help families, groups and communities to meet their social, health, education, cultural and community needs

In this case, the Fraser Primary School requires additional land for future play areas and relocation of portable classrooms currently on school grounds The 2021 enrolments are 85 preschool students and 529 kindergarten to year 6 (K-6) students which are accommodated within a school site of 2 6 hectares The school is looking to expand its site to better accommodate the current school population

The School Siting Guidelines requires that a primary school should have at least 4 0 – 4 5 hectares useable space This does not include constraints like slope and protected trees For the ACT Government Education Directorate to provide a functioning primary school site in Fraser that can accommodate current demand, the current school site available area would need to double in size

As noted at Section 3 1 any redevelopment application will be subject to a separate development application process At this stage, the exact development footprint and master plan for the school has not been developed, and will form part of a separate process

Assumed expansion in response to demographic change

Commented [WS12]: TBC with client – phrasing re demographic shifts

Existing capacity challenges regarding on-street car parking at pick-up/drop-off have been identified INDESCO observed that existing on-street 'pick up/drop off 'kerbside parking spaces do not meet current demand During traffic surveys the following conditions were observed:

- *"School driveway blocking due to parked vehicles.*
- *Vehicle queuing on Tillyard Drive before the school's entrance.*
- *Use of the shopping centre parking area in east of the Tillyard Drive as a pick-up area.*
- *Use of Shakespeare Crescent verge as a pick-up area"*[2].

As the existing school site is constrained by size, existing school buildings and car parking, and landscaping it is not considered practical to undertake additional car park works within the existing school grounds The proposal to rezone land to the north east of the school for a community use will directly respond to this issue It will facilitate a future development application for a community facility (such as an expansion of the Fraser Primary School) and associated on street infrastructure works (such as car parking)

2.3 ALTERNATIVES CONSIDERED

Commented [WS13]: Section to be developed in detail following confirmation from client regarding proposed buildings/works/masterplan

Prior to resolution of the proposed new boundary depicted at Figure XX, alternatives were considered The outcomes of preliminary investigations into alternatives are provided below

2.3.1 EXPANSION TO THE WEST

The Fraser School Expansion Preliminary Biodiversity Assessment prepared by WSP, identified habitat for the Superb Parrot It also contains primarily native vegetation (Eucalyptus) Given the presence of habitat for the Superb Parrot, it

[2] Page 6, Transport Impact Assessment, INDESCO

was determined not to pursue a boundary expansion to the west of the existing school

Figure X: Study area and preliminary results (Source: WSP Preliminary Biodiversity Assessment)

2.3.2 EXPANSION TO THE SOUTH

To the south of the existing school is a sports field and public pathway managed by TCCS The existing facilities are recognised as XXXX (particular category of resort and recreation space??? Under Rec Strategy??) Therefore, it was determined that expansion to the south would not be pursued

Commented [WS14]: Query for TCCS/client Classification of Fraser Oval

2.3.3 ALTERNATIVE USES WITHIN CFZ

As described at Section XX above, there are a suit of uses available pursuant to the CFZ which would attract a Merit Track DA process They are noted below and includes (but is not limited to):

- Cultural facility, emergency services facility, indoor recreation facility, parkland and residential care accommodation

Any application for an alternative use would be assessed on its merits This would include consideration of the site's physical and strategic context

2.3.4 ALTERNATIVE USE OF AREA PROPOSED FOR REZONING

Should the proposed TPV not be pursued, the land would remain in NUZ3 (Hills, Ridges and Buffer Zone) This zone seeks to, amongst other things *"Provide opportunities for appropriate recreational uses"* and *"provide predominantly open buffer spaces for the visual separation of towns…"*.

Community uses (including health facilities and educational facilities) are prohibited under this zone

In this case, the entirety of the study area appears to provide a 'buffer' The study area has been developed with lawn/grassed area and vegetation (including Superb Parrot habitat) that adjoins the existing Fraser Primary School It is considered that on balance, it is reasonable to rezone the portion of the study area in question for a community use as:

— A 'buffer' between the existing residential hinterland of Fraser and the Fraser Primary School would be retained in light of the proposed TPV given that a 30-metre zone setback from the nearest residentially zoned land is proposed;

- The portion of the study area proposed for rezoning is generally devoid of significant vegetation (two small groups of trees were identified at its periphery);
- The area of Block 6, Section 64 affected by this TPV represents a negligible amount of the total block area

3 STRATEGIC PLANNING POLICY CONTEXT

3.1 ACT STRATEGIC PLANNING CONTEXT

3.1.1 ACT PLANNING STRATEGY 2018

The ACT Planning Strategy 2018 provides the medium-term vision for the growth and development of Canberra with a particular emphasis on Canberra being a sustainable, competitive and equitable city To achieve this, it outlines 5 key themes for the development of Canberra:

- Compact and Efficient
- Diverse
- Sustainable and Resilient
- Liveable
- Accessible

These themes include a focus on making Canberra a great place to live and work, including from the development of social infrastructure, open spaces and public places to meet community needs and support strong communities

Several of the strategic directions under the Strategy are relevant to consideration of this proposal and are outlined below:

- 1 3 Use infrastructure efficiently to support our growing community
- 2 2 Enhance the diversity and resilience of our centres to meet the needs of the community, support economic viability and improved liveability
- 2 6 Protect and enhance infrastructure that supports the economic development of Canberra and the region
- 3 5 Protect biodiversity and enhance connectivity to improve landscape resilience
- 4 1 Deliver social infrastructure that meets community needs and supports strong communities
- 4 3 Strengthen neighbourhoods and support their diverse character by creating strong local activity hubs
- 5 1 Enhance accessibility by better integrating transport and land use

The proposed amendment to the Territory Plan responds to these objectives as it facilitates the provision of further zoned for purpose land which will deliver additional educational/health facilities to service the local community

3.1.2 ACT CLIMATE CHANGE STRATEGY 2019 – 25

The ACT Climate Change Strategy 2019-25 outlines actions to meet the 2025 emission reduction target of 50-60% and establishes a pathway for net zero emissions by 2045 Over the next 30 years there will be major changes to support a shift to net zero emissions, however significant change is still a way off therefore in the short-term stronger emphasis needs to be placed on our choices (e g active travel and/or public transportation)

Key initiatives under this Strategy include:

- 3 6 Expand and promote the Active Travel Office and schools-based active travel initiatives
- 5 12 Establish a pathway to zero emissions ACT Government schools supported by an interim emissions reduction plan to 2025

It is considered that the proposal to rezone part of Block XX to CFZ responds appropriately to this Strategy as:

- Increased local school capacity has been found to reduce private vehicle use (as it reduces the likelihood/need for car travel to/from schools);
- An increase in capacity of the existing school network will encouraged increased local enrolment and ease pressures on surrounding education facilities

3.1.3 CANBERRA'S LIVING INFRASTRUCTURE PLAN – PLANNING FOR THE FUTURE 2019

ACT Government Infrastructure Plan 2019 outlines the Government's blueprint for a $14 billion infrastructure investment in the growing needs of the community Since 2010, the number of students attending public schools has grown from around 39,000 to around 49,000 students (an increase of more than 26%) and consequently the infrastructure plan includes $2 1 billion of expenditure on new schools and expansion of existing schools The proposal to rezone land to accommodate an expansion to the Fraser Primary School directly responds to a priority of the Infrastructure Plan – that is to increase the capacity of existing schools

Undertaking planning for new and expanded schools will also progress other elements of the Infrastructure Plan, including an objective of a 30% tree canopy cover target for Canberra Tree cover in primary schools needs to be managed carefully to ensure trees remain safe for students Schools in the ACT undergo routine surveying and consultation with arborists to ensure safety is always maintained The school needs to balance the need to increase canopy cover and the costs of routine maintenance to ensure safety As detailed at Section XX of this report, a Tree Assessment has been prepared for the study area and no tree removal/impacts are proposed as part of this TPV

3.1.4 ACT TRANSPORT STRATEGY 2020

The ACT Transport Strategy 2020 recognises a need for continued investment in Canberra's strategic road network, cycling and walking network and public transport as well as light rail The strategy recognises that future transport in Canberra will feature more attractive, flexible travel options that increase choice, reduce carbon emissions and facilitate a compact, vibrant urban form

In this respect, ACT Education's standard planning documentation for schools projects allows for active travel infrastructure (e g bicycle storage facilities) to support sustainability, reduced private vehicle use, and multi-modal transport It is however noted that as a TPV proposal, no physical buildings/works are proposed as part of this proposal

3.1.5 MINISTERS STATEMENT OF PLANNING INTENT 2015

The 2015 Minister's Statement of Planning Intent outlines planning priorities for Canberra over the immediate, short and medium term up to five years

One of four priorities under the Statement is for the creation of sustainable, compact and liveable neighbourhoods with better transport choices The Statement highlighted a community desire for more inclusive neighbourhoods that deliver housing choice, community facilities, cater to all socio-demographic groups, and allow for ageing-in-place

This included the planning intent to:

- Create environments that are child- and age-friendly, support cycling and walking (active travel) and housing in proximity to recreation opportunities and services (active living)
- Planning should encourage greater take-up of public transport and active travel

Key actions identified in the Statement include to review the existing Territory Plan and planning framework, facilitate investment within local centres, promote active travel initiatives,

The proposed TPV to rezone for education and/or health use on (Part) Block 6 Section 64, Fraser, Fraser supports these intentions, by enabling the provision of additional education and/or health facilities

3.1.6 OTHER RELEVANT ACT GOVERNMENT STRATEGIES

4.1.6.1 The Future of Education Strategy (2018)

The Future of Education Strategy outlines the Government's education strategy for 2018-2028 The Strategy establishes a policy direction that informs a range of future initiatives and projects, rather than simply listing disjointed remedies The Strategy has a principle of access:

"Supports for learning and wellbeing are available and provided to all students".

Adequate school capacity and facilities in our communities is critical to ensuring all children have reasonable access to learning as the population grows New and expanded schools projects will support the Government's and Directorate's strategic objectives The proposed rezoning request directly responds to this consideration

4.1.6.2 Strategic Plan 2018-21 (ACT Education)

The Strategic Plan 2018-21 outlines the Directorate's strategic framework and key focus areas, including placing students at the centre of their learning, empowering education professionals, creating stronger learning communities and strengthening equity and quality in education The Plan includes a number of strategic goals, including ensuring schools are where students enjoy and thrive in learning The Plan identifies delivering schools for growing communities as a key action

Planning for new and expanded schools will assist in making progress to deliver against this action It will also support the Directorate to achieve goals contained in its Strategic Plan, which the propose TPV directly responds to

4.1.6.3 ACT Wellbeing Framework (2020)

The ACT Government is making Canberra and its communities more liveable The ACT Wellbeing Framework captures what is important to Canberra's communities As part of the Wellbeing Framework, twelve domains of wellbeing have been identified including:

- Access and connectivity – Getting to places and accessing services
- Education and life-long learning – Gaining skills and education needed at all stages of life

Planning and feasibility will progress projects closer to delivery stage, to provide increased school capacity and enable local access to school services New school projects will support enhanced learning for students and provide contemporary learning spaces

3.2 NATIONAL CAPITAL PLAN

The study area is not identified as an area subject to the Special Requirement Provisions of the National Capital Plan Therefore, the special requirements of the National Capital Plan pursuant to Section 12 of the Territory Plan are not applicable in this case

3.3 TERRITORY PLAN

The Territory Plan is a key document that guides planning and development in the ACT to provide the people of the ACT with an attractive, safe and efficient environment in which to live, work and play The Territory Plan is used to:

- Manage development in the ACT, particularly how land is used and what can be built
- Assess development applications
- Guide the development of new estates and the management of public land

3.3.1 STRATEGIC DIRECTIONS

The statement of strategic directions is a key component of the Territory Plan that sets out the principles for giving effect to the main object of the Territory Plan as required by the *Planning and Development Act 2007*.

The Statement includes the principles for sustainable development as well as the spatial planning and urban design principles that are intended to guide the more specific policy content of the Territory Plan Table X below provides a response on how the proposed TPV will be consistent with each principal

Table 3.1 Territory Plan Strategic Directions

ADD ALL TO ONETABLE>

STRATEGIC DIRECTION
General Principles 1 1 Planning processes and decisions will be focused on the combined achievement of economic vitality, community wellbeing, and environmental quality Broad community involvement will be a key element in the pursuit of sustainable development, as will complementary regional strategies and agreements 1 2 Matters of broader National Capital, metropolitan and regional significance will be carefully considered when formulating Territory Plan policies and when making decisions about development proposals and sequencing 1 3 Economic, social and environmental objectives will be pursued in a balanced and integrated way, having regard to both short-term and long-term factors, such that present needs can be met without prejudicing the welfare of future generations, and without serious or irreversible loss of life-supporting natural resources or damage to the environment 1 4 Wherever appropriate, the broader global and regional context and potential cumulative impacts of decisions will be taken into account Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for failing to prevent environmental degradation
Environmental Sustainability 1 5 Planning policies will seek to ensure the efficient use of all resources and to reduce consumption of non-renewable resources Waste minimisation, reuse and recycling will be encouraged, whilst energy-rating and conservation measures will be applied wherever appropriate, particularly in transport, subdivision planning, and building design and construction 1 6 The pattern of development is to reflect land capability constraints resulting from topography, soils, geotechnical factors, drainage, natural hazards, microclimate and the sensitivity of ecosystems Particular attention will be given to the need to conserve soil, water and vegetation; maintain biological diversity; safeguard important ecosystems and ecological processes; and provide and protect wildlife corridors 1 7 Land and water resources will be planned in accordance with the principles of integrated catchment management and water sensitive urban design Policies will seek to protect identified environmental values, whilst focusing on opportunities for multi-purpose use of resources Special attention is to be given to protecting sources of the Territory's water supply and to maintaining environmental flows in rivers and streams 1 8 Planning policies will provide for the sustainable management of rural areas, ensuring that rural lands nominated for future urban development or other purposes can be retained in productive use and properly managed for the time being Appropriate activities to reduce net greenhouse gas emissions will be encouraged 1 9 Urban expansion will be contained in order to minimise impacts on valuable natural and rural areas 1 10 Integrated land use and transport planning will seek to maximise accessibility and transport efficiency, prioritise active travel, reduce energy consumption, increase physical activity, support the preferred pattern of development, promote safety, safeguard environmental quality, and minimise greenhouse gas emissions 1 11 Policies for environmental planning and management will ensure amenity, minimise pollution, and protect public health and safety

Economic Sustainability
1 12 Planning policies will facilitate the widest possible range of commercial, retail, industrial, rural, tourism, and other forms of economic activity in order to promote new investment and a more diversified economy, to underpin employment growth, and to respond to changing economic opportunities
1 13 The characteristics of the city that contribute to economic growth: Canberra's role as the national capital and the seat of Federal Parliament; the ease of getting around the city; the safe and clean environment; and the vibrancy of centres as places of social, cultural and business exchange, will be enhanced
1 14 An adequate and diverse supply of industrial land will be maintained to facilitate both conventional and new forms of industry
1 15 Tourism will be fostered by permitting a variety of entertainment, leisure and accommodation facilities, including opportunities for ecotourism, in appropriate locations throughout the Territory
1 16 Sufficient land will be set aside for major communications, educational, scientific, or other activities requiring broadacre sites in appropriate locations outside urban areas
1 17 In planning future development and redevelopment, particular emphasis will be placed on cost-effective provision and management of existing and new infrastructure and services, taking into account whole-of-life and whole-of system costs, including the ecological footprint of proposed developments and activities
Social Sustainability
1 18 Provision will be made for a comprehensive range of readily accessible community, cultural, sporting and recreational facilities, distributed according to the varying needs of different localities and population groups In major centres and developing areas, sites will be safeguarded where necessary for particular community needs
1 18A Development is planned to promote active living through the following six principles:
a) providing connectivity between uses and activity nodes
b) preserving open space
c) encouraging mixed land use and density
d) ensuring public places are safe and attractive for all
e) providing supportive infrastructure that encourages regular physical activity
f) ensuring environments promote social inclusion, and are equitable and where practicable are accessible by all
1 19 A variety of open space types will be provided in each district or local area to meet the diverse recreational needs of residents and visitors, and to contribute to community health
1 20 Planning policies for community facilities and open space will encourage multiple use and flexible design to allow for changing needs
1 21 Provision of affordable, adaptable and special-needs housing will be promoted throughout the city, as well as modification or redevelopment of existing stock to meet emerging social needs
1 22 Urban development will be planned in a manner that promotes community vitality and safety, applying principles of crime prevention through environmental design Provision will also be made for emergency services infrastructure necessary to ensure a high standard of safety for residents and visitors
1 23 The needs of people with disabilities will be recognised in all facets of urban planning, particularly including the design and operation of transport and access systems and the assessment of development proposals
1 24 All new developments and re-developments will be planned with appropriate and segregated network facilities for pedestrians and cyclists; provision for accessible public transport; a legible and permeable hierarchy of roads; conveniently located commercial and community facilities; and a network of open spaces

1 25 Heritage and cultural values will be safeguarded, including in particular those of the Territory's Aboriginal peoples and those derived from both its rural history and urban development as the National Capital The distinctive qualities of residential areas and other places, as well as elements of community heritage, will also be recognised and their conservation promoted 1 26 Identified places of heritage significance will be protected in accordance with requirements for their conservation contained in the Heritage Register and any relevant heritage guidelines under the Heritage Act 2004 Special provisions are included in the Heritage Act for the recognition, registration and conservation of Aboriginal heritage
Urban Areas 2 1 Canberra will continue to develop as a series of discrete urban areas within a landscape setting of hills, ridges and other open spaces Each town will offer a diversity of housing types; the broadest possible range of employment opportunities; and convenient, linked access prioritising active travel to centres, community facilities and open space 2 2 Future residential settlement will be accommodated through development of greenfields areas, subject to detailed feasibility and suitability studies; some expansion of existing towns; and appropriate use of suitable vacant or underdeveloped sites 2 3 Commercial and retail activity will be concentrated in centres and other planned nodes of intensive activity that are well served by public transport to ensure an efficient pattern of development Primary emphasis will be placed on strengthening and enhancing existing and new centres and nodes, including improved urban design and encouragement of more mixed-use development 2 4 Planning policies will support revitalisation of the City Centre as the preeminent centre of governance, commerce and entertainment for the ACT and its region, while keeping the City Centre in appropriate balance with other town centres Within the City Centre, provision will also be made for a range of major community facilities and opportunities for high-density residential development 2 5 A wide range of housing types will be permitted in identified residential areas close to centres and major transport routes to increase choice; maximise opportunities for affordable housing; and secure some intensification of development consistent with maintaining residential amenity Outside of these areas, planning policies will protect the typically low density, garden city character of Canberra's suburban areas 2 6 Higher density development will be encouraged within and near major centres, and in other suitable locations that are well served by public transport 2 6A Development will provide suitable and well-designed supportive infrastructure that enhances the experience of the urban environment for people of all abilities and encourages and supports regular physical activity 2 7 Development will be planned to encourage use of public transport, walking and cycling, including commuter cycling Routes will be reserved for an enhanced inter-town public transport system Requirements for vehicle parking will be related to commercial needs and transport policy objectives 2 8 Industrial areas will be in locations accessible to suitable freight services, and where industrial activity is unlikely to have a significant adverse effect on the environment or the amenity of residential areas 2 9 A planned hierarchy of roads will be maintained in order to promote road safety, protect the amenity of residential and commercial areas, and facilitate the efficient movement of major traffic flows and heavy vehicles 2 10 Adequate provision of open space throughout the Territory will remain a high priority Open space will be planned and carefully maintained as an integrated, hierarchical system that provides for a diversity of sport and recreation activities, contributes to the legibility and character of urban development, is cost-effective to maintain, and assists in the effective management of stormwater
Non-urban Areas 2 11 Planning policies will protect the landscape and environmental qualities of the hills and ridges surrounding urban areas, the Murrumbidgee and other river corridors, the mountains and forests west of the Murrumbidgee River, and productive rural landscapes

2 12 Planning for non-urban and natural areas will also recognise the values of land for research, education, recreation and tourism purposes 2 13 Clearance zones will be established where necessary around major facilities to protect the operational efficiency of those facilities and to minimise adverse environmental impacts
Urban Design 2 14 Policies and procedures to promote high quality, creative design of development, urban spaces and landscape settings will be applied throughout the Territory, and innovation encouraged, in keeping with the spirit of the National Capital as an exemplar of best practice Particular care will be taken to ensure high-amenity, quality design outcomes within residential areas, heritage areas, major centres and activity nodes, and along principal approach routes The relationship between the public and private realms will also be emphasised in terms of the design quality of precincts and shared spaces, including spaces around buildings, as well as that of individual developments 2 15 Policies will acknowledge Canberra as the national capital and the symbolic heart of Australia and will seek to preserve the landscape features that give the national capital its character and setting; respect and reinforce the key elements of Walter Burley Griffin's formally adopted plan for Canberra within the proposed urban settlement pattern; enhance and strengthen approaches and backdrops to the city and its national institutions; conserve open space between urban areas as visual separation buffers consistent with the landscape setting; retain areas that are identified as the rural setting surrounding the city; and retain key vistas created by the landscape network within new settlement areas 2 16 Retention of Canberra's unique landscape setting, including the integration of natural and cultural elements that create its 'garden city' and 'bush capital' qualities, will be accorded the highest priority Special attention will be given to safeguarding visual amenity, protecting vegetation and other important features within the established urban landscape, and ensuring the high quality of environmental design in new developments or redevelopment 2 17 Advertisements and signs will be carefully controlled to maintain environmental amenity

The proposed TPV responds to the above referenced Strategic Directions as:

- It would rezone part of Block 6, Section 64, Fraser from NUZ3 to CFZ and thus provide additional land for education/health facilities to service the needs of the broader community;
- It would retain the Table of prohibited uses for PD1 (Fraser Primary School) expressed at the Fraser Precinct Map over the expanded school site;
- It would transfer custodianship of the land in question to the Education Directorate and in turn, retain the land for public purposes (i e education); and
- It would facilitate the provision of additional community uses (and future developments), including educational facilities and health facilities

3.3.2 *RELEVANT TERRITORY PLAN ZONES*

As described at Section XX the proposed TPV would have the effect of rezoning a portion of the NUZ3 land to CF This would enable the use of land for a community use (such as an educational facility or a health facility, amongst other uses

3.3.3 *RELEVANT TERRITORY PLAN CODES*

As described at Section XX, the proposed TPV would have the effect of removing the Pc: Nature Reserve and PUBLAN: Public Land overlays from that part of the study area affected by the proposal

3.4 OTHER RELEVANT PLANNING DOCUMENTS

3.5 OTHER STATUTORY PROCESSES

3.5.1 EPBCA REQUIREMENTS

TBC pending receipt of flora and fauna study

3.5.2 FUTURE DEVELOPMENT APPLICATIONS

TBC pending client internal meeting on Monday

3.5.3 OTHER ACT GOVERNMENT APPROVALS

TABLE?
Development application
TCCS?
Icon Water? ETC?

How long piece of string? Will depend on proposal TBC with client

4 PRELIMINARY CONSULTATION PROCESS

Community consultation with affected communities and interested members of the public about the proposal is required to be conducted in accordance with the ACT Community Engagement Guideline at: www.yoursay.act.gov.au/about/community-engagement

At a minimum, consultation should include holding at least one public engagement session that is widely advertised in print and electronic media. This part is to include a report on consultation that:

- *provides details of consultation undertaken e.g. notifications, formal presentations, sessions, number of attendees and copies of relevant correspondence;*
- *list of all issues raised in consultation, outcomes, etc; and*
- *responds to issues raised, including any changes to the proposal as a result of consultation*

4.1 APPROACH AND PROCESS

WSP prepared the Fraser Primary School Proposed Territory Plan Variation 'Proposed Community Engagement Strategy' (Draft, March 2021) The Strategy outlines the key project stakeholders and the engagement activities to be undertaken

Commented [WS15]: With client for review

4.2 SUMMARY OUTCOMES

5 IMPACT ASSESSMENT

5.1 PHYSICAL FEATURES, INFRASTRUCTRE AND BUILT FORM

5.1.1 TOPOGRAPHY, SOILS AND GEOLOGY, AND HYDROLOGY

No change to the study area's existing topography, soils and geology and hydrology is proposed as no physical works are proposed

The XXX report prepared by XXX, identifies XXXX

These matters will be duly considered as part of any development application for buildings/works associated with any community facility

5.1.2 ROADS, TRAFFIC AND CARPARKING

A Transport Impact Assessment Report has been prepared by INDESCO in support of the proposed territory plan variation It considers (amongst other things):

- Existing traffic impacts associated with the Fraser Primary School as a benchmark;
- Anticipated traffic impact associated with an assumed increase in student population from K-6 to 800 (from 529 K-6 students);
- Broader road network implications and detailed SIDRA intersection analysis for two intersections of Kerrigan street/Shakespeare Cr and Kerrigan/Tillyard Drive; and
- Car parking, bicycle parking, was ate management, motorcycle parking and pedestrian improvements associated with an expansion

The report concludes that:

- *"The assumed increase to 885 students for modelling purposes is expected to generate an additional 334 and 274 trips in AM and PM school peak hour respectively.*
- *Based on SIDRA simulation results, the development will have a negligible effect on intersections traffic performance and all nominated intersections will perform with the level of service A.*
- *The assumed increase to 885 students would have a parking requirement of 71 spaces; However, considering the 79 existing car parking spaces provided within the existing school area, no additional parking is required for the expansion area;*
- *The expanded school would have a motorcycle parking requirement of 3 spaces;*
- *Based on the ACTPLA Parking and Vehicular Access General Code, the assumed increase to 885 total students would have a pick-up parking requirement of 36 spaces; However, considering provision of 16 pick-up parking spaces within the existing school area, and observed set-down/pick-up parking demand during school peak hour, which is the cause of queue and congestion in the school driveway and Tillyard Drive, it is recommended to provide the maximum possible number of set-down/pick-up parking in Tillyard Drive. It is also recommended to allocate a part of Shakespeare Cresecent as set-down/pick-up parking.*
- *The school will have a total bicycle parking requirement of 4 spaces for staff and 59 spaces for students.*
- *The current school zone needs to be extended to the end of the school boundary on the north side of Tillyard Drive in future design.*

- *Public transport is not expected to be impacted significantly by the proposed expansion; However, in the future design, the school bus stop will need to be located away from crossings. One new school bus will be required as a part of the school expansion; and*
- *The final design of any new site access arrangements must allow for the trucks associated with service and loading on the subject site"*[3].

Essentially, the analysis concludes that the surrounding road network has capacity to support anticipated vehicle movements associated with an expansion to the school Matters of detailed design can otherwise be resolved via a separate development application for physical works – including on-street improvements, car parking improvements and alterations to traffic movement

EPSDD's request for a scoping document made reference to *"Consideration for the future of a bus layover and potentially a parking area e.g. for an oval on weekends as well as a Park and Ride nearby"*. The report prepared by INDESCO notes that provision for an additional school bus should be explored as part of any planned expansion. It is noted that any bus stop would need to be positioned an appropriate distance from school crossings, and be consistent with the ACT Traffic Management and Safety Guide

EPSDD Deed Management has reviewed the proposal recommended that consideration be given to:

- Demonstrations that utility services can adequately service an expanded school area This includes access for emergency vehicles and fire hydrant capacity etc
- Investigation into the road reserve of Shakespeare Crescent to support rezoning (including in relation to capacity and parking)
- Exploration of planning frameworks to control access/egress for any future school on land rezoned as part of the proposed TPV
- There is an existing 1050 dia SW line through the middle of the area servicing the surrounding residential area. Consideration of this existing asset should be given during detailed design of any expansion to the existing school.

It is considered that the above matters have been satisfactorily responded to as:

- The interests of emergency servicing authorities will be incorporated into any detailed design associated with a development application for an expansion of the existing school/development of a community facility;
- INDESCO reviewed the capacity of the surrounding road network and confirmed that it would not be adversely affected by an expansion of 271 students (total of 885 places);
- Section XXX of this TPV report describes the proposed planning framework It is not proposed to restrict access/egress points as part of the proposed rezoning request It is considered reasonable to resolve access/egress via a development application accompanied by a specific design response
- The presence of existing assetss (including 1050 dia SW line) is noted and will be considered by the design team during via a separate development application process

5.1.3 PUBLIC TRANSPORT

Section XX describes existing public transport services

No change to existing public transport facilities or services is proposed as part of the proposed TPV

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[3] Page 23, INDESCO, Transport Impact Assessment

5.1.4 ACTIVE TRAVEL

The subject land (and surrounding area) is well serviced by an established network of walking/cycling trails. It is also provided with convenient connections to the Fraser shops. Opportunities and constraints for increased active travel in the local area have been investigated as part of this rezoning request.

Given that the land proposed for rezoning is located to the north east of the existing school, it is considered some distance from existing pedestrian crossings. INDESCO has therefore recommended that the following improvement works be considered/refined as part of any future development application for an expansion of the school:

- *"A new Children's Crossing to be considered in Tillyard Drive in front of the expansion area.*
- *Upgrade the footpath in open space area to provide a 3 metre shared path for mixed pedestrian and bicycle usage.*
- *Construct a 3 metre shared path along Tillyard Drive in both sides from Daley Crescent South to Daley Crescent North intersection to provide shared path for mixed pedestrian and bicycle usage"*[4].

Figure X: Active Travel Improvements identified by INDESCO (Source: Page 22, INDESCO, Transport Impact Assessment)

The works identified will be subject to further detailed design considerations and discussions with relevant stakeholders, should a development application be pursued Essentially, the existing formalised shared path/network are proposed for retention as part of the rezoning request

As identified at Section XX, further traffic calming measures are likely to be required as part of any development application for the school's expansion – which may include elements such as 'School Zone' speed restrictions

[4] Page 22, INDESCO, Transport Impact Assessment

Any physical works proposed? Fence? Closure of any informal walking trail? How integrated with broader pedestrian network? Client to confirm Gate location in any new fence?

Commented [WS16]: Client to advise following meeting on Monday Physical works

5.1.5 UTILITY SERVICES

The proposed rezoning request will not result in any changes to physical infrastructure (sewerage, water, gas, electricity, stormwater and telecommunications)

Icon Water, Evoenergy and EPSDD's Infrastructure Planning Department have been approached for preliminary advice regarding the proposed rezoning request As part of a future development application process for redevelopment/subdivision, servicing considerations will need to be considered They include, but are not limited to the following:

- The presence of the existing DN150 sewer main that traverses part of Block 6 when developing detailed design for any future school buildings/works and associated infrastructure requirements
- Modelling to determine existing network capacity and any upgrades (including potential for a substation)
- Water and sewer capital contribution charges (as required/triggered)

It is considered that the proposed request for rezoning will not adversely affect the capacity or functionality of any existing servicing authority asset because no physical works are proposed

5.1.6 CONTAMINATION

The Environmental Protection Agency (EPA) has reviewed the proposal to rezone land adjacent to the existing school and advised prior to the commencement of the use (i e educational facility), an environmental assessment in accordance with the EPA Guidelines must be submitted to and endorsed by the EPA

A Contaminated Land Preliminary Assessment has been prepared by WSP The report notes that:

- A review of aerial photography shows historical land use of the site likely comprised grazing or agricultural cropland, recreational open space prior to the establishment of the Fraser Primary School in 1979;
- ACT EPA contaminated land records search indicated no registered contamination within the site;
- A limited number of environmental concern were identified at the site, including:
  - Minor quantities of uncontrolled fill adjacent to boundaries of the site;
  - Household rubbish/building materials and unidentified fibrous material near the north-east boundary of the site; and
  - Open grassed areas which have potentially undergone management associated within parks and open spaces and agricultural use, which may have included chemical control of pests/weeds
- On the basis of the above, the existing use (education facility) and review of historical information, there is a low likelihood for significant contamination impacts to be present at the site Given the changing land use from open space/grassland to an education facility, it is recommended that limited intrusive soil sampling be undertaken once specific development plans have been finalised (i e as part of a development application process)

Therefore, it is considered reasonable to rezone the land to Community Facilities Zone (CFZ), noting that any future development application would be subject to a requirement to undertake further detailed investigations, and subsequent endorsement by the EPA

5.1.7 BUSHFIRE PROTECTION

An Assessment of Bushfire Planning Considerations – Fraser School Expansion (March 2021) has been prepared for the study area by NGH Consulting As part of the study, an assessment of bush fire considerations has been conducted of the proposed areas of expansion and its surrounding landscape to identify the level of risk that the proposed development

may be exposed to The results of the assessment aim to guide and facilitate the master planning of the future school expansion, by identifying constraints that could influence layout options for the proposed development including applicable bushfire protection measures They ultimately aim to improve life safety, property protection, safety and access for emergency services and improve the resilience of a proposed development to bush fire attack

Given that the proposal is for the rezoning of land only, it is considered reasonable to manage the implementation of bushfire planning recommendations via a separate development application process for any new buildings/works on the subject land Such a process would occur after the gazettal of the proposed rezoning It would include the detailed consideration of mitigation measures such as access/egress, asset protection zones, landscaping, water supply, construction standards and emergency management

5.1.8 FLOODING

The subject land has not been identified within the ACT Government's GIS as a flood prone area Therefore, it is considered unlikely that the study area would be subject to adverse flood risk/impact

5.1.9 HAZARDOUS MATERIALS

The proposal to rezone part of the study area to CFZ would not result in an increased risk of storage or handling or hazardous materials on the site The proposed rezoning would facilitate the use of land for an education facility

5.1.10 BUILT FORM

No built form is proposed as part of the request to rezone the land via a Territory Plan variation The suitability of any built form will be subject to a separate development application process Any development application process will require resolution of key built form, design and siting, waste management, environmental and sustainable design, and massing considerations (amongst others)

EPSDD's Waste Management Department reviewed the proposed rezoning request and recommended reiteration of the 2019 Waste Code's requirement for forward-in and forward-out manoeuvres for waste collection vehicles, noting that truck reversing manoeuvres are not permitted in school zones Any future development will need to ensure compliance with the Waste Code via submission of a development application

The CMTEDD – Policy and Cabinet Division reviewed the proposed request to rezone the land and recommended inclusion of details to outline how future school buildings/facilities would achieve best practice sustainable design, including urban heat mitigation and green/living infrastructure In this respect, it is noted that future buildings/works will be subject to a development application process which includes a requirement to demonstrate consistency with the ACT Government's policies on environmental sustainable design (including the ACT Climate Change Strategy 2019-2025) and Canberra's Living Infrastructure Plan

Waste collection and storage to be undertaken in accordance with the Development Control Code for Best Practice Waste Management in the ACT 2019 Subject to a separate development application associated with any proposed expansion No change to existing waste management as part of the proposed TPV

5.1.11 AMENITY

With respect to the potential for adverse amenity impacts associated with noise, odour, light spill impacts and safety it is noted that as the proposal is for a rezoning request only, the risk of the above is negligible Noise, odour, light spill impacts and safety will be considered as part of any future development application

5.2 NATURAL FEATURES AND VALUES

5.2.1 FLORA AND FAUNA

Regarding flora and fauna, the Conservator Flora and Fauna has reviewed the proposed subject land (and surrounding area) and advised that early investigations indicate that an expansion by the school into the proposed area would be appropriate subject to investigation into the presence of Superb Parrots and their habitat within the subject land

A Preliminary Biodiversity Assessment has been prepared by WSP as part of the preliminary investigation into the proposed boundary realignment The study found that:

- *"The majority of the study area consists of grassland. Native amenity planting occurs along the north eastern boundary of the site. These trees are small and no hollows were recorded. These trees do however, provide habitat for common species of bird and a visual buffer to the residential development".*
- *"The majority of the study area is dominated by exotic vegetation, however, a small area of native dominated grassland occurs in the north west corner of the study area. Further to the north west, outside the study area is an unknown drainage line".*
- *The vegetation within the site was not consistent with any EPBC listed ecological community. Native dominated grassland, restricted to a north western corner of the study area, was consistent with low condition native pasture and was considered to be potential consistent with NC Act listed Natural Temperate Grassland".*
- *Superb Parrot. Habitat. This species was recorded outside the study area, adjacent to the existing school (including potential nesting hollow)".*

Early investigations explored the possibility of an expansion of the Fraser Primary School to the north/west (i e into the Superb Parrot habitat) However, as a result of the findings of the preliminary biodiversity assessment, the proposed boundary realignment was amended to remove the Superb Parrot habitat

As part of any buildings and works application following gazettal of the proposed TPV, a referral to the Conservator will be required This will enable provision of suitable landscaping within the school grounds, noting the presence of the Superb Parrot habitat adjacent to the site Such a process would also be likely to include mitigation measures as part of any Construction Environmental Management Plan ("CEMP") prepared to minimise potential impacts to nearby birds – such as timing construction activities and noise attenuation measures

Commented [WS17]: Determine planning pathway following confirmation from client as to whether any physical works proposed IE FENCE

5.2.2 TREES AND VEGETATION

Regarding vegetation management, the Conservator Flora and Fauna has reviewed the proposed subject land (and surrounding area) and advised that early investigations indicate that an expansion by the school into the proposed area would be appropriate subject to a Tree Assessment prepared under the Tree Protection Act Such an assessment would need to identify trees/vegetation that would require protection, noting that a likely condition of expansion would be that all remnant trees were retained

TCCS has reviewed the proposal and advised that there appears to be groups of trees present with aesthetic value, which would need to be assessed via a detailed Tree Assessment and as necessary, the recommendations of any Tree Management Plan

EPSDD's Strategic Planning Department has reviewed the proposal Given the presence of vegetation to the north, it recommended the exploration of a boundary realignment that would generally avoid the ultimate loss of vegetation determined to be of significance (by a Tree Assessment)

In response to the above considerations raised by the Conservator, TCCS and Strategic Planning, a Tree Assessment has been prepared by Redbox Design Group Landscape Architects for the entire study area The assessment concludes:

- Trees across the study area are predominantly Eucalyptus species, which is consistent with much of the planting within the Belconnen District The existing school play area appeared to be dominated by exotic deciduous species;
- Tree groups within the existing school site appear to have been generally planted throughout the 1970's;
- Collectively, the structure and canopy spread of tree groups provides an attractive arrangement for birdlife This is consistent with the findings of the Tree Assessment Report and Preliminary Biodiversity Assessment Report
- One group of medium value and one group of high value trees were present within that part of the study area proposed for rezoning

Importantly, any built form proposed for the part of the study area affected by the proposed TPV would be subject to a separate development application process As part of any development application process, vegetation impacts would be assessed/considered as appropriate It is considered reasonable to determine applicable tree protection measures during assessment of any future development application At this point, rezoning to enable the expansion of the existing Fraser School only is proposed

5.2.3 AIR SOIL AND WATER QUALITY

5.3 SOCIAL AND CULTURAL IMPACTS

5.3.1 COMMUNITIES OF INTEREST

The population and demographic of the Fraser School catchment is changing The Education Directorate (EDU) has identified the need to expand the site boundary of Fraser Primary School due to strong enrolment growth This has resulted in the need for Relocatable Learning Centres (transportables) which reduces the overall play space on school grounds A boundary expansion will enable relocation of school buildings and expansion of the playground area

ACT Health – Strategic Infrastructure has reviewed the proposal and recommended exploration of the potential to co-locate future health facilities/community centre within that part of the study area proposed for rezoning Given this, it is recommended in the Table of Proposed Uses, that 'health facility' and 'education facility' be included (see Section XX)

5.3.2 SOCIAL INFRASTRUCTURE

The proposed rezoning to facilitate an expansion of the Fraser Primary School will assist with the long-term sustainable growth of the school commensurate with population/demographic change in its catchment

The area of the proposed expansion is currently used for open grassland The area for the proposed expansion will not encroach into any space used for active resort and recreation Notably, the rezoning would not impede the function of the shared pedestrian/cyclist facilities proximate/adjacent to the existing Fraser Primary School and study area

Social infrastructure either - including community, shopping and recreation facilities

5.3.3 CHARACTER AND STREETSCAPE

As part of the proposal no built form is proposed and therefore, there would not be any streetscape change

Urban design and impacts to streetscape character and the surrounding urban environment will be assessed as part of any future development application and/or master planning process

TBC as development likely

Commented [WS18]: TBC with client Construction of fence likely

5.3.4 CULTURAL AND HERITAGE ENVIRONMENT

The EPSDD – Heritage Department advised that there are no recorded or registered heritage places or objects on the portion of the block affected by the proposed TPV However, a number of aboriginal places are located to the north of proposed boundary realignment (within Block 6, Section 64 Fraser) It is noted that they are located some distance from the proposed new boundary (and future developable area of the Fraser Primary School) Further, historical aerial imagery indicates that the area was subject to earthworks in the 1970s as part of earlier suburban development, which suggests that the area has low potential for unrecorded aboriginal places or objects

On this basis, the ACT Heritage Council advises that there are no heritage matters required to be addressed within the Planning Report for the proposed TPV

As part of any future construction activities and/or proposal to develop any structure(s) on the land subject to the rezoning, an Unexpected Finds Protocol should be developed Such a protocol would need to describe necessary steps to be taken should any Aboriginal place or objects be identified during construction works

5.3.5 ECONOMIC ENVIRONMENT

6 4 Conclusion

On the basis of the above the proposed rezoning would enable the provision of an expansion to Fraser School in such a way that would present an acceptable impact to physical features and infrastructure and the natural environment

6 CONCLUSIONS

Body Text

Table 6.1 <Title text>

HEADING	HEADING	HEADING

Source: Optional

SCHOOLS PLANNING, ACT EDUCATION

JUNE 2021

FRASER SCHOOL EXPANSION

PRELIMINARY BIODIVERSITY ASSESSMENT

wsp

Question today
Imagine tomorrow
Create for the future

Fraser School Expansion
Preliminary Biodiversity Assessment

Schools Planning, ACT Education

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REV	DATE	DETAILS
A	18/06/2021	Draft

	NAME	DATE	SIGNATURE
Prepared by:	[redacted]	18/06/2021	
Reviewed by:	[redacted]	18/06/2021	
Approved by:	[redacted]	18/06/2021	

WSP acknowledge the Ngunnawal people as the traditional custodians of the area. We acknowledge their ongoing connection to country and pay our respects to elders, past and present. WSP is committed to engaging with and honouring Aboriginal and Torres Strait Islander peoples' unique cultural and spiritual relationships to the land and waters.

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1 PROJECT BACKGROUND

The ACT Government Education Directorate (Education) is seeking to rezone part of Block 6 Section 64 Fraser to support a Territory Plan Variation that will enable the expansion of Fraser Primary School. Fraser Primary School is looking to expand the site to better accommodate the current schooling population. In order to provide a functioning primary school site in Fraser that can accommodate current demand, the school site area would need to double in size.

A preliminary biodiversity assessment is required to identify biodiversity constraints within the proposed school site (Figure 1.1).

The scope of works for this biodiversity assessment was to:

- describe and identify the biodiversity values of the site through desktop review and biodiversity field survey
- prepare a Preliminary Ecological Assessment Report to:
  - present the methods and results of the desktop assessment and biodiversity field survey
  - provide advice on the ecological constraints to the proposal to guide design and planning approval pathway.

Figure 1.1 Study area

2 METHODS

2.1 DESKTOP ASSESSMENT

The desktop assessment for this report involved a review of existing biodiversity information. The aim of this review was to identify the existing environment and associated threatened species or threatened ecological community information within a nominal search area of 10 km around the study area. The review involved use of the following information sources:

- ACT Threatened Species List
- ACTmapi – Significant Species, Vegetation Communities' and Registered Trees mapping tool
- Canberra Nature Map (10 km search area)
- Department of Agriculture, Water and the Environment Matters Search Tool (10 km search area)
- Atlas of Living Australia search tool (10 km search area).

2.2 LIKELIHOOD OF OCCURRENCE ASSESSMENT

The likelihood of threatened species, populations, threatened ecological communities and migratory species occurring within 10 km of the study area was assessed against the criteria outlined in Table 2.1. Species subject to the likelihood of occurrence assessments were those identified during the desktop investigations.

Table 2.1 Likelihood of occurrence assessment

LIKELIHOOD OF OCCURRENCE	CRITERIA
Low	Have not been recorded previously in the study area and surrounds and/or the study area is beyond the current known geographic range of the species. Are dependent on specific habitat types or resources that are not present. Are considered extinct in the locality.
Moderate	Have been recorded previously in the study area and surrounds infrequently (i.e. vagrant individuals). Use habitat types or resources that are present, although generally in a poor or modified condition. Are unlikely to maintain sedentary populations, however may seasonally utilise available resources opportunistically during variable seasons or migration.
High	Have been recorded previously within the study area. Are dependent on habitat types or resources that are abundant and/or in good condition. Are known or likely to maintain resident populations within/surrounding the study area. Are known or likely to visit during regular seasonal movements or migration.
Recorded	Have been recorded within the study area during surveys associated with this report.

2.3 FIELD SURVEY

2.3.1 RANDOM MEANDER SURVEY

The study area was visually assessed for the presence of patches of native vegetation, along with threatened ecological communities, and habitat suitability for threatened species. To survey the vegetation in the study area, a random meander technique (Cropper 1993) was employed whereby the recorder walks in a random meander throughout the study area recording dominant and key plant species (e.g. threatened species, noxious weeds), within the vegetation communities and recording condition of vegetation.

2.3.2 VEGETATION PLOTS AND TRANSECT

Detailed plot and transect surveys were completed as outlined in the methodology contained within *ACT Environmental Offsets Policy* (ACT Government - Environment and Planning 2015).

Three plot surveys were undertaken, recording the following site attributes were recorded at each plot:

- Location (easting – northing).
- Vegetation structure and dominant species and vegetation condition. Vegetation structure was recorded through estimates of percentage foliage cover, average height and height range for each vegetation layer.
- Native and exotic species richness (within a 400 square metre quadrat): This consisted of recording all species by systematically walking through each 20 x 20 metre quadrat. The cover abundance (percentage of area of quadrat covered) of each species was estimated.

2.3.3 CONDITION OF VEGETATION COMMUNITIES

Native vegetation is defined under the *Nature Conservation Act 2014* as either:

- 10 percent or more of the area is covered with vegetation (dead or alive)
- no more than 60 percent of the ground layer vegetation cover is exotic annual (at any time of the year)
- more than 50 percent of the perennial ground layer vegetation cover is native vegetation

OR

- trees or shrubs indigenous to the area have a canopy cover of 10 percent or more in any stratum over the area.

The condition of native vegetation was assessed against the ACT Environmental Offsets Policy (ACT Government - Environment and Planning Directorate 2015, ACT Government - Environment and Planning Directorate 2016) definitions of 'low' and 'moderate to good' condition.

Vegetation in 'low' condition means:

- Paddock trees – native over-storey foliage cover less than 25 percent of the lower value of the over-storey percent foliage cover benchmark for that vegetation type, and less than 50 percent of ground cover perennial vegetation is indigenous species.
- Native pasture – trees are absent or form less than one percent cover. The understorey is predominantly comprised of native grasses, and there are five or less native herbs within the most diverse 20 x 20 metres of the investigation area.

'Moderate to good' broad condition is native vegetation that is not in 'low' broad condition.

2.3.4 FAUNA HABITAT ASSESSMENT

Fauna habitat assessments were undertaken to assess the likelihood of threatened species of animal (identified in desktop review) occurring within the study area. Fauna habitat characteristics assessed included:

- structure and floristics of the canopy, understorey and ground vegetation, including the presence of flowering and fruiting trees providing potential foraging resources
- presence of hollow-bearing trees providing roosting and breeding habitat for arboreal mammals, birds and reptiles
- presence of the ground cover vegetation, leaf litter, rock outcrops and fallen timber and potential to provide protection for ground-dwelling mammals, reptiles and amphibians
- presence of waterways (ephemeral or permanent) and water bodies.

The following criteria were used to evaluate the condition of habitat values:

- **Good:** A full range of fauna habitat components are usually present (for example, old growth trees, fallen timber, feeding and roosting resources) and habitat linkages to other remnant ecosystems in the landscape are intact.
- **Moderate:** Some fauna habitat components are missing or greatly reduced (for example, old-growth trees and fallen timber), although linkages with other remnant habitats in the landscape are usually intact, but sometimes degraded.
- **Poor:** Many fauna habitat elements in low quality remnants have been lost, including old growth trees (for example, due to past timber harvesting or land clearing) and fallen timber, and tree canopies are often highly fragmented. Habitat linkages with other remnant ecosystems in the landscape have usually been severely compromised by extensive clearing in the past.

Opportunistic sightings of animals were recorded. Evidence of animal activity, such as scats, diggings, scratch marks, nests/dreys, burrows etc., was also noted. This provided indirect information on animal presence and activity.

3 EXISTING ENVIRONMENT

3.1 VEGETATION

The study area occurs in a suburban area adjacent to the existing school, road and residential development. The study area is connected to the west to an area of open green space.

The majority of the study area consists of grassland. Native Amenity Planting occurs along the north eastern boundary of the site and provides a visual buffer to residential development.

The study area is subject to urban edge effects (weed invasion, recreation pressures, increased predation of grassland fauna by foxes and cats, requirement for management including regular mowing, fire fuel reduction though burning and slashing. Aerial imagery shows evidence of regular mowing over decades.

Vegetation types within the study area are mapped in Figure 3.1.

3.1.1 EXOTIC GRASSLAND

The majority of the site consists of exotic dominated grassland. The groundlayer is dominated by exotic species such as Paspalum (*Paspalum dilatatum*), Goose Grass (*Eleusine tristachya*), African Love Grass (*Eragrostis curvula*), Brome (*Bromus catharticus*), Cat Grass (*Dactylis glomerata*), flat weeds (*Hypochaeris radicata, Plantato lanceolata, Arctotheca calendula)* and Turnip Weed *(Rapistrum rugosum).*

Native species are present (with low cover) and include disturbance-tolerant native species such as Red-leg Grass (*Bothriochloa macra*), Windmill Grass *(Chloris truncata)* and Wallaby Grass (*Austrodanthonia* species).

Photo 3.1 Exotic grassland

Fraser Primary School Territory Plan Variation

Figure 3.1

Vegetation communities

Legend

- Vegetation Plot
- Site Location
- Blocks

Field Verified Vegetation Communities

- Native dominated grassland
- Amenity planting native
- Exotic grassland

Coordinate system: GDA 1994 MGA Zone 55

Scale ratio correct when printed at A3

1:2,500 Date: 15/06/2021

Data sources - DNRME, TMR, Translink, Geoscience Australia

3.1.2 NATIVE DOMINATED GRASSLAND

Native dominated grassland occurred in the north western section of the study area.

Native grassland was dominated by disturbance tolerant grasses including Red-leg Grass (*Bothriochloa macra*), Hairy Panic (*Panicum effusum*), Windmill Grass (*Chloris truncata*) and Wallaby Grass (*Austrodanthonia* species). Exotic species included Paspalum (*Paspalum dilatatum*), Goose Grass (*Eleusine tristachya*), African Love Grass (*Eragrostis curvula*), flat weeds (*Hypochaeris radicata, Plantato lanceolata, Arctotheca calendula)* and Turnip Weed *(Rapistrum rugosum).*

This community was a 'low condition native pasture based on the understorey being predominantly comprised of native grasses, and less than five native herbs within the most diverse 20 x 20 metre vegetation plot (Appendix A).

Photo 3.2 Native dominated grassland

3.1.3 NATIVE AMENITY PLANTING

Native Amenity Planting occurs along the north eastern boundary of the site and provides a visual buffer to residential development. Approximately 75 trees occur in this area with height ranging from 6–11 metres and circumference of 600–1100 mm.

These trees are mature are likely to have been planted at the time of the development of the suburb in the late 1970s. The species are consistent of a range of eucalyptus and other species known to grow well in Canberra: *Casuarina cunninghamiana, Eucalyptus bicostata, Eucalyptus cinerea, Eucalyptus maidenii, Eucalyptus mannifera, Eucalyptus melliodora, Eucalyptus nicholii, Eucalyptus polyanthemos, Eucalyptus sideroxylon, Eucalyptus viridis, Acacia baileyana.*

The groundlayer vegetation is sparse and is dominated by exotic grass species such as Paspalum (*Paspalum dilatatum*), Goose Grass (*Eleusine tristachya*) and African Love Grass (*Eragrostis curvula*) and disturbance-tolerant native species such as Red-leg Grass (*Bothriochloa macra*).

Photo 3.3 Amenity planting native

3.2 FAUNA HABITAT

Habitat within the study area consisted of low open grassland with a strip of native tree plantings along the north eastern boundary. The grassland was modified from regular mowing and the invasion of common weed species. No rocky outcropping was observed, and other important grassland habitat features such as invertebrate burrows and soil cracks were limited. No hollows were recorded.

The study area provides habitat for a range of grassland species that are adapted to open environments and tolerant of some disturbance. This includes common urban bird species introduced species such as Fox and House Mouse, as well as native grassland species. Some common grassland species recorded during field surveys included Common Wombat, Eastern Grey Kangaroo, European Rabbit* and European Red Fox*.

An area of tall wet grassland/sedgeland was noted near the north western boundary. This would provide habitat for a range of common species of frog including the Spotted Marsh Frog which was recorded calling during the site visit.

4 THREATENED BIODIVERSITY

4.1 THREATENED ECOLOGICAL COMMUNITIES

Two threatened ecological communities are known to occur within the locality:

- Yellow Box-Blakely's Red Gum Grassy Woodland
- Natural Temperate Grassland.

These communities and their potential presence within the site are discussed below.

4.1.1 YELLOW BOX-BLAKELY'S RED GUM GRASSY WOODLAND

Yellow Box-Blakely's Red Gum Grassy Woodland (Box Gum Woodland) is listed as Critically Endangered under the NC Act.

Although White Box (*Eucalyptus albens*) does not occur within the ACT, Yellow Box-Blakely's Red Gum Grassy Woodland, depending on condition, is consistent with the EPBC Act Critically Endangered ecological community White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Maguire and Mulvaney 2011).

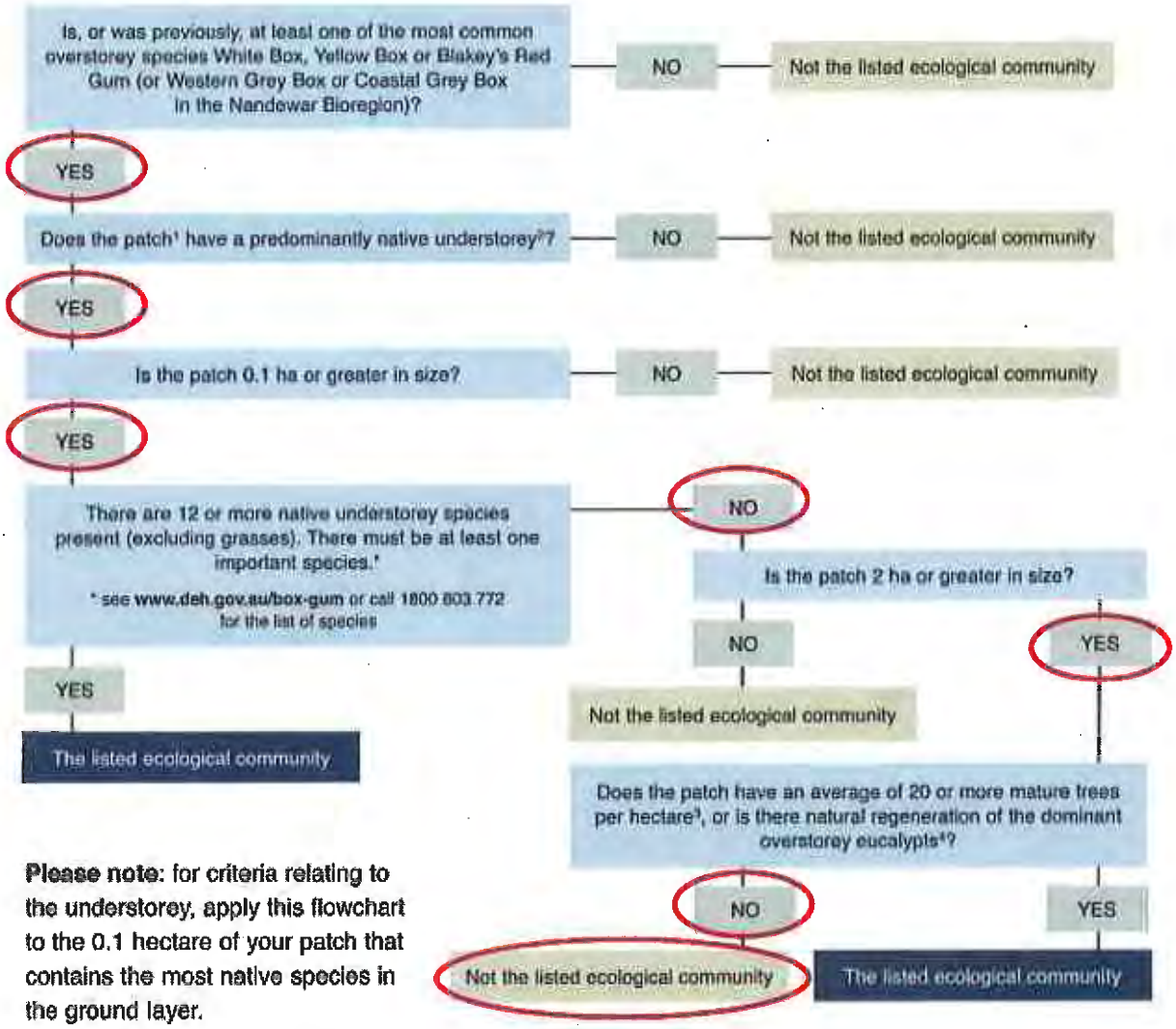
Box Gum Woodland can occur as either open woodland or derived native grassland which has been created through the removal of all tree species.

The majority of the vegetation within the site has been mapped as "potential yellow Box – Blakely's Red Gum Grassy Woodland" (ACTmapi, 2021).

4.1.1.1 EPBC ACT LISTED THREATENED COMMUNITY

Although there was no evidence of past clearing of trees evident on site, the area has been mapped as potential Box Gum Woodland (ACTmapi). For this reason, it was assumed that the site previously included characteristic canopy species namely Yellow Box or Blakely's Red Gum, for the purposes of assessing the site vegetation against condition criteria for EPBC Act listed community.

Analysis of vegetation plots within study area indicate that areas with predominantly native understorey were not consistent with the EPBC Act listed community because although the site is larger than 2 ha, there were not 12 or more native understorey species present (excluding grasses) or the presence of mature canopy or natural regeneration of dominant eucalypt species (Figure 4.1).



Please note: for criteria relating to the understorey, apply this flowchart to the 0.1 hectare of your patch that contains the most native species in the ground layer.

1 Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is, and is not, included within any individual patch. The patch is the larger of:
- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

Patches must be assessed at a scale of 0.1 ha (1000m²) or greater.

2 A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not is if it is difficult to pull out of the soil. Annual species pull out very easily.)

3 Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

4 Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

Source: (Department of the Environment and Heritage 2006)

Figure 4.1 Commonwealth criteria for White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland

4.1.1.2 NC ACT LISTED CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY

An assessment of the characteristics of the NC Act listed Yellow Box – Red Gum Grassy Woodland community against the two patched was undertaken (Table 4.1) (ACT Scientific Committee 2020).

Table 4.1 Characteristics of Yellow Box–Red Gum Grassy Woodland

CHARACTERISTICS OF YELLOW BOX–RED GUM GRASSY WOODLAND TEC	CHARACTERISTICS OF VEGETATION WITHIN SITE		
	Exotic grassland	Native dominated grassland	Amenity planting native
Discontinuous stratum of trees of medium height (10–35 m) with canopies that are separated and with 4–30% foliage cover. The community is dominated by Yellow Box *(Eucalyptus melliodora)* and/ or Blakely's Red Gum *(Eucalyptus blakelyi)*.	No canopy is present.	No canopy is present.	Canopy consists of mix of local and non-local plantings.
There is a species-rich understorey of native tussock grasses, herbs and scattered shrubs. Good condition remnants have a ground cover dominated (50% or more of the perennial species) by native grasses and forbs. The ground of remnants in lower condition may not be dominated by native species yet retain a canopy of mature trees (20 or more per hectare on average) and/or support natural regeneration.	Groundcover dominated by exotic species.	The groundcover is dominated disturbance tolerant native grasses.	Groundcover dominated by exotic species.
	The shrub layer is absent. No remnant trees occur. No natural regeneration.		
Derived (secondary) grasslands where the tree canopy cover is removed (or suffers dieback) but a relatively diverse understorey remains intact.	Consists of grassland with no tree canopy.		Canopy consists of mix of local and non-local plantings.
	Understorey is not intact, is dominated by exotic species and has low native diversity.	Lacks diversity and consists of disturbance tolerant native grasses as well as exotic grasses and forbs.	Understorey is not intact, is dominated by exotic species and has low native diversity.
CONCLUSION	**Not consistent with NC Act listing**	**Vegetation unlikely to be consistent with NC Act listing. Although ground cover is dominated by native grasses, consistent with low condition native pasture, there was no evidence of past tree removal or regeneration.**	**Not consistent with NC Act listing**

4.1.2 NATURAL TEMPERATE GRASSLAND

Natural Temperate Grassland of the South Eastern Highlands is listed as Critically Endangered under both the EPBC Act and NC Act.

Existing mapping suggests that the study area would not consists of natural temperate grassland for the following reasons:

- the study area is outside the area identified in pre-1750 lowland native grassland in the ACT (Environment ACT 2005)
- study area is not identified as a native grassland in ACT native grassland conservation strategy and action plan
- study area is mapped as potential box gum woodland (ACT Government 2021).

Despite existing mapping, there was no evidence on site of past clearing or regeneration of canopy species. The site is low within the landscape and it is considered that the site may have historically consisted of native grassland community. As the vegetation within the study area was not consistent with Box Gum Woodland derived grassland, an assessment was also undertaken against Natural Temperate Grassland listed threatened ecological community.

4.1.2.1 EPBC ACT LISTED COMMUNITY

Within the study area, native grassland broadly corresponds to the EPBC Act listed *Natural Temperate Grassland of the South Eastern Highlands* community (Table 4.2).

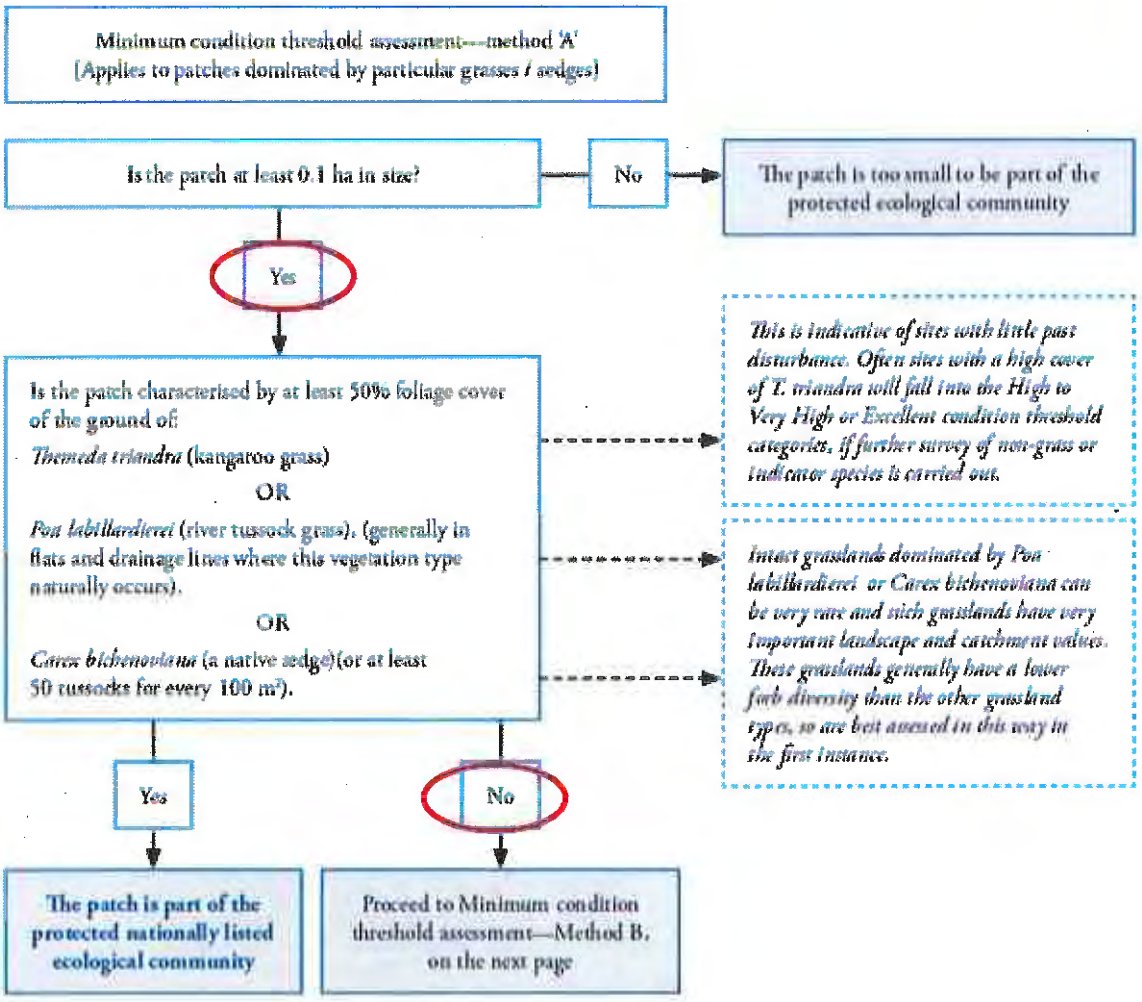
Table 4.2 Key diagnostic characteristics of EPBC Act listed *Natural Temperate Grassland of the South Eastern Highlands*

NATURAL TEMPERATE GRASSLAND OF THE SOUTH EASTERN HIGHLANDS	CONSISTENCY OF SITE WITH DIAGNOSTIC CHARACTERISTICS
Sites are generally confined to the South Eastern Highlands bioregion.	Yes
Sites typically occur at elevations between 350–1200 m above sea level, but may occur as low as 250 m, due to influences of local microclimate.	Yes
Native grasses usually are dominant and include one or more of the following, depending on the association present: – The major dominant or co-dominant grass species in NTG–SEH are: *Themeda triandra* syn. *T. australis* (Kangaroo grass), *Poa sieberiana* (Snowgrass), *Poa labillardierei* (River Tussock Grass), *Austrostipa bigeniculata* (Kneed Speargrass), *Austrostipa scabra* (Slender speargrass), *Bothriochloa macra* (Red Grass), various *Rytidosperma* species syn. *Austrodanthonia* species (Wallaby Grasses) and *Lachnagrostis* spp. (Blowngrasses). – Other grasses that commonly occur, and might form a dominant area within a patch, include *Aristida* spp. (Wiregrasses), *Austrostipa densiflora* (Fox-tail Speargrass), *Dichelachne* spp. (Plume Grasses), indigenous *Eragrostis* spp. (Lovegrasses) and *Poa meionectes* (Fine-leaf Tussock-grass, Short Snowgrass). – Other grasses that are frequently present, though seldom dominant, include *Anthosachne scaber* syn. *Elymus scaber* (Common Wheatgrass), *Panicum effusum* (Hairy Panic), *Chloris truncata* (Windmill Grass), and *Enneapogon nigricans* (Nine-awned Grass).	Yes Species included *Bothriochloa macra* (Red Grass), *Austrodanthonia* species (Wallaby Grasses), *Chloris truncata* (Windmill Grass)
Native sedges may be dominant or co-dominant in some associations, typically *Carex appressa* (Tussock Sedge) or *C. bichenoviana* (Plains Sedge).	n/a

NATURAL TEMPERATE GRASSLAND OF THE SOUTH EASTERN HIGHLANDS	CONSISTENCY OF SITE WITH DIAGNOSTIC CHARACTERISTICS
Typically, a range of native forb species are present, or, in recently disturbed Sites, components of the indigenous native species (including both existing plants and reproductive propagules in the soil e.g. soil seed banks) are present that are sufficient to re-establish the characteristic native groundcover. Typical forb species for each of the defined associations are outlined in Armstrong et al. (2013).	No
A tree, shrub or sub-shrub layer may be present, with up to 10% Projective foliage cover of each layer being present.	Tree and shrub layer absent.
The area is not a derived or secondary grassland (i.e. a grassland derived from clearing of a woodland or forest community), as assessed by the following criteria: There is no evidence of trees formerly occurring on the Site in a density greater than that which would produce a 10% Projective foliage cover (e.g. there are no stumps, regularly spaced depressions in the ground that were once occupied by tree stumps and that may or may not retain pieces of dead timber, or significant amounts of fallen timber, and/or there are no trees of woodland or forest tree species in a woodland or forest formation adjacent to or near the Site, on similar topographical positions and geological substrates); if these signs are evident, then the Site is likely to be a derived or secondary grassland. As a derived grassland, it may be part of another Threatened ecological community that is listed nationally (EPBC Act) or under ACT, NSW or Victorian legislation. - Natural grasslands in some regions are restricted to frost hollows or on heavy soils, where trees will not usually persist. Sites that are difficult to determine as natural or derived grassland should be considered to be part of NTG–SEH, if they otherwise meet the Description and Key Diagnostic Characteristics.	Study area is not identified as a native grassland in ACT native grassland conservation strategy and action plan. Study area is mapped as potential box gum woodland (ACT Government 2021) However, there is no evidence of past clearing or regeneration of canopy. Unclear if site is natural or derived grassland.
CONCLUSION: Since sites that are difficult to determine as natural or derived grassland should be considered to be part of the listed community, Native grassland areas require further assessment against condition criteria for this community	

As vegetation in study area is broadly consistent with the key diagnostic characteristics outlined in Natural Temperate Grasslands in the Approved Conservation Advice (Threatened Species Scientific Committee 2016), a condition threshold assessment was undertaken to determine if condition meets the listing criteria.

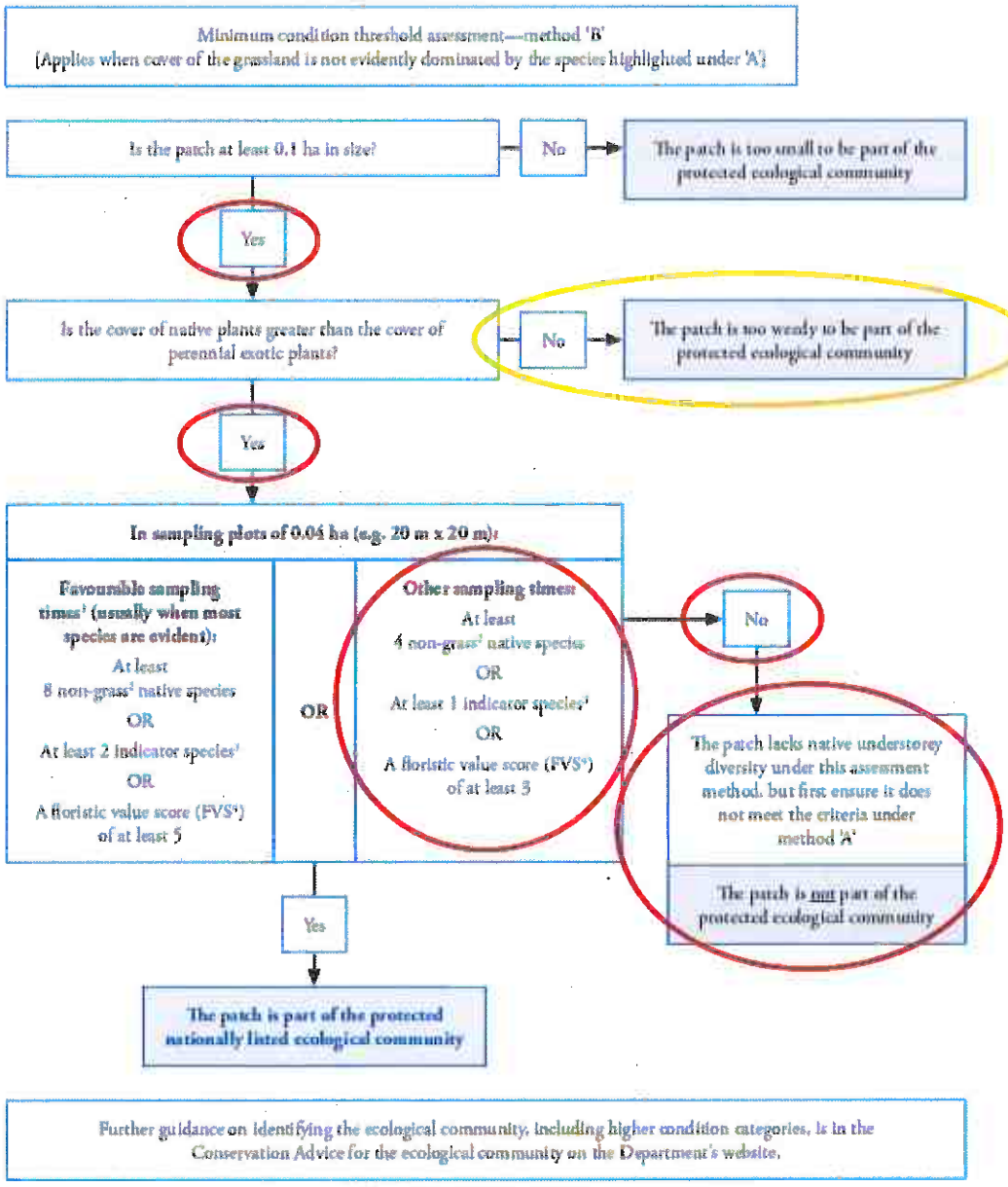
The vegetation within the study area was not of sufficient condition to meet the EPBC Act listed community (Figure 4.2 and Figure 4.3).



Please note:

- Assessments of a patch should initially be centred on the area of highest native floristic diversity.
- Consideration must be given to the timing of surveys and recent disturbance.
- The minimum patch size for consideration as part of the listed ecological community is 0.1 ha (e.g. 50 m x 20 m), but other condition thresholds must also be met.
- The surrounding context of a patch must also be taken into account when considering factors that add to the importance of a patch that meets the condition thresholds.
- The list of Indicator species referred to in the Condition Thresholds, can be found on the Species Profiles and Threats (SPRAT) database, on the Department's website[3].
- A relevant expert (e.g. ecological consultant, local NRM or environment agency) may be useful to help identify the ecological community and its condition.

Figure 4.2 Flowchart to identify Natural Temperate Grassland of the South Eastern Highlands ecological community meeting the minimum condition thresholds A for national protection



1. To be assessed in spring to early summer, and/or other time when native plant species are most evident (e.g. significant recent rainfall that has stimulated flowering of native plants). Or if these conditions not present, counts may be estimated from multiple surveys of the same site in different seasons or years.

2. Non-grass species include forbs/herbs (wildflowers), lilies, orchids, rushes and low shrubs. It does not include trees and, for the purposes of these thresholds, sedges.

3. Indicator species are native plant species that are useful surrogates for conservation value of a patch, and are typically disturbance sensitive species. The list is found on the ecological community profile on the Species Profiles and Threats Database (SPRAT), on the Department's website.

4. Floristic Value Score is a method of measuring the quality of a grassland site, based on Rehwinkel (2015) (see the Conservation Advice for the full reference).

Notes: red = native dominated grassland, orange = Exotic Grassland and Amenity Planting Native

Figure 4.3 Flowchart to identify Natural Temperate Grassland of the South Eastern Highlands ecological community meeting the minimum condition thresholds B for national protection

4.1.2.2 NC ACT LISTED COMMUNITY

Natural Temperate Grassland is listed as Critically Endangered under the NC Act. This community is defined by the vegetation structure and dominance by native species of perennial tussock grasses and a diversity of native forbs. This community is dominated by moderately tall (25–50 cm) to tall (50 cm–1.0 m) dense to open native tussock grasses (*Themeda triandra*, *Rytidosperma* species, *Austrostipa* species, *Bothriochloa* macra, *Poa* species). There is also a diversity of native herbaceous plants (forbs), which may comprise up to 70% of species present. The community is naturally treeless or may contain up to 10% cover of trees or shrubs in its tallest stratum. In the ACT, it occurs up to 1200 m above sea level in locations where tree growth is limited by cold air drainage (ACT Scientific Committee 2020).

Although the study area is mapped as "potential Box Gum Woodland" it is difficult to determine if the vegetation on site is a natural or derived grassland community. Given the low landscape position of native dominated grassland Native dominated grassland areas, occurring in the north western corner of the study area would be consistent with *Natural Temperate Grassland* as listed under the NC Act, albeit in low condition.

4.2 THREATENED SPECIES HABITAT

Based on the results of database searches, 21 threatened flora species and 52 threatened fauna species (Appendix B) were identified as occurring or likely to occur in the locality.

No threatened flora species were considered likely to occur within the study are due to the absence of suitable habitat and the level of regular disturbance including mowing.

Four threatened fauna species were considered to have a moderate or higher likelihood of occurring within the study area.

Table 4.3 Threatened species with potential habitat within the study area

COMMON NAME	SCIENTIFIC NAME	EPBC ACT	NC ACT	HABITAT
Little Eagle	*Hieraaetus morphnoides*	–	V	Foraging habitat
Superb Parrot	*Polytelis swainsonii*	V	V	Foraging habitat. This species was recorded outside the study area, adjacent to the existing school (including potential nesting hollow).
Golden Sun Moth	*Synemon plana*	CE	E	Marginal habitat.
Striped Legless Lizard	*Delma impar*	V	V	Marginal habitat in unmown grassland on/near northern boundary of study area.

5 CONCLUSIONS AND RECOMMENDATIONS

The majority of the study area consists of grassland. Native Amenity Planting occurs along the north eastern boundary of the site. These trees are small and no hollows were recorded. These trees do however, provide habitat for common species of bird and a visual buffer to the residential development.

The majority of the study area is dominated by exotic vegetation, however, a small area of native dominated grassland occurs in the north western corner of the study area. Further to the north west, outside the study area is and unmown drainage line.

The vegetation within the site was not consistent with any EPBC Act listed ecological community. Native dominated grassland, restricted to a north western corner of the study area, was consistent with low condition native pasture and was considered to be potentially consistent with NC Act listed Natural Temperate Grassland.

The study area provides potential habitat for four threatened species (Table 5.1).

Table 5.1 Threatened species with potential habitat within the study area

COMMON NAME	SCIENTIFIC NAME	EPBC ACT	NC ACT	HABITAT	DISCUSSION AND RECOMMENDATIONS
Little Eagle	*Hieraaetus morphnoides*	–	V	Foraging habitat.	Although species may occur on occasion, removal of foraging habitat unlikely to significantly impact species.
Superb Parrot	*Polytelis swainsonii*	V	V	Foraging habitat. This species was recorded outside the study area, adjacent to the existing school (including potential nesting hollow).	Include mitigation measures as part of CEMP to minimise potential impacts to nearby birds. This could include timing of construction work and noise controls.
Golden Sun Moth	*Synemon plana*	CE	E	Marginal habitat.	Undertake surveys during flying season as a precaution.
Striped Legless Lizard	*Delma impar*	V	V	Marginal habitat in unmown grassland on/near northern boundary of study area.	Include mitigation measures as part of CEMP to minimise potential indirect offsite impacts.

To minimise impacts to biodiversity it is recommended that:

- development design avoids impacting
  - amenity planting
  - native dominated grassland
  - drainage line
- mitigation measures are included in construction environmental management plan (CEMP) to minimise off-site indirect impacts to biodiversity including run-off and noise
- targeted surveys are undertaken for Golden Sun Moth in accordance with the 'Significant impact guidelines for the critically endangered Golden Sun Moth' (Department of Environment Water Heritage and the Arts 2009), namely:
  - surveys are undertaken during the local flying season (typically late October to early January)
  - surveys are conducted over at least four suitable days, at approximately weekly intervals
  - a local reference site is surveyed to confirm species is flying during surveys
  - surveys are conducted during appropriate conditions for the species:
    - warm to hot days (i.e. above 20°C by 10 am)
    - during the warmest part the day (10 am to 2 pm)
    - on clear or mostly cloudless sky, with still or relatively still wind conditions
    - at least two days since rain
  - if detected onsite, surveys should focus on determining the relative distribution of the species on the site.

6 LIMITATIONS

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6.5 ECOLOGY SURVEY LIMITATIONS

The diversity of flora and fauna species recorded in this study are a sample from preliminary research and single day of field survey, meaning a full inventory of species was not made, and therefore these findings should not be regarded as a comprehensive list of the species present at the site. It is unlikely that every species present was recorded.

No sampling technique can totally eliminate the possibility that a species is present. For example, some species of plant may be present in the soil seed bank and some fauna species use habitats on a sporadic or seasonal basis and may not be present during surveys.

Flora and fauna occurrence and detectability can vary with climatic, seasonal and weather conditions, a period of several seasons or years is typically required to identify all the species at a site. The conclusions of this report are consequently based on current available data and sources, along with the conditions of the study area and weather at the time of the survey. This study has aimed to identify the presence of threatened species and threatened ecological communities, along with available habitat for threatened species, acknowledging that presence and habitat conditions can change with time.

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APPENDIX A

VEGETATION PLOT DATA

A1 PLOT DATA

SPECIES	REGIONAL SIGNIFICANCE RATING[1]	COVER ABUNDANCE SCORE[2]		
		Plot 1	Plot 2	Plot 3
Arctotheca calendula	Y	2	1	
Bothriochloa macra	C	4	4	7
Bromus catharticus	Z			3
Chloris truncata	C	4		3
Cirsium vulgare	Y	1	1	
Eleusine tristachya	Z	4	4	4
Eragrostis curvula	X	3	5	3
Hypochaeris radicata	Y	2	2	2
Panicum effusum	C	1	3	4
Paspalum dilatatum	X	5	6	4
Plantago lanceolata	Y	1	2	1
Rumex brownii	C	1	1	
Rumex brownii	C			
Rytidosperma sp.(any unidentified species except R. pallidum)	C	4	3	3
Sonchus oleraceus	Z	1	1	
Taraxacum officinale	Y	1	2	
Verbascum thapsus	Y	1		
Floristic Value Score		0.72	1	1.2
Number of indicator species		0	0	0
Number of non-grass native species		1	1	0
Number of exotic species		10	9	6
Number of significant weed species (level X species)		2	2	2
Weed value score		8.4	8.9	8

Notes for table above: 1)

REGIONAL SIGNIFICANCE CODES		
A	Indicator species	Species that are uncommon in the region, and where they occur, generally indicate grassland sites of high to very high value; such species occur very rarely or in very low numbers in grasslands that have been subject to intense, frequent, long-term or sometimes even one-off disturbances, such as, ploughing, heavy stock grazing pressures or application of fertilisers; some of these species are also inherently rare.
B	Indicator species	Species that are more common in grassland sites, relative to level 2 species; they generally occur less frequently in highly disturbed sites, though some persist with intermediate levels of disturbance.
C	Common or increaser species	Species that are thought to be 'disturbance-tolerant', 'disturbance responding' or 'increaser' species; increasers respond positively to various disturbances and are thus most commonly recorded in disturbed or degraded sites.
X	Very high impact weed	very high-impact weed species, such as Phalaris (*Phalaris aquatica*), African Love-grass (*Eragrostis curvula*), the exotic stipoid grasses, Serrated Tussock (*Nassella trichotoma*) and Chilean Needle-grass (*N. neesiana*) and Coolatai Grass (*Hyparrhenia hirta*); they are often, though not always and in every region, declared noxious weeds, are the most intractable species, and if occurring over a large proportion of the site, may render the site's value to be low, despite its other inherent values, as they are difficult, time-consuming and costly to remove without also severely impacting on the native species at the site.
Y	Significant weed	these are the more significant and persistent species, mostly either perennial, or biennial, and sometimes woody; they include species such as Cootamundra Wattle (*Acacia baileyana*), Sweet Briar (*Rosa rubiginosa*), St John's Wort (*Hypericum perforatum*) Cat's-ear (*Hypochaeris radicata*), goat's-beards (*Tragopogon* spp.) and Goose Grass (*Eleusine tristachya*); these species can usually be easily removed, even if occurring in high cover over a site.
Z	Common weed	these include the common, though low-impact, mostly annual weeds; these are equivalent to the 'level C' native flora species; they generally have little impact on the grassland's values.

2) Cover and Abundance scores

COVER AND ABUNDANCE SCORES	
1	< 5% cover and solitary (<4 individuals)
2	< 5% cover and few (4–15 individuals)
3	< 5% cover and numerous (>15 individuals)
4	5% – <25% cover
5	25% – <50% cover
6	50% – <75% cover
7	75 or greater % cover

APPENDIX B

THREATENED SPECIES LIKELIHOOD ASSESSMENT

B1 THREATENED FLORA LIKELIHOOD ASSESSMENT

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Ammobium craspedioides	Yass Daisy	V	–	Found from near Crookwell on the Southern Tablelands to near Wagga Wagga on the South Western Slopes. Most populations are in the Yass region. Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities. Grows in association with a large range of eucalypts (*Eucalyptus blakelyi, E. bridgesiana, E. dives, E. goniocalyx, E. macrorhyncha, E. mannifera, E. melliodora, E. polyanthemos, E. rubida*). Apparently unaffected by light grazing, as populations persist in some grazed sites. (Office of Environment & Heritage 2015).	**Low** – not known to occur in area, closest populations are within the Yass area in NSW. Marginal habitat in project area.
Calotis glandulosa	Mauve Burr-daisy	V	–	The species occurs in the Monaro and Kosciuszko regions, and the upper Shoalhaven catchment. There are also old records from the Dubbo area, near Oberon, and Mt Imlay. The species grows in montane and subalpine grasslands in the Australia Alps. Usually in subalpine grassland dominated by Poa spp., montane or natural temperate grassland dominated by *Themeda australis*, and Snow Gum Woodlands on the Monaro and Shoalhaven area. It is a coloniser of bare patches, often occurring on roadsides. The species flowers in spring and summer (Office of Environment & Heritage 2018).	**Low** – not known to occur within area, lack of preferred habitat in project area.
Leucochrysum albicans var. tricolor	Hoary Sunray	E	–	The species occurs in a wide range of communities and habitats occurring within grasslands, grassy areas in woodlands and dry open forests and modified landscapes on a variety of soils types. This subspecies is restricted to the central and southern tablelands and the central western slopes (Royal Botanic Gardens 2007).	**Moderate** – potential habitat within project area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Rutidosis leptorhynchoides	Button Wrinklewort	E	E	Occurs in Box-Gum Woodland, secondary grassland derived from Box-Gum Woodland or in Natural Temperate Grassland; and often in the ecotone between the two communities. Grows on soils that are usually shallow, stony red-brown clay loams; tends to occupy areas where there is relatively less competition from herbaceous species (either due to the shallow nature of the soils, or at some sites due to the competitive effect of woodland trees). Exhibits an ability to colonise disturbed areas (e.g. vehicle tracks, bulldozer scrapings and areas of soil erosion). Normally flowers between December to March; plants do not usually flower until their second year. Has regenerative buds at the surface of the soil but not below, so plants do not have the ability to resprout from underground structures; the stems usually die back in late summer or autumn and new basal leaves are evident by early winter. Thought to be insect pollinated, although the specific vectors are not known. Observed flourishing at a site a few years after the area was burnt by a wildfire. Apparently susceptible to grazing, being retained in only a small number of populations on roadsides, rail reserves and other un-grazed or very lightly grazed sites (Royal Botanic Gardens 2014).	**Moderate** – potential habitat within project area.
Lepidium ginninderrense	Ginninderra Peppercress	V	E	The Ginninderra Peppercress is known from only two natural sites and two planted sites in the north of the Australian Capital Territory (Department of the Environment and Energy 2018). Given the small distribution of the species, little is known about the species habitat requirements. One of the known natural population occurs in native grasslands on the flood plain of Ginninderra Creek, especially in locations where grass tussocks and other plant growth are short and open, thus there is little competition for space and light. At this site it is associated with Wallaby Grasses (*Rytidosperma* spp.), Windmill Grass (*Chloris truncata*), lemon Beauty-heads (*Calocephalus citreus*) and Fuzzweed (*Vittadinia muelleri*). The other known natural population occurs in patches alongside other native grassland species scattered across otherwise weedy paddocks (ACT Government 2017). The soil type over most of the site is a shallow red earth, with patches of colluvium on the footslopes and the population occurs at an altitude of c.580 metres (Department of the Environment and Energy 2019).	**Moderate** – potential habitat within project area. Species is not known to occur in area.
Lepidium hyssopifolium	Basalt Pepper-cress	E	–	Currently known from about 35 populations. Most occur in Tasmania, three in NSW, and seven in Victoria. In NSW, populations occur in Bathurst and Bungendore (Tumino 2010). Original habitat for the species was likely to be eucalypt and/or *Allocasuarina* woodland with a grassy understorey, and native temperate grasslands. Most remaining populations occur in heavily modified environments (Tumino 2010).	**Low** – no naturally occurring populations within ACT.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Bossiaea grayi	Murrumbidgee bossiaea	–	E	A wiry shrub growing to around 1.5 meters high. The species flowers from September to October and seeds in December. The species is found only with the ACT and is known from ten locations along the Murrumbidgee, Paddy's and Cotter Rivers. The species grows in sandy soil amongst boulders on river banks and adjacent slopes close to rivers, usually at the top of the riparian zone (Environment and Planning Directorate - Environment 2015).	**Low** - no preferred habitat within project area.
Swainsona recta	Small Purple Pea	E	E	Found in grassland and open woodland, often on stony hillsides (Royal Botanic Gardens 2004). Before European settlement it occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum (*Eucalyptus blakelyi*), Yellow Box (*E. melliodora*), Candlebark Gum (*E. rubida*) and Long-leaf Box (*E. goniocalyx*). Grows in association with understorey dominants that include Kangaroo Grass (*Themeda triandra*), poa tussocks (*Poa* spp.) and spear-grasses (*Austrostipa* spp.). Plants die back in summer, surviving as a rootstocks until they shoot again in autumn (Department of Environment and Climate Change 2008).	**Moderate** – potential habitat within project area.
Gentiana baeuerlenii	Baeuerlen's Gentian	E	E	The species is known from only one location in the Orroral Valley in Namadgi National Park. The species was previously known from the Quidong area near Bombala where it is now thought to be extinct from the area (Environment Planning and Sustainable Development Directorate 2017). In Namadgi National Park the species grows as an inter-tussock herb in moist tussock grassland and sedgeland associated with ground water, possibly a spring fed-area. The species has not been observed within Namadgi National Park since in the 1990s (Office of Environment & Heritage 2018).	**Low** – in ACT it is known only from Namadgi National Park, where it has not been seen since the 1990's.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Eucalyptus aggregata	Black Gum	V	V	Black Gum is found in the NSW Central and Southern Tablelands, with small isolated populations in Victoria and the ACT. Black Gum has a moderately narrow distribution, occurring mainly in the wetter, cooler and higher parts of the tablelands, for example in the Blayney, Crookwell, Goulburn, Braidwood and Bungendore districts (Office of Environment and Heritage 2017). In the ACT the species occurs to a very minor extent, with only 16 known mature trees in the wild in 2014. Older records identify a further two mature trees by the Kings Highway, but these have subsequently been removed (Department of the Environment and Energy 2019). The species grows on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers in the lowest parts of the landscape (Office of Environment & Heritage 2019). The species often occurs with other cold-adapted eucalypts such as Snow Gum (*Eucalyptus pauciflora*), manna Gum (*E. viminalis*), Candlebark (*E. rubida*), Black Sallee (*E. stellulata*), and Swamp Gum (*E. ovata*). Often occurs in open woodland formation with a grass ground layer dominated by Kangaroo Grass (*Themesa triandra*) or River Tussock (*Poa labillardierei*). The species also occurs as isolated paddock trees in pastures (Office of Environment & Heritage 2019).	**Low** – species is conspicuous, and no individuals or likely habitat identified in project area.
Arachnorchis actensis	Canberra Spider Orchid	CE	CE	The species is endemic to the ACT and is only known from three populations; slopes of Mount Ainslie and Mount Majura, and a more recently discovered population located in the Majura Valley on land managed by the Department of Defence as Majura Field Firing Range (Frawley 2010). At Mount Ainslie/ Majura the species grows in transitional vegetation zones between Yellow Box - Red Gum Tableland Grassland Woodland and Red Stringybark Tableland Grass/Shrub Forest at altitudes of 645 to 745 m. The species often occurs among rocks, in a groundcover of grasses, forbs, and low shrubs. Soils are shallow gravelly brown clay loam of volcanic origin (Frawley 2010)	**Low** – not known from area, closest records are Mount Majura (>10 km away). Marginal habitat within project area.
Pomaderris cotoneaster	Cotoneaster Pomaderris	E	–	Occurs in south-eastern NSW (South Coast and Southern Tablelands regions) south from the Moss Vale district and in far eastern Vic. (East Gippsland region). Usually growing on shallow soils with outcropping rock, often associated with clifflines (above, on or below) or riverbanks. The species occurs in dry, shrubby open forest on north-west to south-west facing slopes (Department of Agriculture Water and the Environment 2021).	**Low** – not known to occur within ACT. No preferred habitat within project area.
Corunastylis ectopa	Brindabella Midge Orchid	CE	CE	The species is endemic to the ACT and is only known from on hectare of the Brindabella Range within Namadgi National Park. It grows in an open part of the Namadgi eucalypt forest, on steep slope that aces north. It occurs amongst ground cover of low shrubs at 840 meters above sea level (Environment Planning and Sustainable Development Directorate 2012).	**Low** – known only from the Brindabella Ranges within ACT, no preferred habitat within project area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Prasophyllum petilum	Tarengo Leek Orchid	E	E	Natural populations are known from a total of five sites in NSW. These area at Boorowa, Captains Flat, Ilford, Delegate and a newly recognised population c.10 k SE of Muswellbrook. It also occurs at Hall in the Australian Capital Territory. Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock (*Poa labillardieri),* Black Gum *(Eucalyptus aggregata)* and tea-trees (Leptospermum spp.) at Captains Flat and within the grassy groundlayer dominated by Kangaroo Grass (*Themeda triandra*) under Box-Gum Woodland at Ilford (and Hall, ACT). Highly susceptible to grazing, being retained only at little-grazed travelling stock reserves (Boorowa & Delegate) and in cemeteries (Captains Flat, Ilford and Hall) (Office of Environment & Heritage 2015, Department of the Environment and Energy 2019).	**Moderate** – known to occur at Hall (3 km away). Potential habitat within project area.
Pterostylis oreophila	Blue-tongued Greenhood, Kiandra Greenhood	CE	CE	Kinadra Greenhood is a terrestrial orchid found in four distinct geographic locations being the Brindabella Ranges in the ACT, Kiandra and Bago areas of NSW, and northeast Victoria (Department of Sustainability Environment Water Population and Communities 2012). The species extent and area of occupancy are unknown, however its geographic distribution is considered to be restricted as indicated by the low number of mature plants and severe fragmentation. The species grows beside small montane and subalpine streams under tall dense thickets of *Leptospermum grandiflorum* (mountain tea tree), in black oozing mud or less commonly in peaty soils and sphagnum mounds (Department of Sustainability Environment Water Population and Communities 2012). The species is more commonly found in low-light conditions, however appears to also tolerate full sun (Office of Environment and Heritage 2018).	**Low -** known only from the Brindabella Ranges within ACT, no preferred habitat within project area.
Amphibromus fluitans	River Swamp Wallaby-grass	V	–	The species occurs in southern NSW, Victoria, South Australia, and Tasmania. In NSW historic collections come from the Albury area, Along the Murray River, and along the Murrumbidgee River. It grows in moderately fertile soil, with some bare ground, and conditions that are caused by seasonally fluctuating water levels. The specie mostly grows in permanent swamps, but also occurs in billabongs, lagoons, dams, and in roadside ditches (Department of the Environment and Energy 2018).	**Low** – preferred habitat in the form of swamps, billabongs, lagoons, and dams does not occur within the project area. Species not known to occur within ACT.
Muehlenbeckia tuggeranong	Tuggeranong Lignum	E	E	Known from a few sites on flood terraces along the eastern bank of the Murrumbidgee River South of Canberra. Grows on terraces prone to occasional flooding and on adjacent gentle slopes at an altitude of 550 m growing on coarse-textured alluvium, mainly quarzitic sand and gravel (Department of the Environment 2015).	**Low** - no potential habitat occurs within project area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Pomaderris pallida	Pale Pomaderris	V	V	Pale Pomaderris has been recorded from near Kydra Trig, north-west of Nimmitabel, Tinderry Nature Reserve, and the Queanbeyan River. A record from Byadbo in Kosciuszko National Park has not been relocated. The main distribution is along the Murrumbidgee in the ACT. It was recorded recently in eastern Victoria. This species usually grows in shrub communities surrounded by Brittle Gum (*Eucalyptus mannifera*) and Red Stringybark (*E. macrorhyncha*) or *Callitris* spp. woodland (Royal Botanic Gardens 2009).	**Low** – not known to occur in area. No preferred habitat within project area.
Thesium australe	Austral Toadflax	V	V	Grows in grassland on coastal headlands or grassland and grassy woodland away from the coast (Office of Environment & Heritage 2018). It is a semi-parasitic herb and hosts are likely to be *Themeda triandra* and *Poa* spp. (Harden 1992, Department of Environment and Climate Change 2008). Records within the ACT come from Mulligans Flat Nature Reserve in the north, and along the Murrumbidgee River and in Namadgi National Park in the south. In subalpine and tableland climates, the species dies back to rootstock during winter and resprouts in spring (Department of the Environment and Energy 2019).	**Moderate** – potential habitat within project area.
Senecio macrocarpus	Large-fruit Fireweed	V	–	*Senecio macrocarpus* occurs in SA, Victoria and NSW. In NSW, one population has been discovered near Gundaroo. In NSW, species occurs in partly cleared dry forests and box-gum woodlands which transition to Brittle Gum Forest with a relatively undisturbed understorey of native grasses, forbs and subshrubs (Department of Agriculture Water and the Environment 2021).	**Low** – not known to occur within ACT, closest known population occurs in Gundaroo, NSW.

B2 THREATENED FAUNA LIKELIHOOD ASSESSMENT

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Amphibians						
Litoria aurea	Green and Golden Bell Frog	V	V	Records from the ACT regions exist from the early 1960s to the mid-1980s from the Uriarra, Murrumbidgee and Ginninderra Creek areas (ACT Scientific Committee 2019). The species inhabits a wide range of waterbodies, including both natural and man-made structures, such as marshes, dams, stream sides and ephemeral ponds, particularly those containing bulrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.) (Office of Environment & Heritage 2017). It is found in small pockets of habitat in otherwise developed areas and can occur in disturbed sites. Optimum habitat includes unshaded water-bodies that are free of predatory fish (e.g. Plague Minnow (*Gambusia holbrooki*)) and have a grassy area nearby and diurnal sheltering sites available (Office of Environment & Heritage 2017). Terrestrial habitat such as consist of grassy areas and vegetation no higher than woodlands and a range of diurnal shelter sites such as rocks, logs, tussock forming vegetation (Department of Agriculture Water and the Environment 2020)	PMST ACT threatened species list ALA	**Low** – considered locally extinct within the ACT
Litoria booroolongensis	Booroolong Frog	E	–	Restricted to tablelands and slopes in NSW and north-eastern Victoria at 200-1300 m above sea level, predominantly along the western-flowing streams and their headwaters of the Great Dividing Range (Department of Agriculture Water and the Environment 2020). Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins and shelter under rocks or amongst vegetation near the ground on the stream edge (Office of Environment & Heritage 2017). One historic record (1977) of the species comes from the north west of the ACT on the Murrumbidgee River (Atlas of Living Australia 2020).	PMST	**Low** – no preferred habitat in study area

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Litoria castanea	Yellow-spotted Tree Frog	CE	CE	The species was once known from a northern and southern population. The northern population occurred in the New England Tablelands near the town of Guyra, NSW and the southern population had a distribution between Canberra, ACT and Bombala, NSW on the Southern Tablelands at altitudes between 700 and 800 m (Department of the Environment and Energy 2018). The species suffered extensive decline following the outbreak of the chytrid virus in the 1970s, and was believed to be extinct until rediscovered near Yass on the Southern Tablelands in 2009 (Office of Environment and Heritage 2017). The species is believed to be locally extinct within the ACT (ACT Scientific Committee 2019). The species requires large permanent ponds, swamps, lagoons, farm dams, and the still backwaters of rivers usually with tall reeds present (Office of Environment and Heritage 2017, Department of the Environment and Energy 2018). Shelters during autumn and winter in hollow centres of rotting logs, in earth surrounding uprooted trees, under fallen timber, rocks, other debris or thick vegetation (Office of Environment and Heritage 2017, Department of the Environment and Energy 2018).	PMST ACT threatened species list ALA	**Low** – considered locally extinct within the ACT.
Litoria raniformis	Southern Bell Frog	V	V	In the past, the Southern Bell Frog was distributed across a large area of south-east Australia, including Tasmania, at altitudes of up to 1300 m. Its range has declined over time with the most pronounced decline evident in NSW. In NSW and the ACT, the range of the species was centred on the Murray and Murrumbidgee River valleys and their tributaries (ACT Scientific Committee 2019). It is now thought to be locally extinct in the ACT (ACT Scientific Committee 2019). The species is usually found amongst emergent vegetation such as *Typha* sp. (Bullrushes), *Phragmites* sp. (reeds) and *Eleocharis* sp. (sedges) within or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds, and farm dams (Robinson 1993, Department of Agriculture Water and the Environment 2020). It also occurs in clays or well-watered sandy soils, open grassland, open woodlands and forest, marshes and swamps, steep-banked water edges (e.g. ditches and drains), irrigation channels and crops, lignum shrublands, and at the periphery of rivers (Department of Agriculture Water and the Environment 2020). Refuge sites include soil cracks, fallen timber, debris and dense vegetation on low, frequently inundated floodplains (Cogger 2000 in Department of Agriculture Water and the Environment 2020).	ACT threatened species list	**Low** – considered locally extinct within the ACT.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Litoria verreauxii alpine	Alpine Tree Frog	V	V	The Alpine Tree Frog occurs in the south-eastern NSW and Victorian high country (alpine and sub-alpine zones) generally above 1100 m asl. Most locations are within National Park and some are close to alpine resorts (Office of Environment and Heritage 2017). The species was previously thought to occur in Namadgi National Park but this has not been confirmed recently (Department of Agriculture Water and the Environment 2021). Found in a variety of habitats, including woodlands, grasslands, heath, and herb fields (ACT Scientific Committee 2019). The species uses a range of slow moving or still water bodies for breeding, including bogs, fens, stream pools, dams, drainage channels and wetlands. Non-breeding habitat and overwintering refuge may include general ground debris such as logs, leaf litter and rocks (Office of Environment and Heritage 2017).	ACT threatened species list	**Low** – closest ACT record is in Namadgi National Park, but this has not been recently confirmed. No preferred habitat in study area
Pseudophryne pengilleyi	Northern Corroboree Frog	CE	CE	Confined to the high country of the ACT and adjacent NSW, along the Brindabella and Bimberi Ranges and through the Fiery Range and Bogong Mountains (Department of the Environment and Energy 2018). The ACT population occurs as two subpopulations. One occurs only in the sub-alpine zone (above about 1400 m) from near the summit of Mount Bimberi northwards to Ginnini Flat. The other occurs at lower altitudes long the Brindabella Range from Bushrangers Creek in the ACT northwards to near California Flats in NSW (ACT Scientific Committee 2019). Habitat varies from summer to winter. In summer, breeding occurs in shallow pools and seepages in sphagnum bogs, wet tussock grasslands, fens and wet heath, and dry ephemeral waterbodies. They forage and shelter in montane forest, sub-alpine woodland and tall heath adjacent to breeding areas. Outside of the breeding season the species move away from pools to shelter under dense leaf litter, or under logs and rocks in adjacent woodland and tall moist heath (ACT Scientific Committee 2019).	ACT threatened species list	**Low** – closest known distribution is Brindabella ranges, no preferred habitat in study area.
Fish						
Gadopsis bispinosus	Two-spined Blackfish	–	V	The Two-spined Blackfish only occurs in inland drainages of south-eastern Australia, where it is restricted to cool, clear upland or montane streams with abundant instream cover, usually in the form of boulders and cobble. It is more often found in the medium to larger streams where there is greater water depth and lower stream velocity. It is not found in the smallest headwater streams but is generally found in forested catchments, where there is little sediment input to the stream from erosion or land management practices. In the ACT, the species is now found only in the Cotter River catchment upstream of the Cotter Dam (ACT Government 1999).	ACT threatened species list	**Low** – species confined to the Cotter River catchment in ACT

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Maccullochella macquariensis	Trout Cod	E	E	Once widespread in the south-eastern region of the Murray-Darling Basin with records from the Murray, Murrumbidgee and Macquarie rivers in NSW/ ACT and the Goulburn, Broken, Campaspe, Ovens, King, Buffalo and Mitta Mitta rivers in Victoria. The Murray River from Yarrawonga to Cobram is a large (60-100 m wide), slow flowing and deep (>3 m) river with a sand, silt and clay substrate, and contains abundant snags and woody debris. Seven Creeks (Victoria) is a relatively narrow (5-7 m wide) stream having a rock, gravel and sand substrate. The pools are generally less than 2 m deep and are interspersed by rapids and cascades. The physical characteristics of the Murrumbidgee River in the ACT are intermediate between Seven Creeks and the Murray River. In general, it appears that adults are essentially a pool dwelling, cover-seeking fish. In the ACT the species has been released in the Murrumbidgee River and associated tributaries (ACT Government 1999).	PMST ACT threatened species list ACTMapi – 7.9 km away (SW)	**Low** – no habitat available in study area
Maccullochella peelii	Murray Cod	V	–	The Murray Cod was historically distributed throughout the Murray-Darling Basin, which extends from southern Queensland, through NSW, the ACT and Victoria to South Australia, with the exception of the upper reaches of some tributaries. The species still occurs in most parts of this natural distribution, up to approximately 1000 m above sea level. It utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs. Preferred microhabitat consists of complex structural features in streams such as large rocks, snags (pieces of large submerged woody debris), overhanging stream banks and vegetation, tree stumps, logs, branches and other woody structures. Known to occur in Lake Ginninderra (Department of the Environment 2016).	PMST ACTMapi – 4.2 km away (SE)	**Low** – no habitat available in study area
Macquaria australasica	Macquarie Perch	E	E	Macquarie Perch are found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury/Nepean and Shoalhaven catchments. Macquarie Perch are found in both river and lake habitats; especially the upper reaches of rivers and their tributaries. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks. Spawning occurs just above riffles (shallow running water) (Department of the Environment and Energy 2019).	PMST ACT threatened species list ACTMapi – 7.9 km away (SW)	**Low** – no habitat available in study area

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Bidyanus bidyanus	Silver Perch	CE	E	The Silver Perch is found over a broad area of the Murray-Darling Basin and is often found in similar habitats to Murray Cod (*Maccullochella peelii*) and Golden Perch (*Macquaria ambigua*), i.e. lowland, turbid rivers. It prefers faster, open water, but the general scarcity of information on the habitat preferences of the species makes generalisation difficult. The species is not found in the cool, fast-flowing, upland rivers of the Murray-Darling Basin (ACT Government 2018). In the Canberra region the species has been recorded from the Murrumbidgee River where numbers recorded in a fish trap at Casuarina Sands between 1980 and 1991 declined noticeably from the mid-1980s (ACT Government 2018). In the last decade, there have been a small number of angler reports of the species within the Murrumbidgee River. In NSW bounding the ACT, the species is known from four other locations being: a stocked population in Googong Reservoir on the Queanbeyan River, a stocked population in the Yass weir pool on the Yass River; a stocked population in Lake George; and a population of unknown size in Burrinjuck dam (ACT Government 2018).	ACT threatened species list	**Low** – no habitat available in study area
Birds						
Anthochaera phrygia	Regent Honeyeater	CE; M	CE	Occurs mostly in box-ironbark forests and woodland and prefers wet, fertile sites such as along creek flats, broad river valleys and foothills. Riparian forests with *Casuarina cunninghamiana* and *Amyema cambagei* important for feeding and breeding. Spotted Gum and Swamp Mahogany forests are also important feeding areas in coastal areas. Important food trees include *Eucalyptus sideroxylon* (Mugga Ironbark), *E. albens* (White Box), *E. melliodora* (Yellow Box) and *E. leucoxylon* (Yellow Gum) (Garnett and Crowley 2000). Within the ACT Regent Honeyeaters movements are complex and usually dependent on the occurrence of blossom resource of several eucalypt species. In the ACT region individuals have regularly been associated with the occurrence of Yellow Box – Red Gum Grassy Woodland along the lower slopes of Mounts Ainslie and Majura, extending through Mulligans Flat Nature Reserve to the Sutton and Lake George areas. The occurrence of large heavily flowering eucalypts on fertile soils are important habitats for individuals. Due to the species rapid decline there has been few records of individuals within the ACT, and majority of sightings have been single birds or occasional pairs. It is perceived that the ACT region acts as an area for rare breeding summer visitors. Breeding records are rare - four pairs on the lowest western slopes of Mount Majura bordering Antill Street in Watson in early 1996 (ACT Government - Environment and Planning Directorate - Environment 2015).	PMST ACT threatened species list ALA	**Low**– preferred habitat not present

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Botaurus poiciloptilus	Australasian Bittern	E	E	The Australasian Bittern is a rare, non-breeding vagrant to the ACT. Most sightings in the region are outside the ACT. It occurs occasionally in the ACT at Jerrabomberra Wetlands and Lake Ginninderra. Opportunistic sightings at McKellar Wetland in 2014 and 2015 were recorded (ACT Scientific Committee 2019). Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds (Parsons Brinckerhoff 2004).	PMST ACT threatened species list ALA	**Low** – previously known to occur on occasion at Lake Ginninderra (4 km away) but no preferred habitat in study area.
Calidris ferruginea	Curlew Sandpiper	CE, M	–	Curlew Sandpipers occur around the coasts and are also quite widespread inland, though in smaller numbers. In NSW, they are widespread east of the Great Divide, especially in coastal regions. They are occasionally recorded in the Tablelands and are widespread in the Riverina and south-west NSW, with scattered records elsewhere. Occurs in inter-tidal mudflats of estuaries, lagoons, mangrove channels and also around lakes, dams, floodwaters and flooded saltbush surrounding inland lakes. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters (Morcombe 2003, Department of the Environment and Energy 2019).	PMST ALA	**Low** – no preferred habitat in study area.
Calyptorhynchus lathami	Glossy Black-Cockatoo	–	V	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. It inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Feeds almost exclusively on the seeds of several species of she-oak *(Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. In the ACT, they feed almost exclusively on Dropping Sheoaks (*Allocasuarina verticillata*) in larger stands. Major known feeding and breeding areas in Canberra are on Mount Majura and Mount Ainslie although have been sighted through surrounding nature reserves in the ACT. Dependent on large hollow-bearing eucalypts for nest sites (Office of Environment & Heritage 2015, ACT Government - Environment and Planning Directorate - Environment 2016).	ACT threatened species list ALA	**Low** – known to occur in Mount Majura and Mount Ainslie in ACT but sightings are rare and no preferred foraging habitat in study area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	–	V	The Brown Treecreeper is found in sub-coastal environments and the inland slopes of the Great Dividing Range from the Grampians in western Victoria, through central New South Wales to the Queensland border and north to the Bunya Mountains. In the ACT, the species is found in dry woodlands and open forest below 1000 m, including in the Clear Range and along the Lower Naas River, Campbell Park, Goorooyarroo, Burbong, former quarries south of the airport, and Castle Hill, north of Tharwa. Important habitat includes relatively undisturbed grassy woodland with native understorey; large living and dead trees for nesting and foraging and fallen timber on the ground layer (Office of Environment & Heritage 2014).	ACT threatened species list ALA	**Low** – – preferred habitat not present
Daphoenositta chrysoptera	Varied Sittella	–	V	The Varied Sittella inhabits most of mainland Australia except the treeless deserts and open grasslands. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. It builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years (Office of Environment & Heritage 2016). In the ACT, it is recorded in Aranda bushland, O'Connor and Bruce Ridges, Black Mountain, the Pinnacle Stringybark forest, Mt Ainslie–Campbell Park, Mulligan's Flat, Bluett's Eucalypt forest, Naas and Orroral valleys, Shepherd's Lookout and the Murrumbidgee River Corridor. In this region, the species has a preference for areas with Red Stringybark (*Eucalyptus macrorhyncha*) (ACT Government - Environment and Planning Directorate - Environment 2016).	ACT threatened species list ALA	**Low** – preferred habitat not present.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Gallinago hardwickii	Latham's Snipe	M	–	The species occurs permanent and ephemeral wetlands up to 2000 m above sea level. They primarily inhabit open, freshwater wetlands with a form of shelter (commonly low, dense vegetation). Occasionally, they are also recorded in saline or brackish water habitats, in modified or artificial habitats, or close to human occupation. These habitats are primarily used during migration (Department of the Environment and Energy 2019). In Australia, the species most commonly inhabit flooded meadows, season or semi-permanent swamps, or open waters. They will utilise a range of other freshwater habitats, in which the structure and composition of vegetation does not appear to alter the suitability of these habitats. Therefore, suitable freshwater habitats may occur in tussock grasslands with reeds, rushed, and sedges, alpine or coastal heathland, lignum or tea-tree scrub, open forest, alpine herbfields, and button-grass plains (Department of the Environment and Energy 2019). Latham's Snipe is a fairly common visitor to the ACT. Canberra Ornithologists Group get regular recordings across the Territory (Canberra Ornithologists Group 2017), with higher number recorded at Jerrabomberra Wetlands, where a radio tracking program for the species started recently.	PMST	**Low** – no preferred habitat in study area.
Grantiella picta	Painted Honeyeater	V	V	Lives in dry forests and woodlands. Primary food is the mistletoes in the genus *Amyema,* though it will take some nectar and insects. Its breeding distribution is dictated by presence of mistletoes which are largely restricted to older trees. Less likely to be found in in strips of remnant box-ironbark woodlands, such as occur along roadsides and in windbreaks, than in wider blocks (Garnett and Crowley 2000). In the ACT region, the species has been recorded from a range of woodlands that contain mistletoe, including River Oak (*Casuarina cunninghamiana*) woodland associated with river systems, and Yellow Box–Red Gum Woodlands at locations such as Mulligans Flat and Campbell Park (ACT Government - Environment and Planning Directorate - Environment 2015).	PMST ACT threatened species list ALA	**Low** – lack of high quality habitat or mistletoe present at study area.
Hieraaetus morphnoides	Little Eagle	–	V	The Little Eagle is distributed throughout the Australian mainland occupying habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring. Prey includes birds, reptiles and mammals, with the occasional large insect and carrion. Most of its former native mammalian prey species in inland areas are extinct and rabbits now form a major part of the diet (Marchant and Higgins 1993, Office of Environment and Heritage 2017). Within the ACT sightings have been recorded across majority of the territory, however, breeding range has been restricted to the lower parts of northern ACT around the Murrumbidgee and Molonglo river corridors (ACT Government - Environment and Planning Directorate - Environment 2016).	ACT threatened species list ALA	**Moderate** – marginal foraging habitat. Breeding habitat not present.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Hirundapus caudacutus	White-throated Needletail	M, V	V	It is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Occurs in airspace over forests, woodlands, farmlands, plains, lakes, coasts and towns. Breeds in the northern hemisphere and migrates to Australia in October-April. It is widespread in eastern and south-eastern Australia, from the islands in Torres Strait and the tip of Cape York south to Tasmania (Pizzey and Knight 2007, Department of the Environment and Energy 2019).	PMST ACT threatened species list	**Low** – may occur on occasion in aerial spaces above study area.
Lalage tricolor	White-winged Triller	–	V	The species is found across Australia. It is resident near water in the north, but nomadic and seasonally migratory through central and southern Australia and vagrant in northern Tasmania. It is also found in Indonesia and New Guinea. In the ACT region, the species is an uncommon, breeding, summer migrant, and numbers vary from year to year. In the local area, the species is found in and around grassy woodland areas including Yellow Box–Red Gum, Apple Box, Candlebark, or less commonly, Snowgum woodlands. Important habitat includes large living and dead trees and areas of grass and fallen timber for foraging. In the ACT region, records of the species are widespread, but most records are from Hall, Mulligans Flat, Goorooyarroo, the Pinnacle, Campbell Park and the Gigerline–Tharwa area (ACT Government - Environment and Planning Directorate - Environment 2016).	ACT threatened species list ALA	**Low** – uncommon in region, may pass through area however important habitat not present.
Lathamus discolor	Swift Parrot	CE	CE	Breeding occurs in Tasmania, majority migrates to mainland Australia in autumn, over-wintering, particularly in Victoria and central and eastern NSW, but also south-eastern Queensland as far north as Duaringa. In mainland Australia it is semi-nomadic, foraging in flowering eucalypts in eucalypt associations, particularly box-ironbark forests and woodlands. Preference sites with highly fertile soils where large trees have high nectar production, including along drainage lines and isolated rural or urban remnants, and for sites with flowering *Acacia pycnantha*, is indicated. Sites used vary from year to year. In the ACT region, the Swift Parrot is associated with flowering and lerping eucalypts, particularly box-ironbark communities and Yellow Box – Red Gum Woodlands. It has the potential to occur anywhere below 700m and has also been recorded in suburban environments. Majority of records of the species have been from inner Canberra suburbs, Gungahlin and Hall (Garnett and Crowley 2000, Swift Parrot Recovery Team 2001, ACT Government - Environment and Planning Directorate - Environment 2015).	PMST ACT threatened species list ALA	**Moderate –** potential habitat in plantings at edge of study area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Melanodryas cucullata cucullata	Hooded Robin (South-Eastern)	–	V	Found in south-eastern Australia, generally east of the Great Dividing Range. Found in eucalypt woodland and mallee and acacia shrubland. This is one of a suite of species that has declined in woodland areas in south-eastern Australia (Garnett and Crowley 2000, Traill and Duncan 2000). The species occupies drier eucalypt forest, woodland and scrub, grasses and low shrubs, as well as cleared paddocks with regrowth or stumps. It avoids dense forests and urban areas. Yellow Box–Red Gum Grassy Woodland provides important habitat. The species appears unable to survive in remnants smaller than 100-200ha (Department of Environment and Conservation 2005). In the ACT, the species has been recorded at Mulligans Flat Nature Reserve, Goorooyarroo Woodlands, Newline Quarry, Majura Field Firing Range and Tharwa. Black Mountain, Campbell Park, Mt Ainslie and Tuggeranong Homestead may no longer support populations of the species (Department of Environment and Conservation 2005).	ACT threatened species list ALA	**Low** – marginal foraging habitat in plantings at edge of study area however this occurs adjacent to urban area
Numenius madagascariensis	Eastern Curlew	CE; M	–	Inhabits coastal estuaries, mangroves, mud flats and sand pits. It is a migratory shorebird which generally inhabits sea and lake shore mud flats, deltas and similar areas, where it forages for crabs and other crustaceans, clam worms and other annelids, molluscs, insects and other invertebrates. Its migration route ranges from its wintering grounds in Australia to its breeding grounds in northern China, Korea and Russia (Pizzey and Knight 2007).	PMST ALA	**Low** – no preferred habitat in study area.
Petroica boodang	Scarlet Robin	–	V	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude.	ACT threatened species list ALA	**Low** – marginal habitat in plantings at edge of study area, though lacking woody debris.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Polytelis swainsonii	Superb Parrot	V	V	The Superb Parrot occurs in south-eastern Australia where it occurs on inland slopes of the Great Divide and its adjacent plains. It mainly utilises eucalypt forests and woodland especially areas along river systems which consist of *Eucalyptus camaldulensis* (River Red Gum), *E. melliodora* (Yellow Box) and E. macrocarpa (Grey Box) (Department of the Environment and Energy 2019). The species is a summer breeding migrant to the ACT, and is gradually extending its range into the ACT from western woodlands (Canberra Ornithologists Group 2017). Within the region individuals inhabit Yellow Box-Red Gum Grassy Woodlands, with Blakey's Red Gum (E. blakelyi) being an important source for nesting hollows (ACT Government 2005). The species has been recorded across the ACT, however breeding records appear to be concentrated in the north of the territory, around the Belconnen and Gungahlin regions (Canberra Ornithologists Group 2017).	PMST ACT threatened species list ALA	**Recorded -** recorded flying over study area and nesting in hollow in large Eucalypt southwest of study area
Rostratula australis	Australian Painted Snipe	E; M	E	It has been recorded at wetlands in all states of Australia. It is most common in eastern Australia, where it has been recorded at scattered locations throughout much of Queensland, NSW, Victoria and south-eastern South Australia. Inhabits shallow, vegetated, temporary or infrequently filled wetlands, including where there are trees such as *Eucalyptus camaldulensis* (River Red Gum), *E. populnea* (Poplar Box) or shrubs such as *Muehlenbeckia florulenta* (Lignum) or *Sarcocornia quinqueflora* (Samphire). Feeds at the water's edge and on mudflats on seeds and invertebrates, including insects, worms, molluscs and crustaceans. Males incubate eggs in a shallow scrape nest (Garnett and Crowley 2000). Breeding habitat requirements may be quite specific and include; shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands (Department of the Environment and Energy 2019)	PMST ACT threatened species list ALA	**Low –** no preferred habitat in study area.
Falco hypoleucos	Grey Falcon	V	–	Grey Falcons occur in arid and semi-arid Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia. The species is mainly found where annual rainfall is less than 500 mm, except when wet years are followed by drought, when the species becomes more widespread. The Grey Falcon occurs at low densities across inland Australia. The ecology of the Grey Falcon is known almost entirely from anecdotal and opportunistic observations. The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (Department of Environment and Energy 2019).	PMST	**Low –** ACT is not within species known or predicted distribution. No preferred habitat within study area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Actitis hypoleucos	Common Sandpiper	M	–	The Common Sandpiper frequents a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity. It is mostly encountered along muddy margins or rocky shores and rarely on mudflats. It has been recorded in estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves. The species is known to perch on posts, jetties, moored boats and other artificial structures, and to sometimes rest on mud or 'loaf' on rocks (Department of Agriculture Water and the Environment 2021)	PMST	**Low** – no preferred habitat within study area.
Calidris acuminata	Sharp-tailed Sandpiper	M	–	Occurs in a variety of habitats: tidal mudflat, mangrove swamps, saltmarshes, shallow fresh, brackish, salt inland swamps and lakes; flooded and irrigated paddocks, sewage farms and commercial saltfields (Department of Agriculture Water and the Environment 2021).	PMST	**Low** – no preferred habitat within study area
Pandion haliaetus	Eastern Osprey	M	–	The breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island. The total range (breeding plus non-breeding) around the northern coast is more widespread, extending from Esperance in Western Australia to NSW, where records become scarcer towards the south, and into Victoria and Tasmania, where the species is a rare vagrant. Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia (Department of Agriculture Water and the Environment 2021).	PMST	**Low** – no preferred habitat within study area.
Monarcha melanopsis	Black-faced Monarch	M	–	Mainly occurs in rainforests ecosystems. Sometimes found in or near eucalypt forests, woodlands. Especially occurs in 'marginal' habitat during winter or during migration (Department of Agriculture Water and the Environment 2021). The Canberra Ornithologists Group describes the species as a seldomly reported in the ACT, rarely occurring as far inland as the ACT. Records for the species occur from October to April (Canberra Ornithologists Group 2019).	PMST	**Low** – potential marginal habitat within the study area. The species may be observed during migration movements.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Motacilla flava	Yellow Wagtail	M	–	This species occurs in a range of habitats including estuarine habitats such as sand dunes, mangrove forests and coastal saltmarshes. This species also occurs in open grassy areas including disturbed sites such as sports grounds and has been recorded on the edges of wetlands, swamps, lakes and farm dams. This species migrates from Asia to Australia in spring-summer. It has been recorded in the estuarine areas of the Hunter River in Newcastle NSW and in QLD and the north of NT and WA (Higgins, Peter et al. 2006).	PMST	**Low –** not known to occur within ACT. No preferred habitat in study area
Rhipidura rufifrons	Rufous Fantail	M	–	Occurs in a range of habitats including the undergrowth of rainforests/wetter eucalypt forests/gullies, monsoon forests paperbarks, sub-inland and coastal scrubs, mangroves, watercourses, parks and gardens. When migrating they may also be recorded on farms, streets and buildings. Migrates to SE Australia in October-April to breed, mostly in or on the coastal side of the Great Dividing Range (Pizzey and Knight 2007).	PMST	**Low -** species may be observed during migration movements; however, the study area does not contain preferred habitat.
Invertebrates						
Euastacus armatus	Murray River crayfish	–	V	The Murray River Crayfish inhabits large and small streams in a variety of habitats including cleared pasture and dry and wet sclerophyll forests at altitudes from close to sea level to over 700 m above sea level. The species prefers faster flowing cool water habitats of the main channels of rivers, in contrast to the Yabby, which prefers slow warm water and billabongs. In lowland rivers such as the Murray and lower Murrumbidgee, the species constructs burrows in the clay river banks for shelter. In the upland rivers with stony beds such as the Tumut, Goobarragandra and upper Murrumbidgee, the species tends to use the interstitial spaces between boulders and cobbles on the river bed for shelter. Within the ACT, it is mainly found in the Murrumbidgee River, but has also been recorded from the Cotter and Paddy's Rivers (ACT Government 2015).	ACT threatened species list ACTMapi (7.9 km away – SE)	**Low –** no habitat available in study area
Perunga ochracea	Perunga Grasshopper	–	V	Important habitat for the species appears to be natural temperate grassland dominated by wallaby, kangaroo and spear grasses with forb food plants located in the inter-tussock spaces. Grass tussocks are used also to escape predators. It may also occur in open woodland areas with a grassy understorey, including the endangered Yellow Box–Red Gum Grassy Woodland community. ACT locality records include Black Mountain, Gungahlin, Majura Valley, Canberra International Airport, Jerrabomberra Valley, Molonglo valley, the Campbell Park paddocks, Belconnen Naval Station, Hall, Kambah Pool, Mt Stromlo, Reid, Weetangera and Tuggeranong (Environment ACT 2006).	ACTMapi (4.6 km away (SE)) ACT threatened species list	**Low-** preferred habitat not present.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Synemon plana	Golden Sun Moth	CE	E	The Golden Sun Moth's NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. The species' historical distribution extended from Bathurst (central NSW) through the NSW Southern Tablelands, through to central and western Victoria, to Bordertown in eastern South Australia. Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses (*Austrodanthonia* spp). Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat feature for the Golden Sun Moth, as it is typically these areas on which the females are observed displaying to attract males. Habitat may contain several wallaby grass species, which are typically associated with other grasses particularly spear-grasses *Austrostipa* spp. or Kangaroo Grass *Themeda australis*. The flight period is relatively short, typically lasting from six to eight weeks (during November and December in the ACT region, possibly earlier or later in other regions). Males fly only in bright sunshine during the warmest part of the day (1000 - 1400 hrs). Adults emerge continuously throughout the flying season (Office of Environment and Heritage 2017, Department of the Environment and Energy 2019).	PMST ACTMapi (approximately 660 m to north west) ACT threatened species list ALA	**Moderate** – small areas of potential habitat within study area.
Mammals						
Chalinolobus dwyeri	Large-eared Pied Bat	V	–	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies (Schultz, Coles et al. 1999).	PMST	**Low** – no roosting habitat identified within study area

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Dasyurus maculatus maculatus	Spotted-Tailed Quoll (Southern Subspecies)	E	V	Occurs from the Bundaberg area in south-east Queensland, south through NSW to western Victoria and Tasmania. In NSW, it occurs on both sides of the Great Dividing Range and north-east NSW represents a national stronghold (NSW National Parks and Wildlife Service 1999). In the ACT region, occasional sightings with confirmed occurrences in three locations in Namadgi National Park. Most sightings have occurred in timbered ranges and large remnant reserves (Department of Environment 2016). The preferred habitat occurs in wide range of forest types, although appears to prefer moist sclerophyll and rainforest forest types, and riparian habitat. Most common in large unfragmented patches of forest. It has also been recorded from dry sclerophyll forest, open woodland and coastal heathland, and despite its occurrence in riparian areas, it also ranges over dry ridges. Nests in rock caves and hollow logs or trees. Feeds on a variety of prey including birds, terrestrial and arboreal mammals, small macropods, reptiles and arthropods (NSW National Parks and Wildlife Service 1999, NSW National Parks and Wildlife Service 1999).	PMST ACT threatened species list ACTMapi (on site)	**Low** – though habitat is mapped in the area, no preferred habitat of sufficient size and quality was identified within study area.
Dasyurus viverrinus	Eastern Quoll		E	The Eastern Quoll was once widespread across mainland south-eastern Australia, but disappeared from the mainland in the 1960s, now persisting only in Tasmania (ACT Scientific Committee 2019). Since 2002, Eastern Quolls have been reintroduced to three mainland sites: Mt Rothwell Biodiversity Centre in Victoria, Mulligans Flat Woodland Sanctuary in the ACT (both fenced), and Booderee National Park in NSW (unfenced) (Department of Agriculture Water and the Environment 2021). The species is highly flexible in habitat selection, occupying dry sclerophyll forest, scrub heathlands, pasture and cultivated land. Home ranges vary between sexes and depending on habitat quality but range from a few hundred meters to over a kilometre a night (Office of Environment and Heritage 2019).	ACT threatened species list	**Low** – No wild populations currently occur in the ACT
Petauroides volans	Greater Glider	V	V	The Greater Glider has a restricted distribution in eastern Australia, from the Windsor Tableland in north Queensland to central Victoria, with an elevated range from sea level to 1200m above sea level. The species is largely restricted to eucalypt forests and woodlands, with a diet comprising of eucalypt leaves and occasional flowers. It is found in abundance in montane eucalypt forest with relatively old trees and an abundance of hollows. It also favours forests with a diversity of eucalypts to cater for seasonal variation in food abundance (Department of the Environment and Energy 2019). In the ACT region the species has been recorded in the Namadgi National Park and Tidbinbilla Nature Reserve during 2014 arboreal mammal surveys (ACT Government - Environment and Planning Directorate - Environment 2016).	PMST ACT threatened species list	**Low** – marginal foraging habitat but lack of preferred sheltering habitat (large, old hollows) within study area

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Petrogale penicillata	Brush-tailed Rock-wallaby	V	E	Occurs in inland and sub-coastal south eastern Australia where it inhabits rock slopes. It has a preference for rocks which receive sunlight for a considerable part of the day. Windblown caves, rock cracks or tumbled boulders are used for shelter. Occur in small groups or "colonies" each usually separated by hundreds of metres (NSW National Parks and Wildlife Service 2003). Within the ACT the species is presumed to be extinct, with the last confirmed sighting occurring at Wallaby Rocks in the TNR in 1959. However, the discovery of rock-wallaby skeletal material in NNP suggest a more recent occurrence of the species (Reside and Martin 1996). The nearest known extant colonies to the ACT are at Nattai National Park (156 km NNE of Canberra) and in Kangaroo Valley, NSW (187 km ENE of Canberra) (ACT Government - Environment and Planning Directorate - Environment 2015).	PMST ACT threatened species list	**Low** – presumed to be locally extinct, no habitat in study area.
Phascolarctos cinereus	Koala	V	V	In the ACT region, Koalas are thought to be present through the Brindabella Ranges and in the Orroral Valley, Tidbinbilla reserve and Namadgi National Park (Department of the Environment and Energy 2019). The species inhabits eucalypt woodlands and forests. Koalas Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. The preferred tree species vary widely on a regional and local basis. Some preferred species include Forest Red Gum (*Eucalyptus tereticornis*), Grey Gum (*E. punctata.*) in coastal areas, Tallowwood (*E. microcorys*) and Swamp Mahogany (*E. robusta)* are important food species, while in inland areas White Box (*E. albens*), Bimble Box (*E. populnea*) and River Red Gum (*E. camaldulensis*) are favoured (NSW National Parks and Wildlife Service 1999, NSW National Parks and Wildlife Service 2003, Office of Environment and Heritage 2017).	PMST ACT threatened species list	**Low** – marginal habitat present within study area though not known to occur here. No post 1980 records for the species within this area of the ACT.
Pseudomys fumeus	Smoky Mouse	E	E	In the ACT, the species was known from Namadgi National Park, however despite surveys, no live individuals have been recorded in the park since 1987. The Smoky Mouse occurs in a variety of vegetation communities, ranging from coastal heath to dry ridgeline forest, sub-alpine heath and, occasionally, wetter gullies. Except for the wetter sites, a consistent feature of Smoky Mouse habitats is the diversity of heath and bush-pea species present, combined with potential shelter sites in the form of woody debris or rocks. The vegetation at capture sites varies widely in age post-fire (Menkhorst and Knight 2004).	ACT threatened species list	**Low** – not recorded from ACT since the 1980's, no potential habitat within study area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Mastacomys fuscus mordicus	Broad-toothed Rat (mainland)		V	The Broad-toothed Rat has a fragmented distribution, having declined significantly since European settlement. Scattered records occur across the Great Diving Range from near Warburton (Victoria), to the Brindabella Range (ACT) and around Barrington Tops (NSW) (Threatened Species Scientific Committee, 2016). The species occurs in a range of habitats but is typically highly selective in any region. Preferred habitats include alpine and subalpine heathlands, grassland adjacent to boulder outcrops, swamps, sedgelands, coastal grassy or shrubby dunes, and occasionally forests with grassy understorey (Threatened Species Scientific Committee, 2016). The species occupies a complex of runways through dense vegetation of its wet grass, sedge or heath habitat or under snow in the winter (Office of Environment and Heritage, 2017d).	ACT threatened species list	**Low** – no preferred habitat within study area.
Pseudomys novaehollandiae	New Holland Mouse		V	New Holland Mouse has a fragmented distribution across Queensland, NSW, Victoria and Tasmania. In the ACT the species has likely been locally extinct since the 1880s, however the species has been reintroduced to Mulligans Flat Woodland Sanctuary (Department of the Environment and Energy, 2019k). Mulligans Flat Woodland Sanctuary is a predator-proof fenced sanctuary which has reintroduced many native woodland species (Capital Woodlands and Wetlands Conservation Trust, 2015). Habitat for the species includes open heathland, woodlands and forests with a heathland understorey and vegetated sand dunes (Office of Environment and Heritage, 2017e).	ACT threatened species list	**Low** - no wild populations of the species known to occur within the ACT.
Isoodon obesulus obesulus	Southern Brown Bandicoot (Eastern)		E	Inhabits a variety of habitats including heathland, shrubland, sedgeland, heathy open forest and woodland and are usually associated with infertile, sandy and well drained soils, but can be found in a range of soil types (Coates et al. 2008; Menkhorst and Seebeck 1990; NSW DEC 2006; Paull 1993). Within these vegetation communities they typically inhabit areas of dense ground cover. Species experts define suitable habitat for Southern Brown Bandicoots (eastern) to be any patches of native or exotic vegetation, within their distribution, which contains understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. In areas where native habitats have been degraded or diminished, exotic vegetation, such as Blackberry (Rubus spp.), can and often does, provide important habitat (DSEWPaC 2011g).	ACT threatened species list	**Low** – no potential habitat in study area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines (Office of Environment and Heritage 2017, Department of the Environment and Energy 2019). The species is a regular visitor to the ACT during summer and autumn months and has more recently over-wintered in the ACT. A known camp is located in Commonwealth Park, a second camp was established more recently near Lake Ginninderra and a new roosting location was potentially identified at Kowen forest in 2018 (ACT Scientific Committee 2019).	PMST ACT threatened species list ALA	**Low** – known roost camp occurs at Lake Ginninderra (4 km away). Marginal foraging habitat within study area. May fly over or occur sporadically in study area.
Reptiles						
Aprasia parapulchella	Pink-tailed Worm Lizard	V	V	This lizard is known from four sites in eastern Australia: near Canberra in the ACT, Tarcutta and Bathurst in NSW, and near Bendigo in Vic. More specifically in the ACT, known habitat include areas around Queanbeyan and regions along the Murrumbidgee and Molonglo River corridors and on adjacent outlying hills (ACT Government - Environment Planning and Sustainable Development 2018). In general, lizards occur in open grassland habitats that have a substantial cover of small rocks (Osbourne and Jones 1995). Lizards also show a preference for sunny aspects, avoiding south facing slopes, these sites tend to be well drained. Some specimens have been collected from grassland sites that appear not to support any native grasses and several animals have been found on the edge of *Callitris enlicheri* woodland and *Eucalyptus macrorhyncha* woodland (Osbourne and Jones 1995). A burrowing species, it is usually found under rocks on well-drained soil and in ant nests, occasionally with several individuals found under the same rock (Swan, Shea et al. 2004).	PMST ACT threatened species list ACTMapi (3.4 km away (NE + SW)) ALA	**Low** – no rocky habitat identified within study area.

SCIENTIFIC NAME	COMMON NAME	EPBC ACT STATUS[1]	NC ACT STATUS[2]	HABITAT DESCRIPTION	DATA SOURCE	LIKELIHOOD OF OCCURRENCE ASSESSMENT
Delma impar	Striped Legless Lizard	V	V	In the ACT region, four disjunct populations of the species are recognised: Gungahlin, Yarramundi Reach, Majura Valley and Jerrabomberra Valley (Department of the Environment 2016). Found mainly in Natural Temperate Grassland but has also been captured in modified grasslands that have a high cover of exotic grasses. The species is also found in secondary grassland near Natural Temperate Grassland and occasionally in open Box-Gum Woodland. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass (*Themeda triandra*), Spear-grasses (*Austrostipa* spp.), Poa tussocks (*Poa* spp.), and occasionally Wallaby Grasses (*Rytidosperma* spp.) Also sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter (Environment ACT 2005, Office of Environment and Heritage 2017).	PMST ACT threatened species list ACTMapi – 4.9 km from study area ALA	**Moderate** – potential habitat within study area.
Tympanocryptis pinguicolla	Grassland Earless Dragon	E	E	In the ACT region, the species is found only in a small number of sites with suitable native grassland habitat located in the Majura and Jerrabomberra valleys and one adjacent location near Queanbeyan in NSW (Environment ACT 2005). The species occurs in Natural Temperate Grassland sites dominated by wallaby grasses (*Rytidosperma* spp.), spear grasses (*Austrostipa* spp.), Poa Tussock (*Poa sieberiana*), Red Grass (*Bothriochloa macra*), and occasionally Kangaroo Grass (*Themeda australis*). Introduced pasture grasses occur at many of the sites supporting this species, which has also been captured in secondary grassland. Within its habitat, the species appears to prefer areas with a more open structure, characterised by small patches of bare ground between the grasses and herbs. In addition to tussocks, partially embedded surface rocks, and spider and insect holes are used for shelter. These are important micro-habitat elements within the grassland habitat. Rocks and arthropod holes provide important thermal refuges during temperature extremes (Department of Environment and Climate Change 2007).	PMST ACT threatened species list	**Low** – species has highly restricted distribution, not known to occur within area, marginal habitat within study area.

ABOUT US

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From: Ayyar-Biddle, Aarthi
To: Klein, Liz
Subject: FW: 7974 Fraser Primary School - Transport Impact Assessment Report - V.02
Date: Wednesday, 7 July 2021 10:53:53 AM
Attachments: image006.png
image007.png
7974 Fraser Primary School - TIA_V2.pdf
image002.jpg
image005.jpg
image008.png

OFFICIAL

Hi Liz,
I've gone through Indesco's amended report and checked against our latest round of comments. They have implemented all our comments except the one regarding Fig 2 – Proposed expansion area showing a slightly smaller area than in Fig 1. I think the difference is minor and does not impact on the outcomes or recommendations of the report. I am satisfied that the report is now ready to provide to WSP to input into the draft Planning Report - happy to discuss & hear your thoughts before proceeding,
Thanks
Aarthi

Aarthi Ayyar-Biddle | Assistant Director, Schools Planning
02 6207 4673| aarthi.ayyar-biddle@act.gov.au
System Policy and Reform Division | Education | ACT Government
GPO Box 158 Canberra ACT 2601
www.education.act.gov.au

From: [redacted]@indesco.com.au>
Sent: Tuesday, 6 July 2021 6:26 PM
To: Ayyar-Biddle, Aarthi <Aarthi.Ayyar-Biddle@act.gov.au>
Cc: Klein, Liz <Liz.Klein@act.gov.au>; [redacted]@indesco.com.au>; [redacted]@indesco.com.au>
Subject: RE: 7974 Fraser Primary School - Transport Impact Assessment Report - V.02

Hi Aarthi,
Thanks for your comments, these have been addressed in the attached TIPA.
FYI parking for staff can be provided on site or within 200m of the site. As were are in Nature Reserve lane Section 3.9.4 applies. However it'd be more common to refer to CF Zones for compliance. Both allow long stay (staff) parking within 200m of the site.

Regards,

[redacted]
P: (02) 6285 1022

From: Ayyar-Biddle, Aarthi <Aarthi.Ayyar-Biddle@act.gov.au>
Sent: Tuesday, 6 July 2021 4:51 PM
To: [redacted]@indesco.com.au>
Cc: Klein, Liz <Liz.Klein@act.gov.au>; [redacted]@indesco.com.au>; [redacted]@indesco.com.au>
Subject: RE: 7974 Fraser Primary School - Transport Impact Assessment Report - V.02

OFFICIAL

Hi [redacted]
Thank you for responding to our queries and providing an opportunity to review the Traffic Report again prior to finalising.
We have a few items that we would ask be made a bit clearer in the final version, mainly to ensure it is consistent with our scope and with the other reports under preparation to support a possible Territory Plan Variation. These are shown in the attached (edited) PDF as highlighted text and comments, so please let me know if you have any issues viewing them.
Overall we feel the edit has greatly improved the readability of the report, so thank you very much for that. We look forward to finalising it soon.
Kind Regards,
Aarthi

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From: [redacted]@indesco.com.au>
Sent: Wednesday, 23 June 2021 1:54 PM
To: Ayyar-Biddle, Aarthi <Aarthi.Ayyar-Biddle@act.gov.au>
Cc: Klein, Liz <Liz.Klein@act.gov.au>; Player, Ben <Ben.Player@act.gov.au>; [redacted]@indesco.com.au>; [redacted]@indesco.com.au>
Subject: 7974 Fraser Primary School - Transport Impact Assessment Report - V.02

Hi Aarthi,
Hope you are doing well.
7974 Fraser Primary School
Transport Impact Assessment Report – V.02
Please find the attached revised report. We revised the report by changing the wording and adding new statements to cover your comments.
As you have put some question in the report please see the below answers in this regard:
Table 7 - Is this more than one because a 'trip' is classified as either coming or going from the school? Yes, the rate includes incoming and outgoing traffic
Table 8 - What does this figure mean (in relation to the percentage of students using car figure?). What is the distance from school after which car is assumed mode? It is assumed that car will be the mode of transport for walking distances greater than 500m distance from the school site, considering that most of the parent drop off or pick up their children before and after work
Section 5.2 - But don't we say above that no additional car parking spaces are required? Correct, the statement has been provided only as general consideration of parking. Not necessarily meaning that the development needs additional staff parking.

Section 5.7 - Can it be made clear that the updated code would only apply to any new construction of bicycle parking i.e. existing bicycle parking would not be affected? Many ACT primary schools have open-air bicycle parking that was constructed prior to the updated requirements. Yes this has been clarified.

If you have any queries please feel free to contact me.

Kind regards,

[redacted]

P: (02) 6285 1022

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FRASER PRIMARY SCHOOL
TRANSPORT IMPACT ASSESSMENT REPORT

PROJECT NO: 7974
ACT EDUCATION DIRECTORATE

JULY 2021

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PROJECT TITLE: *Fraser Primary School – Transport Impact Assessment*

PROJECT NUMBER: 7974

Prepared by:		Date: 7 July 2021
Reviewed by:		Date: 7 July 2021
Approved by:		Date: 7 July 2021

Base Template:	Version B June 2020

External Issue

Revision Control Register			
Version No:	**Issue Date:**	**Issued To:**	**Name:**
Draft	14 May 2021	ACT Education Directorate	Aarthi Ayyar-Biddle
1	23 June 2021	ACT Education Directorate	Aarthi Ayyar-Biddle
2	7 July 2021	ACT Education Directorate	Aarthi Ayyar-Biddle

EXECUTIVE SUMMARY

Indesco was engaged by the ACT Education Directorate to prepare a transport impact assessment (TIA) for a potential expansion of Fraser Primary School in Fraser. The site is situated on part of Section 64 Block 6. This report assesses the proposed development on the nominated site. The following provides an executive summary of the report. The report sets out an assessment of the anticipated transport implications of the planning proposal, including consideration of the:

1. Existing traffic and parking conditions surrounding the site
2. Traffic management and safety around school
3. The traffic generation of the development and its impact on the surrounding road network
4. Suitability of parking in terms of supply
5. Pedestrian and bicycle requirements
6. Public transport connections
7. Service vehicle requirements

Traffic Impact

The traffic modelling is based on an assumed increase in student population from K-6 to 800, and preschool enrolments staying stable at 85 students. The purpose of the assessment is to support a Territory Plan proposal to expands the boundary of the existing school site.

On this basis, the proposed development is expected to generate a total of 334 and 274 trips in AM and PM school peak hour respectively.

The SIDRA modelling was undertaken to assess the impact on key external intersections.

1. Kerrigan Street / Shakespeare Crescent
2. Tillyard Drive / Kerrigan Street
3. Tillyard Drive / Daley Crescent (South)
4. Tillyard Drive / Daley Crescent (North)

Based on the SIDRA simulation results, the development will have a negligible effect on intersections traffic performance and all nominated intersections will perform with level of service A.

The current school zone needs to be extended till the end of the school boundary on the north side along Tillyard Drive with the expansion of the school.

Parking

The assumed increase to 885 total students has a parking requirement of 71 spaces; however, considering the 79 existing car parking spaces provided within the existing school area, no additional parking is required for expansion area.

The future school would have a motorcycle parking requirement of 3 spaces.

Based on the ACTPLA Parking and Vehicular Access General Code, the assumed increase to 885 total students would have a pick-up parking requirement of 36 spaces; however, considering the 16 pick-up parking spaces provided within the existing school area, and observed set-down/pick-up parking demand during school peak periods. It is recommended to provide the maximum possible number of set-down/pick-up parking in Tillyard Drive. It is also recommended to allocate a part of Shakespeare Crescent as set-down/pick-up parking.

The future school expansion would have a bicycle parking requirement of 4 spaces for staff and 59 spaces for students.

Active Travel

The following improvement works are recommended to be undertaken as part of such a development to further support walking and cycling:

- A new Children's Crossing to be considered in Tillyard Drive in front of the expansion area
- Upgrade the footpath in open space area to provide a 3m shared path for mixed pedestrian and bicycle usage
- Construct a 3m shared path along the Tillyard Drive in each verge from Daley Crescent South to Daley Crescent North intersection to cater for mixed pedestrian and bicycle usage

Public Transport Services

Public transport is not expected to be impacted significantly by an expansion of the assumed capacity; however, the school expansion design will need to position the school bus stop away from crossings. With the projected student population increase one new school bus should be provided as a part of the expansion plan.

Service Vehicles

Any loading / waste collection activities should occur on-site, and away from trunk pedestrian areas. On this basis, the physical design of the vehicle access points should consider heavy vehicles to accommodate service activities with forward entry-forward exit movements in compliance with the Development Control Code for Best Practice Waste Management in the ACT 2019.

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1. INTRODUCTION

1.1 INTRODUCTION

Indesco was engaged by the ACT Education Directorate to prepare a transport impact assessment (TIA) for expansion of the Fraser Primary School site boundary in Fraser. The site is situated on part of Section 64 Block 6. This report has been prepared to support the proposed school expansion through the analysis and assessment of traffic, parking requirements, public transport and active travel infrastructure. For this reason, an assumed increase in student population from K-6 to 800, and preschool enrolments staying stable at 85 students has been assessed.

1.2 PURPOSE OF THIS REPORT

This report sets out an assessment of the anticipated transport implications of the planning proposal, including consideration of the:

1. Existing traffic and parking conditions surrounding the site
2. Traffic management and safety around school
3. The traffic generation of the development and its impact on the surrounding road network
4. Suitability of parking in terms of supply
5. Pedestrian and bicycle requirements
6. Public transport connections
7. Service vehicle requirements

1.3 PROPONENT

The development is proposed to be undertaken by the ACT Education Directorate.

2. PROPOSED DEVELOPMENT

Fraser Primary School is located in Fraser, Section 2, Block 40 with 26,133 m^2 area. The 2021 enrolment numbers for Fraser Primary School are as follows:

- 85 preschool students
- 529 K-6 students

For the purposes of this assessment a hypothetical expansion of the student capacity of the school of up to 800 K-6 students has been assumed. The assumed expansion of student numbers is aimed to ensure that the scope of the traffic study is as wide as possible to consider the maximum potential impact.

Within the assumed increase to 885 total student population with the school expansion, the traffic assessment assesses the impact of 271 additional students in the future year scenario.

The planning proposal identifies the expansion area of the school situated to the north of the existing school as shown in Figure 1.

Figure 1: Proposed Expansion Area

3. EXISTING CONDITIONS

3.1 SUBJECT SITE

The subject site is part of Block 6, Section 64, located in Fraser, ACT. The site is bounded by Tillyard Drive to the east, residential area to the north and the subject school to the south. It is a part of an urban approved block. The site area can be seen in Figure 2.

Figure 2: Subject Site Location

Table 1 outlines the key existing features of the development site.

Table 1: Existing Features of Subject Site

Site Feature	Detail
Existing Use	Nature Reserve, Public Land
Zoning & Overlays	Suburban (RZ1), Urban Open Space (PRZ1)
Existing On-Site Car Parking	N/A
On-Street Car Parking	There is 100m of on-street parking alone the West-side of Tillyard Drive adjacent to the school.

3.2 ROAD NETWORK

Tillyard Drive is a major collector road that extends from Ginninderra Drive in the South to Kuringa Drive in the North.

Tillyard Drive provides a two (2) lane, two-way undivided carriageway.

An extension provides limited parking on the West side of the road adjacent to Fraser Primary School.

The sign posted speed limit is 60 km/h outside of the school zone.

Shakespeare Crescent is a minor collector road connected to Kerrington Street at both ends extending North.

Shakespeare Crescent provides a two (2) lane, two-way undivided carriageway.

The sign posted speed limit is 50 km/h outside of the school zone.

Kerrigan Street is a major collector road extending from Lance Hill Avenue in the West to Tillyard Drive in the East.

Kerrigan Street provides a two (2) lane, two-way undivided carriageway.

The sign posted speed limit is 60 km/h.

3.3 PRIORITY ENROLMENT AREAS (PEA)

The Priority Enrolment Area (PEA) of the Fraser Primary School is the assumed catchment for students and is adopted for the purpose of modelling traffic movements. The 2021 PEA is as follows:

- Charnwood - except south of Bettington Circuit, south of Bloxham Street and continuing from the corner of Kerrigan and Dunnett Streets
- Dunlop - north of Kerrigan Street
- Fraser

Figure 3 Shows the PEA of the Fraser primary school.

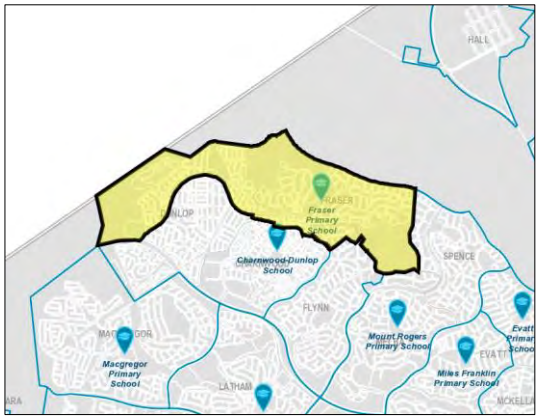

Figure 3: Priority Enrolment Areas (PEA) Map

3.4 SPEED REDUCTION & SCHOOL ZONE

Speed limit and school zone restrictions are in place along the following roads:

- Tillyard Drive, from the south of the intersection with Kerrigan Street to the north of the school
- Shakespeare Crescent from the Kerrigan Street in south for 300m to the north
- Kerrigan Street from intersection with Shakespeare Crescent to the intersection with Tillyard Drive

Figure 4 shows the nominated speed reduction and school zone.

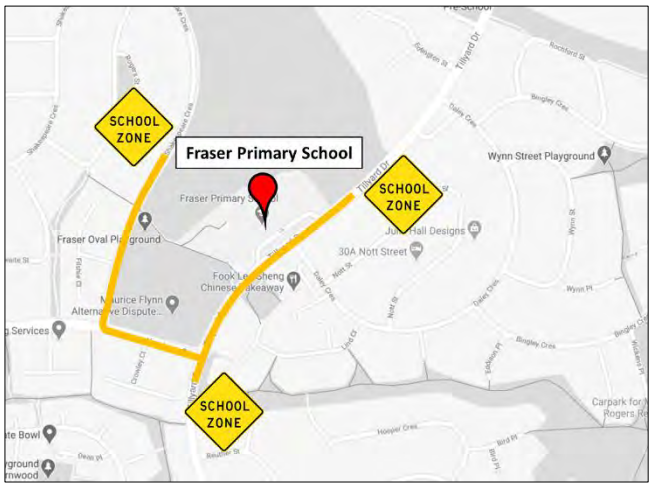

Figure 4: Existing School Zone

Figure 5 shows the existing school zone signs within the study area.

Tillyard Drive, North

Tillyard Drive, South

Kerrigan Street

Shakespeare Crescent

Figure 5: Existing School Zone Signs

3.5 ROAD CROSSING

Existing road crossing infrastructure is available at the following locations:

- An underpass crossing Tillyard Drive in south of the subject site
- A children's crossing in Shakespeare Crescent

Figure 6 shows the location of the nominated crossings.

Figure 6: Road Crossings

Despite the existing under path crossing Tillyard Drive, jaywalking was observed in that area.

3.6 PARKING

Parking spaces are located in several locations around school provided access through Tillyard Drive. The number of parking spaces are as follows:

- 77 car park spaces
- Two (2) disabled car park spaces
- One (1) bus stop space

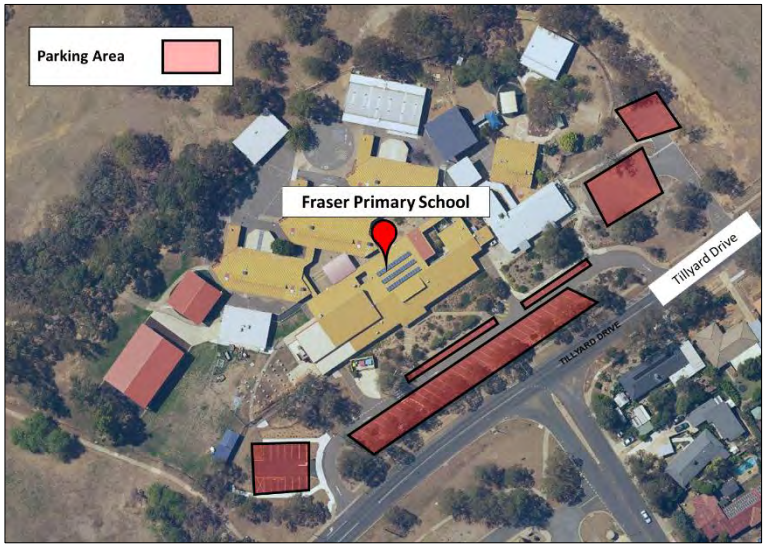

Figure 7: Existing Parking Areas

3.7 DROP-OFF & PICK-UP AREAS

Sixteen (16) drop-off/pick-up kerbside parking spaces are located on the western side of Tillyard Drive. However, this current provision does not meet the peak demand requirements. During the traffic survey undertaken on the 3rd of March 2021, the following conditions were observed:

- School driveway blocking due to parked vehicles.
- Vehicle queuing on Tillyard Drive before the school's entrance.
- Use of the shopping centre parking in east of the Tillyard Drive as a pick-up area
- Use of Shakespeare Crescent verge as a pick-up area

Figure 8: Vehicle queue in Tillyard Drive

Figure 9: Using shopping centre parking as a pick-up area

Figure 10: Using Shakespeare Crescent verge as a pick-up area

3.8 WALKING & CYCLING FACILITIES

The subject site is served by an existing pedestrian path network that provides active travel connections to the subject site. The footpaths include a 1.2m width pedestrian path in the east side of the school along with Tillyard Drive, a 2m path from Shakespeare Crescent in to Tillyard Drive and an underpass crossing Tillyard Drive to the south side of the school.

The Active Infrastructure Practitioner Tool shows that continuous active infrastructure links are present through Sutherland Crescent. These links include, community routes, on-road cycling routes and CBR cycling road which can be seen in the below figures.

Figure 11: Community Routes

Figure 12: On-Road Cycling Routes

Note: on-road active travel infrastructure does not support safe primary school student active travel to / from school.

Figure 13: CBR Cycling Route

3.9 BUS FACILITIES

The Fraser Primary School bus stop is located within the school's main entrance driveway, parallel and adjacent to Tillyard Drive.

As seen in Figure 14 and Figure 15 , route 42 travels along Tillyard Drive and two bus stops are within 200m of either side of the school. Another Route 42 stop is within 100m of the school, along Daley Crescent.

Figure 14: Bus Stops in the Study Area

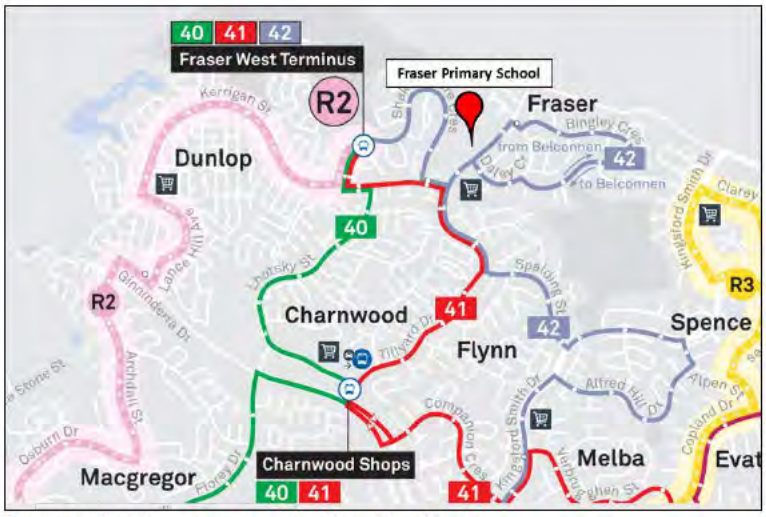

Figure 15: Bus Routes in the Study Area

The school has a bus stop in the school driveway. Figure 16 shows the school bus stop.

Figure 16: School's bus stop

3.10 HISTORICAL CRASH DATA

Historical crash data has been reviewed for the sections of Shakespeare Crescent-Kerrigan Street-Tillyard Drive-Daley Crescent. This data listed the type, location, severity and other details of all reported crashes in this section of the road network that occurred in the five years from 2015 to 2019.

The crash data showed a total of 27 crashes. Table 2 shows the details of crashes during the five-year period.

Table 2: Details of Crash Data

Location Type	Location Description	Number of Property Damage Crashes	Number of Injury Crashes	Total Number of Crashes
Intersection	Kerrigan/Tillyard	3	0	3
Mid Block	Tillyard (Kerrigan->Daley)	7	1	8
Intersection	Daley/Tillyard	3	3	6
Mid Block	Tillyard (Daley->Tillyard Service Rd)	3	1	4
Mid Block	Tillyard (Tillyard->Daley)	1	0	1
Intersection	Daley/Tillyard	2	1	3
Intersection	Kerrigan/Shakespeare	1	0	1
Mid Block	Kerrigan Street (Shakespeare -> Mckid)	1	0	1
Total		**21**	**6**	**27**

The three most prevalent crash types at the study area were as follows:

- Rear-end crashes (RUM Code 301) which accounted for 30% of all crashes
- Right rear end collisions (RUM code 303) which accounted for 22% of all crashes
- Parked collisions (RUM code 601) which accounted for 11% of all crashes

As the data shows most of the crashes are common crashes with the total number of recorded injuries being 6.

3.11 TRAFFIC SURVEY

The peak traffic survey has been undertaken by Trans Traffic Survey during the AM period (7:30am-9:30am) and PM period (2:30pm-7:00pm). A summary of the data utilised for each intersection is as follows:

- Kerrigan Street / Shakespeare Crescent
- Tillyard Drive/Kerrigan Street
- Tillyard Drive /Daley Crescent (South)
- Tillyard Drive /Daley Crescent (North)

A summary of the existing movements during each peak hour at both intersections are presented in Figure 17 and Figure 18, with the full data provided in Appendix A.

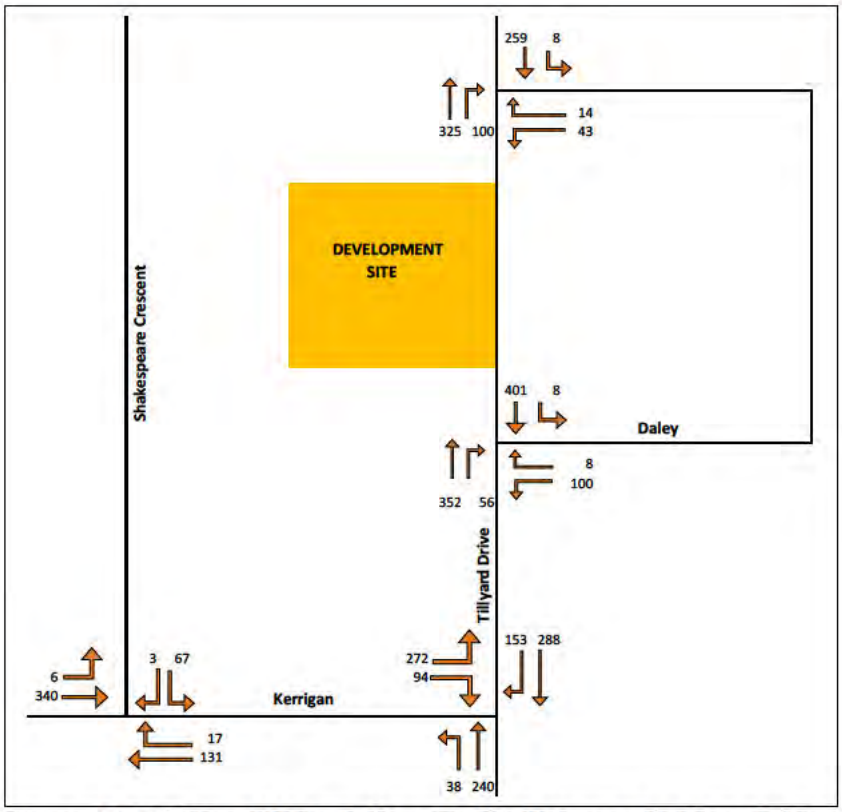

Figure 17: Existing AM Peak Hour Traffic Volumes (8:00am-9:00am)

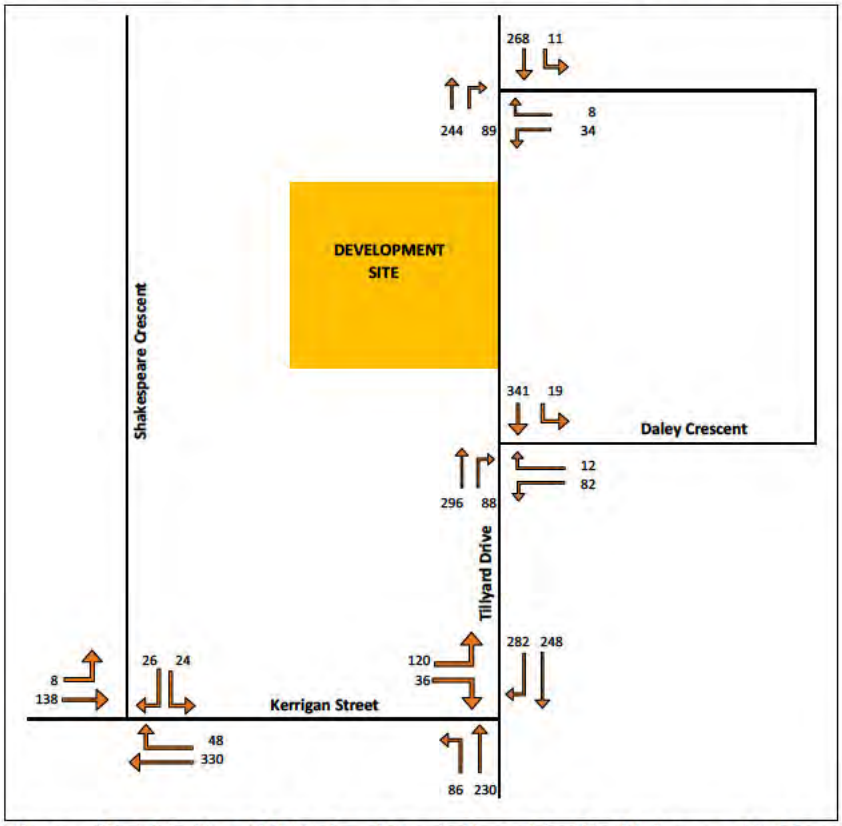

Figure 18: Existing PM School Peak Hour Traffic Volumes (2:30pm-3:30pm)

3.12 INTERSECTION PERFORMANCE

The performance of the key intersections and the site access have been assessed using SIDRA INTERSECTION 9.0 analytical traffic modelling software. SIDRA analysis defines intersection performance based on the following four key parameters:

- Degree of saturation (DOS), which represents the ratio of traffic demand to theoretical intersection capacity
- Average delay (in seconds) experienced by vehicles undertaking each movement at the intersection
- Level of Service (LOS), which converts the average delay to a letter grade that reflects the average driver's perception of the traffic conditions
- 95th percentile queue lengths, which reflect the length of queuing (in metres), on each approach lane at the intersection that has a 5% (or 1-in-20) chance of being exceeded

The *RMS* Traffic Modelling Guidelines identify the maximum practical DOS for various intersection controls as presented in the Table 3.

Table 3: Maximum Practical DOS for Various Intersection Controls

Intersection Control	Maximum Practical DOS
Traffic Signals	0.90
Roundabout (incl. Metered)	0.85
Priority-Controlled	0.80

The RMS Traffic Modelling Guidelines also identify LOS criteria for intersections as shown in the Table 4.

Table 4: LOS Criteria for Intersection

LOS	Average delay per vehicle
A	≤ 14s
B	15s – 28s
C	29s – 42s
D	43s – 56s
E	57s – 70s
F	> 70s

95th percentile queue lengths have been assessed against the available storage length within each respective lane.

Table 5 summarises the performance of Intersections' existing condition. Further details of the SIDRA analysis are provided at Appendix C.

Table 5: Intersection Performance Summary - Existing Conditions (AM & PM Peak Hours)

Intersection	Intersection Arrangement	AM Peak Hour				PM Peak Hour			
		DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
Kerrigan St /Shakespeare Cr	Give-way Intersection	0.195	0.8	A	1.5	0.218	0.8	A	2.9
Tillyard Dr /Kerrigan St	Give-way Intersection	0.253	2.4	A	8.2	0.314	2.6	A	13.6
Tillyard Dr /Daley Cr (South)	Give-way Intersection	0.235	1	A	3.9	0.223	1.3	A	5.4
Tillyard Dr /Daley Cr (North)	Give-way Intersection	0.241	1.4	A	5.7	0.19	14	A	4.7

The SIDRA simulation results show that nominated intersections operate with acceptable performance (LOS A) in AM and PM peak hours.

4. TRAFFIC ASSESSMENT

4.1 TRAFFIC GENERATION

The schools' trip generation survey undertaken by GTA Consultant in NSW provides guidance on traffic generation rates for school. Given the location of subject school, the traffic generation rate is as follows:

AM school peak: 1.23 vehicle trip per student

PM school peak: 1.01 vehicle trip per student

Table 6 summarises the traffic generation for the proposed development for the additional 271 students.

Table 6: Traffic Generation

Land Use	Number of Students	AM Volumes		School PM Volumes	
		Rate	No	Rate	No
School	271	1.23 vehicle trip per student	334	1.01 vehicle trip per student	274
Total			**334**		**274**

4.2 SITE ACCESS

The assessment assumes the provision of one vehicle access point (driveway) onto Tillyard Drive from the site's eastern side. In addition, it is anticipated that this access point will be utilised by all service/waste vehicles.

4.3 TRAFFIC DISTRIBUTION

Traffic volumes generated by the school have been distributed in the surrounding road network via two key routes. Traffic distribution is derived using the PEA catchment area for the school. Mode split is considerate of the proximity between school and dwelling within the PEA. It is also assuming that car will be used for more than 500m distance, considering that most of the parent drop off or pick up their children before and after work. Table 7 shows the calculation of the number of students using car as transport in each suburb.

Table 7: Calculation of The Number of Students Using Car as Transport

Suburbs	Fraser	Dunlop
Population	2026	7197
Number of pre and primary school Students	234	1001
Area (Km^2)	2.5	3.6
PEA Area (Km^2)	2.5	1
Affected students	234	278
Catchment % using car as the mode of transport	80%	100%
Number of students by car	187	278
Percentage of students by car	40%	60%

Given the location of the school in the centre of Fraser suburb, it is assumed that the traffic going to Fraser will be equally distributed between the north and west route.

A summary of the adopted allocations is provided in Table 8, whilst a summary diagram of the two key distribution routes through the local road network are provided in Figure 19.

Table 8: Traffic Distribution

Route	Streets	Allocation
North	Tillyard Drive north, Daley Crescent	20%
West	Tillyard Drive south, Kerrigan Street west	80%
Total		**100%**

Figure 19: Traffic Distribution Routes

The inbound/outbound splits for the trip distribution based on the schools' trip generation survey undertaken by GTA Consultant in NSW is as the Table 9.

Table 9: Inbound and Outbound Splits

Land Use	Peak	Inbound	Outbound
School	AM	51%	49%
	PM	49%	51%

4.4 PEAK HOUR TRAFFIC VOLUME ANALYSIS

4.4.1 Development Peak Hour Volumes

The turning movements generated by the development on the road network are shown in Figure 20 and Figure 21.

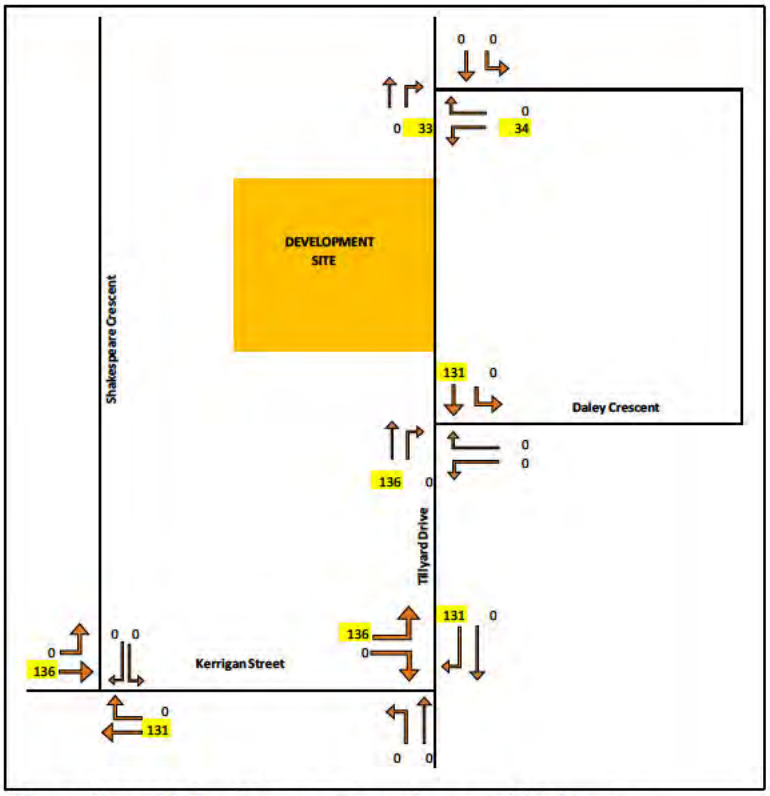

Figure 20: AM Peak Hour – Development Volumes

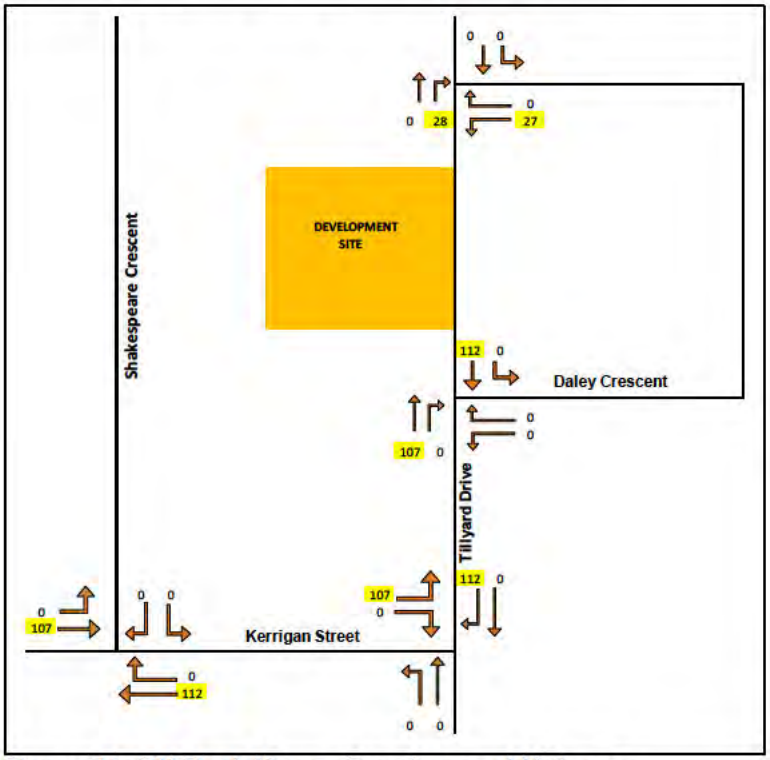

Figure 21: PM Peak Hour – Development Volumes

4.4.2 Future Scenario Non-Development Traffic Volumes

A 'future' traffic volume data set has also been developed by applying annual growth rate of 1.5% (derived from CSTM Data) to all traffic movement in the network. A growth factor of 1.5% p.a. (linear) has been adopted for analysis, applied over a 10-year period.

The future scenario volumes are shown in Figure 22 and Figure 23.

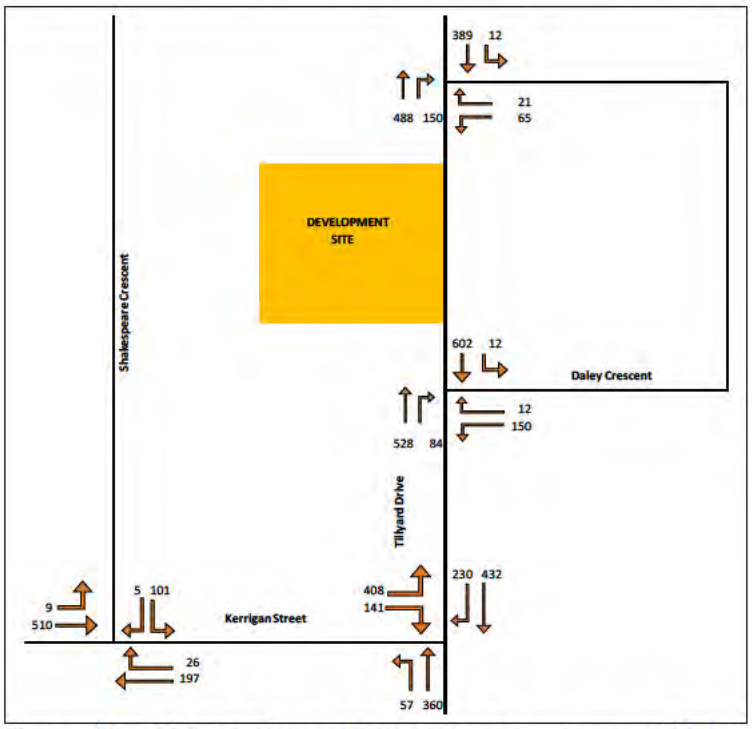

Figure 22: AM Peak Hour – Future Non-Development Volumes

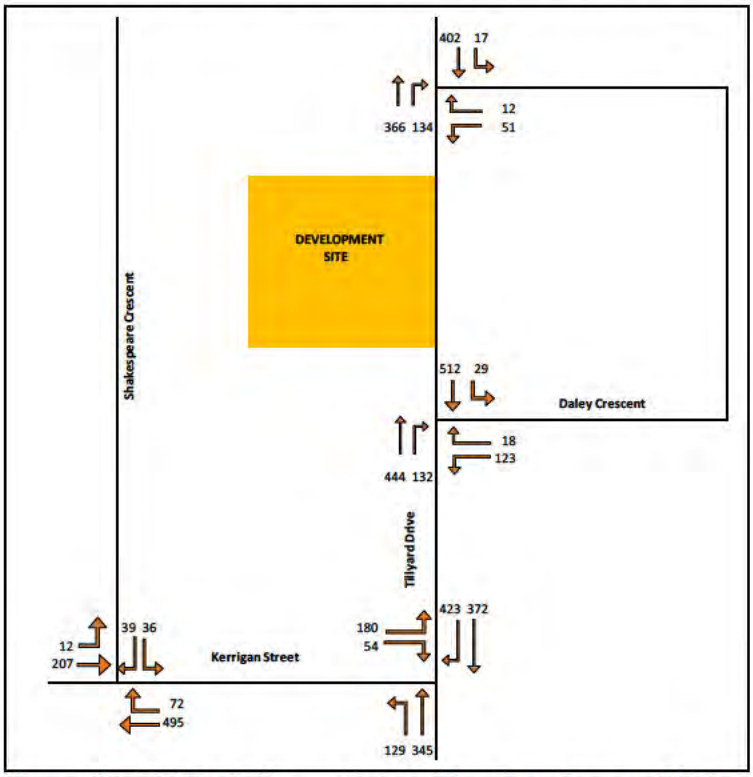

Figure 23: PM Peak Hour – Future Non-Development Volumes

4.4.3 Future Scenario Post-Development Traffic Volumes

Future traffic volumes with considering development's traffic generation are shown in Figure 24 and Figure 25.

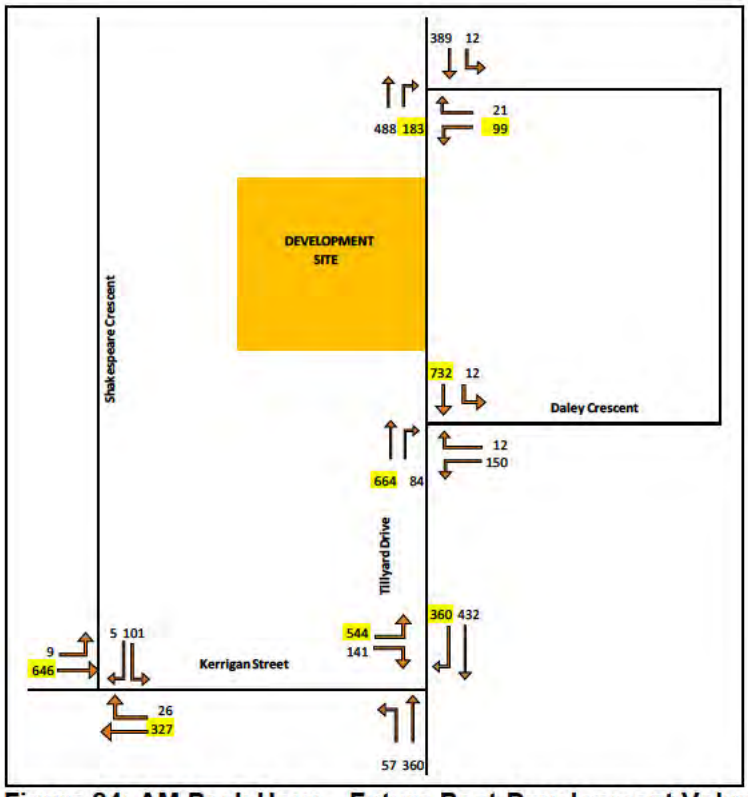

Figure 24: AM Peak Hour – Future Post-Development Volumes

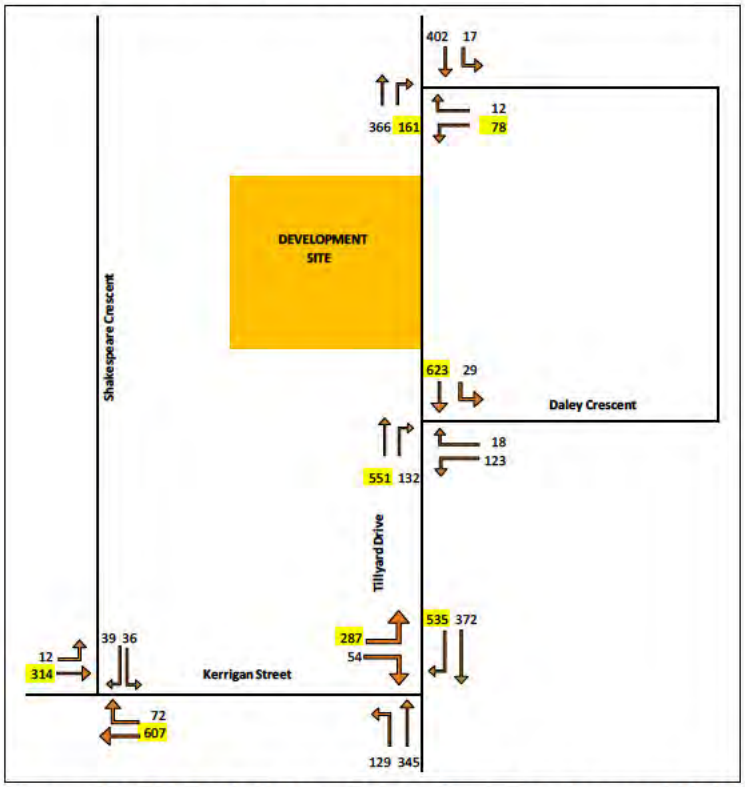

Figure 25: PM Peak Hour – Future Post-Development Volumes

4.4.4 Intersection Capacity Analysis – Post Development & Future

SIDRA modelling has been undertaken for the future traffic volumes scenario. A summary of the SIDRA model outputs for each intersection in 2031 Non-development scenario is shown in Table 10. Further details of the SIDRA analysis are provided in Appendix E.

Table 10: Intersection Performance Summary – Future Non-Development

Intersection	Intersection Arrangement	AM Peak Hour				PM Peak Hour			
		DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
Kerrigan St /Shakespeare Cr	Give-way Intersection	0.29	1	A	2.8	0.332	0.9	A	5.4
Tillyard Dr /Kerrigan St	Give-way Intersection	0.402	3.1	A	19	0.522	3.8	A	40.9
Tillyard Dr /Daley Cr (South)	Give-way Intersection	0.371	1.6	A	10.4	0.356	1.8	A	12.9
Tillyard Dr /Daley Cr (North)	Give-way Intersection	0.376	1.8	A	12.2	0.298	1.7	A	9

A summary of the SIDRA model outputs for each intersection in 2031 post development scenario (Future) is shown in Table 11. Further details of the SIDRA analysis are provided in Appendix F.

Table 11: Intersection Performance Summary – Future Post-Development

Intersection	Intersection Arrangement	AM Peak Hour				PM Peak Hour			
		DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
Kerrigan St /Shakespeare Cr	Give-way Intersection	0.365	1	A	3.4	0.401	1	A	7.9
Tillyard Dr /Kerrigan St	Give-way Intersection	0.496	3.9	A	34.1	0.605	4.5	A	57.7
Tillyard Dr /Daley Cr (South)	Give-way Intersection	0.463	1.8	A	15.8	0.433	2.1	A	18.8
Tillyard Dr /Daley Cr (North)	Give-way Intersection	0.398	2.2	A	15.6	0.317	2	A	10.7

The SIDRA simulation results show that nominated intersections operate with acceptable performance (LOS A) in future post-development scenario. Therefore, the traffic impact of the school expansion is negligible and the operation of the road network will operate at an acceptable level of performance.

5. CAR PARKING ASSESSMENT

5.1 CAR PARKING REQUIREMENTS

Under the modelling scenario of an assumed additional 271 K-6 students, the site will accommodate an 885 total student population.

The ACTPLA Parking and Vehicular Access General Code provides car parking requirements for developments.

In this case, the subject site is defined as a community facility zone and the development is classified under pre-, primary & high schools. As such, the two parking requirements are as follows:

- 0.8 spaces per 10 students
- 0.4 set-down/pick-up spaces per 10 students

Based on the above rates, the car parking requirements for the proposed development are shown in Table 12.

Table 12: Car Parking Assessment

Land Use	Type	Number / Size	Car parking Rate	Parking Requirement (space)
Community Facility Zone (Pre-school)	Regular (staff)	885 Students	0.8 Spaces/10 Students	71
	Set-down / Pick-up	885 Students	0.4 spaces/10 students	36
Total				**107**

Considering the 79 existing carparking spaces provided within the existing school area, no additional parking is required for the expansion area.

Given the 16 existing set-down/pick-up parking spaces, 20 additional set-down/pick-up parking spaces are required to comply with the requirements of the Code.

However, considering the existing set-down/pick-up parking demand during school peak periods, which is the cause of queue and congestion in the school driveway and Tillyard Drive, it is recommended to provide an additional set-down/pick-up parking allowance of 36 spaces along Tillyard Drive and Shakespeare Crescent.

5.2 CAR PARKING LOCATION

The ACTPLA Parking and Vehicular Access General Code also provides guidance in relation to the location of car parking.

For the land use of the site, the following requirements apply:

- Pick-up (short term) – On-site or within 100m
- Staff Parking (long term) – On-site or within 200m

In view of the above, the parking spaces associated with set-down/pick-up are required to be provided on-site or within 100m of the school entrance(s).

The parking spaces associated with staff (long term) are provided on-site, consistent with the requirements of the Code.

5.3 DROP-OFF & PICK-UP AREAS REQUIREMENTS

Section 5.7 of the ACT's Traffic Management and Safety Guide indicates that "No Parking" and pick-up areas on the same side of the road as the school may be used as pick-up/drop-off areas as long as parents/guardians are able to do so within a two minute timeframe and remain in control of the vehicle while doing so. These areas should be located within 100m of the school.

Section 5.8 of the same guideline states that drop-off points can be located 500m – 1km from the school and is an effective strategy to reduce traffic around the school gate and enable children to have a short walk before school. Schools can identify safe drop off points a short distance from school and encourage parents to drop their children off to walk the rest of the way on their own or walk with them. Ideally schools can nominate a time that families can meet at the drop off points so students can walk together in a group.

5.4 BUS STOP REQUIREMENTS

Section 5.4 of the ACT's Traffic Management and Safety Guide specifies that, wherever possible, bus stops should be located away from crossings and with good visibility. Crossings to and from the bus stop should also have good visibility. Vehicles should not stop within 20m of the rear and 10m of the front of the bus. Bus zone signs should be used in the case of multiple buses. Bus stops should also avoid preventing other vehicles from circulating, especially when stationed for longer timeframes. Given the increase in the number of students in future plan, a new school bus should be provided as a part of the expansion plan.

5.5 DISABLED CAR PARKING

The ACTPLA Parking and Vehicular Access General Code requires that a minimum of 3% of all parking spaces be disabled parking spaces. Therefore, a minimum of three (3) disabled parking spaces are required for regular parking and none for pick-up parking.

5.6 MOTORCYCLE PARKING

The ACTPLA Parking and Vehicular Access General Code requires that a minimum of three (3) dedicated motorcycle parking spaces per 100 long term parking spaces. As such, three (3) motorcycle parking spaces are required to be within 200m of the site.

5.7 BICYCLE PARKING

The provision of bicycle parking is set out in the ACTPLA Bicycle Parking General Code.

For primary schools, the code requires 1 space per 200 students after the first 200 students and 1 student parking space per 15 students. A summary of the bicycle parking requirements is provided in Table 13.

Table 13: Bicycle Parking Assessment

Land Use	Number of Students	User Type	Bicycle Parking Rate	Bicycle Parking Requirement (space)
Primary School	885	Staff	1 space/200 students after first 200	4
		Students	1 space per 15 students	59
Total				**63**

For student bicycle parking the code requires that cages or compounds containing installations such as metal hoops and rails should be used to securely lock the bikes. Therefore, it is recommended that any new bicycle parking required with the school expansion address the following items:

- Secure area for students/staff
- The storage area contains the installations mentioned above
- Meet the Section 4 requirements of the Bicycle Parking General Code

The space should be located conveniently to access the surrounding bicycle facilities and the proposed development.

6. ACTIVE TRAVEL ASSESSMENT

Whilst the existing network provides good walking and cycling linkages to the existing school boundary, given that the future expansion area which is far from the existing underpass crossing in south of the existing school, the following improvement works are recommended as part of the proposed development to continue to support walking and cycling modes of travel:

- A new Children's Crossing to be considered in Tillyard Drive in front of the expansion area
- Upgrade the footpath in open space area to provide a 3m shared path for mixed pedestrian and bicycle usage
- Construct a 3m shared path along Tillyard Drive in both sides from Daley Crescent South to Daley Crescent North intersection to provide shared path for mixed pedestrian and bicycle usage

Section 5.3.1 of the ACT's Traffic Management and Safety Guide indicates that the Children's crossings are appropriate when the minimum number of students crossing per peak half hour is 20 and the minimum number of vehicles passing in the same half hour is 50. Crossing movements should be contained within a 30m section of road.

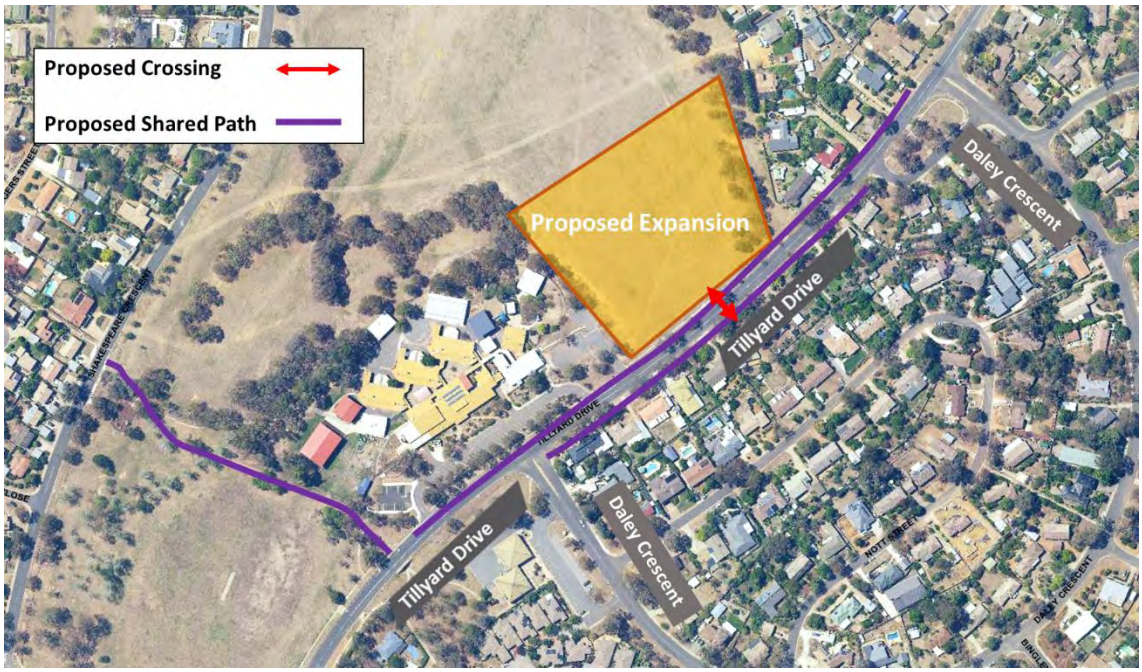

Figure 26: Proposed Active Travel Improvements

7. SERVICE VEHICLES

Any loading / waste collection activities should occur on-site. On this basis, the physical design of any new vehicle access points should consider heavy vehicles to accommodate service activities with forward entry-forward exit movements in compliance with the Development Control Code for Best Practice Waste Management in the ACT 2019. Waste collection points and waste truck routes should be arranged in a way to avoid conflict with pedestrian and students access points and paths.

8. CONSTRUCTION CONSIDERATIONS

Construction vehicles will be subject to individual and specific traffic management plans. Separation of construction access and general school and public travel is essential. It is recommended to minimise the construction activities, and truck movements along Tillyard Drive during AM and PM school peak.

9. CONCLUSION

Indesco was engaged by the ACT Education Directorate to prepare a transport impact assessment (TIA) for expansion of Fraser Primary School in Fraser, Section 64, Block 6.

For the purposes of this assessment, an upper limit expansion of the student population to 800 K-6 students and 85 preschool students is assumed.

SIDRA modelling was undertaken to assess the impact on key external intersections.

1. Kerrigan Street / Shakespeare Crescent
2. Tillyard Drive / Kerrigan Street
3. Tillyard Drive / Daley Crescent (South)
4. Tillyard Drive / Daley Crescent (North)

The analysis and relevant discussion in this report led to the following conclusions:

1. The assumed increase to 885 total students for modelling purposes is expected to generate an additional 334 and 274 trips in AM and PM school peak hour respectively.
2. Based on the SIDRA simulation results, the development will have a negligible effect on intersections traffic performance and all nominated intersections will perform with the level of service A.
3. The assumed increase to 885 total students would have a parking requirement of 71 spaces; however, considering the 79 existing car parking spaces provided within the existing school area, no additional parking is required for the expansion area.
4. The expanded school would have a motorcycle parking requirement of 3 spaces.
5. Based on the ACTPLA Parking and Vehicular Access General Code, the assumed increase to 885 total students would have a pick-up parking requirement of 36 spaces; however, considering provision of 16 pick-up parking spaces within the existing school area, and observed set-down/pick-up parking demand during school peak hour, which is the cause of queue and congestion in the school driveway and Tillyard Drive, it is recommended to provide the maximum possible number of set-down/pick-up parking in Tillyard Drive. It is also recommended to allocate a part of Shakespeare Crescent as set-down/pick-up parking.
6. The school will have a total bicycle parking requirement of 4 spaces for staff and 59 spaces for students.
7. The following improvement works are recommended to be undertaken as part of the proposed development to further support walking and cycling:
   - A new Children's Crossing to be considered in Tillyard Drive in front of the expansion area
   - Consider upgrading footpath adjacent to expansion area to provide a 3m shared path for mixed pedestrian and bicycle usage
   - Construct a 3m shared path along the Tillyard Drive in each verge from Daley Crescent South to Daley Crescent North intersection to provide shared path for mixed pedestrian and bicycle usage
8. The current school zone needs to be extended to the end of the school boundary on the north side along Tillyard Drive in future design.
9. Public transport is not expected to be impacted significantly by the proposed expansion; however, in the future design, the school bus stop will need to be located away from crossings. One new school bus will be required as a part of the school expansion.
10. The final design of any new site access arrangements must allow for the trucks associated with service and loading on the subject site.

Appendix A: Peak Hour Traffic Counts

TRANS TRAFFIC SURVEY

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TURNING MOVEMENT SURVEY

Intersection of Tillyard Drive and Delay Crescent (North), Fraser

GPS *-35.189794, 149.046715*

Date:	Tue 27/04/21
Weather:	Fine
Suburban:	Fraser
Customer:	Indesco

North East:	Tillyard Drive
South East:	Delay Crescent (North)
South West:	Tillyard Drive
West:	N/A

Survey Period	AM:	7:30 AM-10:30 AM
	PM:	3:30 PM-3:30 PM
Traffic Peak	AM:	8:15 AM-9:15 AM
	PM-SCH	2:30 PM-3:30 PM
	PM:	4:45 PM-5:45 PM

All Vehicles

Time		North Approach Tillyard Drive			East Approach Delay Crescent (North)			South Approach Tillyard Drive			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
7:30	7:45	0	46	2	0	4	10	0	4	68	595	
7:45	8:00	0	48	0	0	13	7	0	0	71	630	
8:00	8:15	0	56	5	0	8	3	0	5	90	715	
8:15	8:30	0	60	3	0	5	9	0	0	78	749	Peak
8:30	8:45	0	63	1	0	5	5	0	13	82	709	
8:45	9:00	0	75	4	0	1	17	0	37	90		
9:00	9:15	0	61	0	0	3	12	0	50	75		
9:15	9:30	0	41	1	0	2	4	0	9	58		
14:30	14:45	0	53	2	0	4	5	0	5	52	654	Peak
14:45	15:00	0	67	4	0	0	11	0	6	54		
15:00	15:15	0	67	4	0	1	7	0	48	53		
15:15	15:30	0	81	1	0	3	11	0	30	85		
15:30	15:45	0	91	3	0	3	10	0	4	51	703	
15:45	16:00	0	94	1	0	1	8	0	5	70	709	
16:00	16:15	0	80	2	0	3	5	0	7	75	734	
16:15	16:30	0	96	2	0	1	7	0	9	75	793	
16:30	16:45	0	77	4	0	2	9	0	8	68	855	
16:45	17:00	0	109	4	0	0	11	0	9	71	893	Peak
17:00	17:15	0	111	5	0	3	4	0	10	98	855	
17:15	17:30	0	107	4	0	3	11	0	14	113	791	
17:30	17:45	0	95	4	0	2	9	0	13	83	683	
17:45	18:00	0	78	1	0	0	4	0	11	72		
18:00	18:15	0	63	3	0	4	5	0	11	81		
18:15	18:30	0	73	3	0	0	6	0	10	52		

Peak Time		North Approach Tillyard Drive			East Approach Delay Crescent (North)			South Approach Tillyard Drive			Peak total
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	
8:15	9:15	0	259	8	0	14	43	0	100	325	749
14:30	15:30	0	268	11	0	8	34	0	89	244	654
16:45	17:45	0	422	17	0	8	35	0	46	365	893

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Tillyard Drive and Delay Crescent (South), Fraser

GPS	*-35.192144, 149.043685*
Date:	Tue 27/04/21
Weather:	Fine
Suburban:	Fraser
Customer:	Indesco

North East:	Tillyard Drive
South East:	Delay Crescent (South)
South West:	Tillyard Drive
West:	N/A

Survey Period	AM:	7:30 AM-10:30 AM
	PM:	3:30 PM-3:30 PM
Traffic Peak	AM:	8:15 AM-9:15 AM
	PM-SCH:	2:30 PM-3:30 PM
	PM:	4:45 PM-5:45 PM

All Vehicles

Time		North Approach Tillyard Drive			East Approach Delay Crescent (South)			South Approach Tillyard Drive			Hourly Total	
Period Start	**Period End**	**U**	**SB**	**L**	**U**	**R**	**L**	**U**	**R**	**NB**	**Hour**	**Peak**
7:30	7:45	0	60	0	0	3	8	0	9	68	650	
7:45	8:00	0	60	1	0	0	16	0	4	67	711	
8:00	8:15	0	61	2	0	1	21	0	2	94	849	
8:15	8:30	0	76	2	0	2	17	0	4	72	925	Peak
8:30	8:45	0	74	1	0	2	26	0	14	92	888	
8:45	9:00	0	122	3	0	2	30	0	22	107		
9:00	9:15	0	129	2	0	2	27	0	16	81		
9:15	9:30	0	51	1	0	4	15	0	7	58		
14:30	14:45	0	55	4	0	1	10	0	14	61	838	Peak
14:45	15:00	0	66	8	0	4	13	0	19	74		
15 00	15:15	0	102	4	0	3	37	0	27	70		
15:15	15:30	0	118	3	0	4	22	0	28	91		
15:30	15:45	0	100	3	0	2	14	0	12	52	806	
15:45	16:00	0	105	4	0	3	9	0	12	71	821	
16 00	16:15	0	88	1	0	1	10	0	17	80	848	
16:15	16:30	0	107	3	0	2	11	0	16	83	922	
16:30	16:45	0	86	4	0	3	11	0	18	76	980	
16:45	17:00	0	127	1	0	2	12	0	21	68	1030	Peak
17 00	17:15	0	124	7	0	1	16	0	13	110	1003	
17:15	17:30	0	130	3	0	7	8	0	22	110	912	
17:30	17:45	0	118	3	0	3	13	0	19	92	805	
17:45	18:00	0	90	3	0	1	16	0	14	80		
18 00	18:15	0	65	5	0	0	7	0	19	84		
18:15	18:30	0	81	3	0	1	15	0	16	57		

Peak Time		North Approach Tillyard Drive			East Approach Delay Crescent (South)			South Approach Tillyard Drive			Peak total
Period Start	**Period End**	U	WB	L	U	R	L	U	R	EB	
8:15	9:15	0	401	8	0	8	100	0	56	352	925
14:30	15:30	0	341	19	0	12	82	0	88	296	838
16:45	17:45	0	499	14	0	13	49	0	75	380	1030

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Kerrigan St and Shakespeare Cr, Fraser

GPS *-35.193604, 149.039727*

Date:	Wed 03/03/21
Weather:	Overcast
Suburban:	Fraser
Customer:	Indesco

North:	Shakespeare Cr
East:	Kerrigan St
South:	N/A
West:	Kerrigan St

Survey Period	AM:	7:30 AM-9:30 AM
	PM:	2:30 PM-6:30 PM
Traffic Peak	AM:	8:00 AM-9:00 AM
	PM-SCH	2:30 PM-3:30 PM
	PM:	4:15 PM-5:15 PM

All Vehicles

Time		North Approach Shakespeare Cr			East Approach Kerrigan St			West Approach Kerrigan St			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
7:30	7:45	0	0	11	0	3	14	0	68	0	443	
7:45	8:00	0	0	8	0	5	30	0	72	1	493	
8:00	8:15	0	1	11	0	4	20	0	79	2	564	Peak
8:15	8:30	0	0	19	0	4	25	0	65	1	562	
8:30	8:45	0	2	23	0	4	34	0	82	1	536	
8:45	9:00	0	0	14	0	5	52	0	114	2		
9:00	9:15	0	2	13	0	7	53	0	40	0		
9:15	9:30	0	6	13	0	8	30	0	30	1		
14:30	14:45	0	5	5	0	10	84	0	47	3	574	
14:45	15:00	0	8	7	0	14	81	0	22	1	549	
15:00	15:15	0	5	5	0	10	84	0	47	3	553	
15:15	15:30	0	8	7	0	14	81	0	22	1	511	
15:30	15:45	0	3	7	0	14	65	0	40	0	522	
15:45	16:00	0	1	10	0	19	63	0	44	0	538	
16:00	16:15	0	0	7	0	15	50	0	40	0	556	
16:15	16:30	0	2	8	0	11	80	0	43	0	584	
16:30	16:45	0	1	4	0	10	76	0	54	0	606	
16:45	17:00	0	0	5	0	12	86	0	50	2	610	Peak
17:00	17:15	0	1	5	0	9	69	0	55	1	610	Peak
17:15	17:30	0	1	6	0	10	100	0	49	0	600	
17:30	17:45	0	1	7	0	10	87	0	44	0	588	
17:45	18:00	0	2	6	0	14	84	0	47	2	559	
18:00	18:15	0	0	3	0	6	80	0	40	1	507	
18:15	18:30	0	1	7	0	23	73	0	49	1		
18:30	18:45	0	2	6	0	15	57	0	40	0		
18:45	19:00	0	0	0	0	8	57	0	38	0		

Peak Time		North Approach Shakespeare Cr			East Approach Kerrigan St			West Approach Kerrigan St			Peak
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
8:00	9:00	0	3	67	0	17	131	0	340	6	564
14:30	15:30	0	26	24	0	48	330	0	138	8	574
16:15	17:15	0	3	23	0	41	342	0	198	3	610

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Kerrigan St and Tillyard Dr, Fraser

GPS *-35.194101, 149.041756*

Date:	Wed 03/03/21
Weather:	Overcast
Suburban:	Fraser
Customer:	Indesco

North:	Tillyard Dr
East:	N/A
South:	Tillyard Dr
West:	Kerrigan St

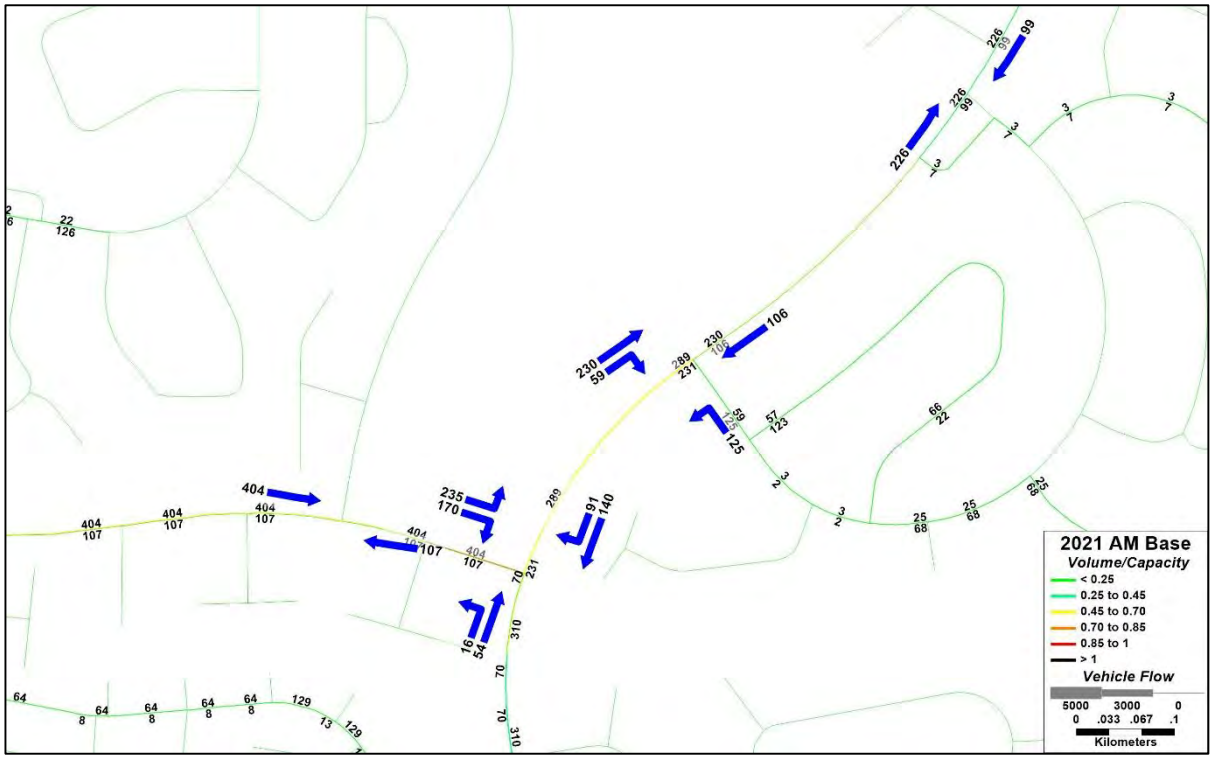
Survey Period	AM:	7:30 AM-9:30 AM
	PM:	2:30 PM-6:30 PM
Traffic Peak	AM:	8:15 AM-9:15 AM
	PM-SCH:	2:30 AM-3:30 PM
	PM:	4:15 PM-5:15 PM

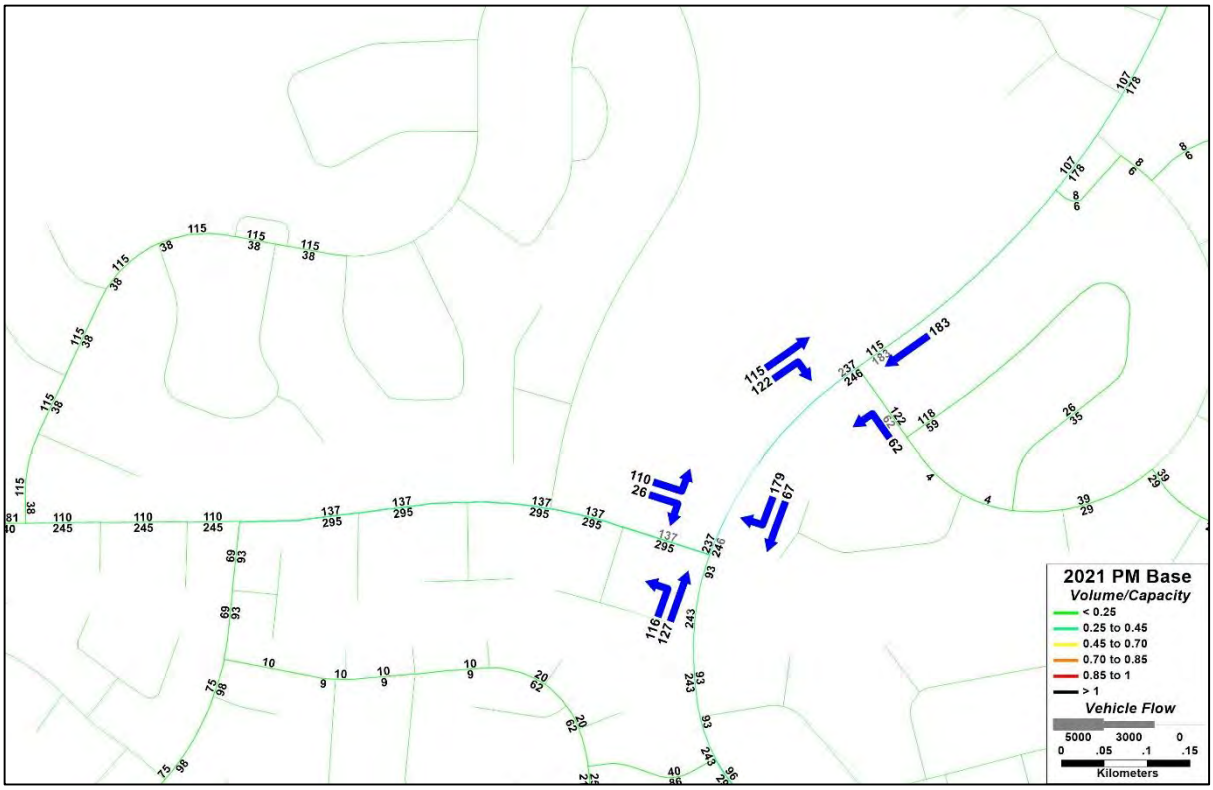
All Vehicles

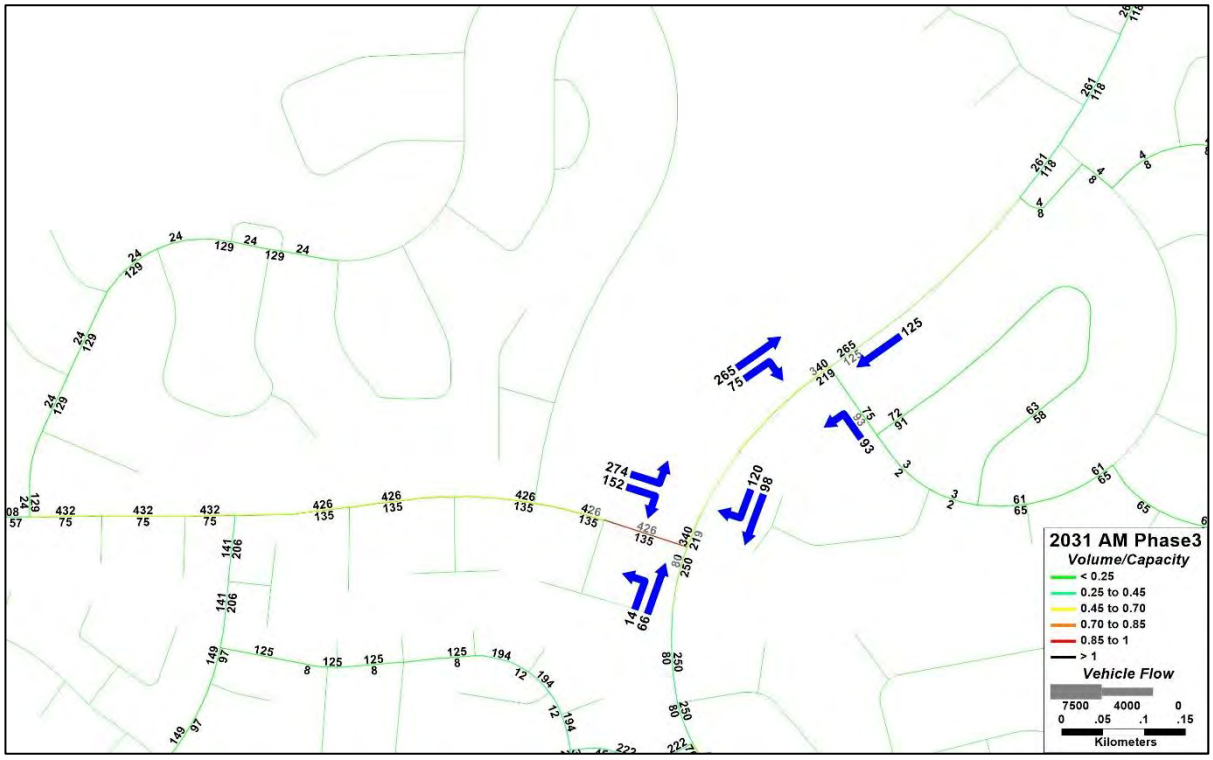
Time		North Approach Tillyard Dr			South Approach Tillyard Dr			West Approach Kerrigan St			Hourly Total	
Period Start	**Period End**	**U**	**R**	**SB**	**U**	**NB**	**L**	**U**	**R**	**L**	**Hour**	**Peak**
7:30	7:45	0	13	39	0	39	4	0	28	52	835	
7:45	8:00	0	22	65	0	33	10	0	28	52	941	
8:00	8:15	0	15	65	0	51	6	0	35	59	1076	
8:15	8:30	0	26	58	0	49	5	0	32	49	1085	Peak
8:30	8:45	0	32	62	0	69	9	0	26	83	1033	
8:45	9:00	0	45	87	0	71	13	0	21	108		
9:00	9:15	0	50	81	0	51	11	0	15	32		
9:15	9:30	0	27	42	0	42	13	0	14	29		
14:30	14:45	0	69	62	0	67	22	0	6	44	1002	
14:45	15:00	0	72	62	0	48	21	0	12	16	945	
15:00	15:15	0	69	62	0	67	22	0	6	44	945	
15:15	15:30	0	72	62	0	48	21	0	12	16	887	
15:30	15:45	0	48	34	0	51	29	0	15	36	919	
15:45	16:00	0	59	52	0	43	24	0	23	30	977	
16:00	16:15	0	46	56	0	43	21	0	13	33	1033	
16:15	16:30	0	74	55	0	65	18	0	14	37	1099	
16:30	16:45	0	55	51	0	73	30	0	18	44	1144	
16:45	17:00	0	67	59	0	73	34	0	15	39	1161	Peak
17:00	17:15	0	50	53	0	81	31	0	12	51	1123	
17:15	17:30	0	72	62	0	82	40	0	13	39	1066	
17:30	17:45	0	63	58	0	81	36	0	12	38	1040	
17:45	18:00	0	63	39	0	65	33	0	13	36	949	
18:00	18:15	0	58	38	0	55	27	0	13	30	878	
18:15	18:30	0	62	50	0	79	37	0	19	35		
18:30	18:45	0	43	36	0	40	32	0	15	31		
18:45	19:00	0	37	37	0	37	27	0	13	27		

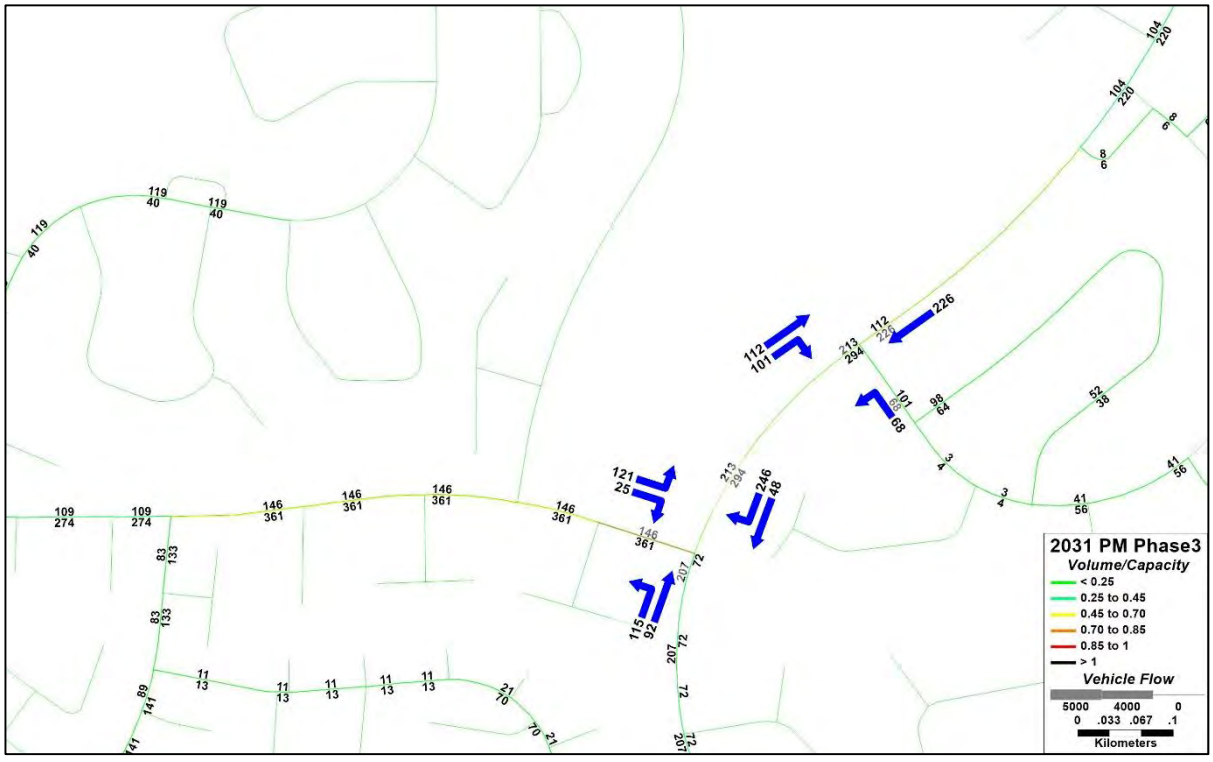
Peak Time		North Approach Tillyard Dr			South Approach Tillyard Dr			West Approach Kerrigan St			Peak
Period Start	**Period End**	U	R	SB	U	NB	L	U	R	L	**total**
8:15	9:15	0	153	288	0	240	38	0	94	272	1085
14:30	15:30	0	282	248	0	230	86	0	36	120	1002
16:15	17:15	0	252	232	0	317	141	0	52	167	1161

Appendix B: CSTM Data


2021 AM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000 3000 0
0 .033 .067 .1
Kilometers


2021 PM Base
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000 3000 0
0 .05 .1 .15
Kilometers


2031 AM Phase3
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
7500 4000 0
0 .05 .1 .15
Kilometers


2031 PM Phase3
Volume/Capacity
< 0.25
0.25 to 0.45
0.45 to 0.70
0.70 to 0.85
0.85 to 1
> 1
Vehicle Flow
5000 4000 0
0 .033 .067 .1
Kilometers

Appendix C: Crash Data

STREET REPORT
History Location: TILLYARD DRIVE - showing Intersections and Midblocks
Report Date Range: 01/01/2015 12:00:00 AM -> 31/12/2019 11:59:59 PM

Location Type Intersection
Location Unique 1561
Location Description REUTHER/TILLYARD

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code

Crashes = 0

Location Type Mid Block
Location Unique 1828
Location Description TILLYARD DRIVE (REUTHER -> KERRIGAN)

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code

Crashes = 0

Location Type Intersection
Location Unique 1421
Location Description KERRIGAN/TILLYARD

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code
KERRIGAN/TILLYARD	2015-1153099	17/05/2015 19:40	Property Damage Only			6	0	2 Good dry surface	Fine	301
	Vehicle 1	East bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
	Vehicle 2	East bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				
KERRIGAN/TILLYARD	2016-1100653	7/06/2016 17:15	Property Damage Only			2	0	2 Good dry surface	Cloudy or	104
	Vehicle 1	East bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				
KERRIGAN/TILLYARD	2016-1174218	16/06/2016 17:15	Property Damage Only			2	0	2 Good dry surface	Fine	104
	Vehicle 1	North bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				
	Vehicle 2	East bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				

Crashes = 3

Location Type Mid Block
Location Unique 1669
Location Description TILLYARD DRIVE (KERRIGAN -> DALEY)

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code
TILLYARD DRIVE (KERRIGAN -	2016-1112434	25/11/2016 17:20	Property Damage Only			6	0	2 Good dry surface	Fine	301
	Vehicle 1	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 2	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
TILLYARD DRIVE (KERRIGAN -	2017-2198176	30/01/2017 15:00	Property Damage Only			7	0	2 Good dry surface	Fine	601
	Vehicle 1	North bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 2	North bound	3rd lane	Not related to intersection	Parked	Not obstructed				
TILLYARD DRIVE (KERRIGAN -	2018-1215300	2/08/2018 17:15	Property Damage Only			6	0	4 Good dry surface	Fine	303
	Vehicle 1	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 2	South bound	1st (kerb or left) lane	Into driveway	Right turn	Not obstructed				
	Vehicle 3	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 4	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
TILLYARD DRIVE (KERRIGAN -	2018-2125306	16/10/2018 13:40	Injury	Received medical treatm		5	3	2 Good dry surface	Fine	201
	Vehicle 1	South bound	On wrong side of road	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
TILLYARD DRIVE (KERRIGAN -	2018-1200716	8/11/2018 20:15	Property Damage Only			6	0	2 Good dry surface	Fine	301
	Vehicle 1	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 2	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not known				
TILLYARD DRIVE (KERRIGAN -	2018-1153033	13/12/2018 14:45	Property Damage Only			9	0	2 Wet surface	Light rain	403
	Vehicle 1	North bound	1st (kerb or left) lane	Not related to intersection	Backing	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Not related to intersection	Parked	Not obstructed				
TILLYARD DRIVE (KERRIGAN -	2019-2167419	22/01/2019 13:30	Property Damage Only			19	0	1 Good dry surface	Fine	708
	Vehicle 1	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
TILLYARD DRIVE (KERRIGAN -	2019-2105964	18/12/2019 8:00	Property Damage Only			19	0	1 Good dry surface	Fine	703
	Vehicle 1	North bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				

Crashes = 8

Location Type Intersection
Location Unique 1274
Location Description DALEY/TILLYARD (SW)

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code
DALEY/TILLYARD (SW)	2015-1178279	20/03/2015 16:40	Property Damage Only			6	0	2 Good dry surface	Fine	301
	Vehicle 1	North bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
DALEY/TILLYARD (SW)	2016-2231192	9/05/2016 14:30	Injury	Received medical treatm		13	1	1 Wet surface	Heavy rai	707
	Vehicle 1	East bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				
DALEY/TILLYARD (SW)	2016-1177511	19/11/2016 14:30	Property Damage Only			6	0	2 Good dry surface	Fine	303
	Vehicle 1	North bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				
DALEY/TILLYARD (SW)	2018-2082510	28/06/2018 17:50	Injury	Received medical treatm		6	1	2 Good dry surface	Fine	303
	Vehicle 1	North bound	1st (kerb or left) lane	Within intersection	Right turn	Not known				
	Vehicle 2	North bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not known				
DALEY/TILLYARD (SW)	2018-1127800	5/08/2018 8:40	Property Damage Only			6	0	2 Good dry surface	Fine	301
	Vehicle 1	North bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
DALEY/TILLYARD (SW)	2019-2062642	13/07/2019 21:54	Injury	Received medical treatm		2	1	2 Good dry surface	Fine	104
	Vehicle 1	West bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				
	Vehicle 2	South bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				

Crashes = 6

Location Type Mid Block
Location Unique 1508
Location Description TILLYARD DRIVE (DALEY -> TILLYARD SERVICE RD)

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				
TILLYARD DRIVE (DALEY -> TI	2015-2163661	16/12/2015 15:15	Injury	Received medical treatm		9	1	4 Wet surface	Light rain	406
	Vehicle 1	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 2	East bound	Other	Out of driveway	Left turn	Not obstructed				
	Vehicle 3	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 4	North bound	1st (kerb or left) lane	Not related to intersection	Parked	Not obstructed				
TILLYARD DRIVE (DALEY -> TI	2017-1193744	25/11/2017 19:25	Property Damage Only			11	0	1 Wet surface	Light rain	609
	Vehicle 1	North bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
TILLYARD DRIVE (DALEY -> TI	2018-1085089	3/11/2018 17:30	Property Damage Only			7	0	2 Good dry surface	Fine	601
	Vehicle 1	South bound	1st (kerb or left) lane	Not related to intersection	Parked	Not obstructed				
	Vehicle 2	South bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
TILLYARD DRIVE (DALEY -> TI	2019-1216785	26/08/2019 15:20	Property Damage Only			7	0	2 Good dry surface	Fine	601
	Vehicle 1	North bound	1st (kerb or left) lane	Not related to intersection	Parked	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				

Crashes = 4

Location Type Intersection
Location Unique 1165
Location Description TILLYARD/TILLYARD SRV RD

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				

Crashes = 0

Location Type Mid Block
Location Unique 1377
Location Description TILLYARD DRIVE (TILLYARD -> DALEY)

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				
TILLYARD DRIVE (TILLYARD ->	2017-1217715	28/11/2017 18:15	Property Damage Only			6	0	2 Good dry surface	Fine	301
	Vehicle 1	North bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Not related to intersection	Straight ahead	Not obstructed				

Crashes = 1

Location Type Intersection
Location Unique 1129
Location Description DALEY/TILLYARD

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				
DALEY/TILLYARD	2015-1107691	14/08/2015 15:35	Property Damage Only			6	0	2 Good dry surface	Fine	303
	Vehicle 1	North bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
DALEY/TILLYARD	2016-2107309	17/12/2016 13:45	Injury	Received medical treatm		6	2	2 Good dry surface	Fine	303
	Vehicle 1	North bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				
DALEY/TILLYARD	2019-2015233	11/11/2019 17:30	Property Damage Only			6	0	2 Good dry surface	Fine	303
	Vehicle 1	North bound	1st (kerb or left) lane	Within intersection	Right turn	Not known				
	Vehicle 2	North bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not known				

Crashes = 3

STREET REPORT
History Location: KERRIGAN STREET - showing Intersections and Midblocks
Report Date Range: 01/01/2015 12:00:00 AM -> 31/12/2019 11:59:59 PM

Location Type Intersection
Location Unique 1421
Location Description KERRIGAN/TILLYARD

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code
KERRIGAN/TILLYARD	2015-1153099	17/05/2015 19:40	Property Damage Only			6	0	2 Good dry surface	Fine	301
	Vehicle 1	East bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
	Vehicle 2	East bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				
KERRIGAN/TILLYARD	2016-1100653	7/06/2016 17:15	Property Damage Only			2	0	2 Good dry surface	Cloudy or	104
	Vehicle 1	East bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				
	Vehicle 2	North bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				
KERRIGAN/TILLYARD	2016-1174218	16/06/2016 17:15	Property Damage Only			2	0	2 Good dry surface	Fine	104
	Vehicle 1	North bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				
	Vehicle 2	East bound	1st (kerb or left) lane	Within intersection	Right turn	Not obstructed				

Crashes = 3

Location Type Mid Block
Location Unique 1670
Location Description KERRIGAN STREET (TILLYARD -> CROWLEY)

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code

Crashes = 0

Location Type Intersection
Location Unique 1398
Location Description CROWLEY/KERRIGAN

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code

Crashes = 0

Location Type Mid Block
Location Unique 1640
Location Description KERRIGAN STREET (CROWLEY -> SHAKESPEARE)

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code

Crashes = 0

Location Type Intersection
Location Unique 1379
Location Description KERRIGAN/SHAKESPEARE

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code
KERRIGAN/SHAKESPEARE	2015-1204886	16/06/2015 18:00	Property Damage Only			6	0	2 Wet surface	Light rain	301
	Vehicle 1	West bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
	Vehicle 2	West bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				

Crashes = 1

Location Type Mid Block
Location Unique 1617
Location Description KERRIGAN STREET (SHAKESPEARE -> MCKID)

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code
KERRIGAN STREET (SHAKESF	2017-1096181	5/08/2017 21:00	Property Damage Only			7	0	2 Wet surface	Light rain	601
	Vehicle 1	West bound	1st (kerb or left) lane	Not related to intersection	Parked	Not obstructed				
	Vehicle 2	West bound	1st (kerb or left) lane	Not related to intersection	Straight ahead					

Crashes = 1

Location Type Intersection
Location Unique 1372
Location Description KERRIGAN/MCKID

Location : Chainage	Police Reference	Date/Time / Direction	Severity / Lane	Injury Type / Position	Crash Type / Movement	Number of Casualties / Visibility	Number of Vehicles	Road Surface	Weather	Rum Code

Crashes = 0

STREET REPORT
History Location: **SHAKESPEARE CRESCENT - showing Intersections and Midblocks**
Report Date Range: **01/01/2015 12:00:00 AM -> 31/12/2019 11:59:59 PM**

Location Type **Intersection**
Location Unique **1044**
Location Description **ROGERS/SHAKESPEARE**

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				

Crashes = 0

Location Type **Mid Block**
Location Unique **1527**
Location Description **SHAKESPEARE CRESCENT (ROGERS -> FILSHIE)**

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				

Crashes = 0

Location Type **Intersection**
Location Unique **1295**
Location Description **FILSHIE/SHAKESPEARE**

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				

Crashes = 0

Location Type **Mid Block**
Location Unique **1616**
Location Description **SHAKESPEARE CRESCENT (FILSHIE -> KERRIGAN)**

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				

Crashes = 0

Location Type **Intersection**
Location Unique **1379**
Location Description **KERRIGAN/SHAKESPEARE**

Location : Chainage	Police Reference	Date/Time	Severity	Injury Type	Crash Type	Number of Casualties	Number of Vehicles	Road Surface	Weather	Rum Code
		Direction	Lane	Position	Movement	Visibility				
KERRIGAN/SHAKESPEARE	**2015-1204886**	**16/06/2015 18:00**	**Property Damage Only**			**6**	**0**	**2 Wet surface**	**Light rain**	**301**
	Vehicle 1	West bound	1st (kerb or left) lane	Approaching intersection	Straight ahead	Not obstructed				
	Vehicle 2	West bound	1st (kerb or left) lane	Within intersection	Straight ahead	Not obstructed				

Crashes = 1

Total Crashes = 1

Appendix D: SIDRA Outputs - Existing

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2021 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
1	L2	38	5.0	40	5.0	0.156	3.4	LOS A	0.0	0.0	0.00	0.06	0.00	39.7
2	T1	240	5.0	253	5.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.3
Approach		278	5.0	293	5.0	0.156	0.5	NA	0.0	0.0	0.00	0.06	0.00	39.4
North: Tillyard Dr - N														
8	T1	288	5.0	303	5.0	0.253	0.5	LOS A	1.1	8.2	0.33	0.19	0.33	36.8
9	R2	153	5.0	161	5.0	0.253	4.6	LOS A	1.1	8.2	0.33	0.19	0.33	36.2
Approach		441	5.0	464	5.0	0.253	2.0	NA	1.1	8.2	0.33	0.19	0.33	36.5
West: Kerrigan St - W														
10	L2	272	5.0	286	5.0	0.223	4.2	LOS A	1.1	7.7	0.36	0.54	0.36	34.4
12	R2	94	5.0	99	5.0	0.223	4.4	LOS A	1.1	7.7	0.36	0.54	0.36	33.6
Approach		366	5.0	385	5.0	0.223	4.3	LOS A	1.1	7.7	0.36	0.54	0.36	34.2
All Vehicles		1085	5.0	1142	5.0	0.253	2.4	NA	1.1	8.2	0.25	0.28	0.25	36.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2021 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	293	5.0	1875	0.156	100	0.5	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	293	5.0		0.156		0.5	NA	0.0	0.0				
North: Tillyard Dr - N													
Lane 1	464	5.0	1836	0.253	100	2.0	LOS A	1.1	8.2	Full	150	0.0	0.0
Approach	464	5.0		0.253		2.0	NA	1.1	8.2				
West: Kerrigan St - W													
Lane 1	385	5.0	1728	0.223	100	4.3	LOS A	1.1	7.7	Full	150	0.0	0.0
Approach	385	5.0		0.223		4.3	LOS A	1.1	7.7				
Intersection	1142	5.0		0.253		2.4	NA	1.1	8.2				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2021 PM - School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
1	L2	86	5.0	91	5.0	0.179	3.4	LOS A	0.0	0.0	0.00	0.13	0.00	39.1
2	T1	230	5.0	242	5.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	38.7
Approach		316	5.0	333	5.0	0.179	1.0	NA	0.0	0.0	0.00	0.13	0.00	38.8
North: Tillyard Dr - N														
8	T1	248	5.0	261	5.0	0.314	1.0	LOS A	1.9	13.6	0.47	0.32	0.47	35.4
9	R2	282	5.0	297	5.0	0.314	4.8	LOS A	1.9	13.6	0.47	0.32	0.47	34.8
Approach		530	5.0	558	5.0	0.314	3.0	NA	1.9	13.6	0.47	0.32	0.47	35.1
West: Kerrigan St - W														
10	L2	120	5.0	126	5.0	0.096	4.1	LOS A	0.4	3.0	0.32	0.51	0.32	34.6
12	R2	36	5.0	38	5.0	0.096	4.4	LOS A	0.4	3.0	0.32	0.51	0.32	33.8
Approach		156	5.0	164	5.0	0.096	4.2	LOS A	0.4	3.0	0.32	0.51	0.32	34.4
All Vehicles		1002	5.0	1055	5.0	0.314	2.6	NA	1.9	13.6	0.30	0.29	0.30	36.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2021 PM - School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	333	5.0	1862	0.179	100	1.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	333	5.0		0.179		1.0	NA	0.0	0.0				
North: Tillyard Dr - N													
Lane 1	558	5.0	1779	0.314	100	3.0	LOS A	1.9	13.6	Full	150	0.0	0.0
Approach	558	5.0		0.314		3.0	NA	1.9	13.6				
West: Kerrigan St - W													
Lane 1	164	5.0	1712	0.096	100	4.2	LOS A	0.4	3.0	Full	150	0.0	0.0
Approach	164	5.0		0.096		4.2	LOS A	0.4	3.0				
Intersection	1055	5.0		0.314		2.6	NA	1.9	13.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2021 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Kerrigan St - E														
5	T1	131	5.0	138	5.0	0.088	0.3	LOS A	0.2	1.2	0.13	0.06	0.13	38.7
6	R2	17	5.0	18	5.0	0.088	5.0	LOS A	0.2	1.2	0.13	0.06	0.13	38.1
Approach		148	5.0	156	5.0	0.088	0.8	NA	0.2	1.2	0.13	0.06	0.13	38.7
North: Shakespeare Cr - N														
7	L2	67	5.0	71	5.0	0.048	4.4	LOS A	0.2	1.5	0.41	0.52	0.41	34.3
9	R2	3	5.0	3	5.0	0.048	4.0	LOS A	0.2	1.5	0.41	0.52	0.41	33.4
Approach		70	5.0	74	5.0	0.048	4.4	LOS A	0.2	1.5	0.41	0.52	0.41	34.2
West: Kerrigan St - W														
10	L2	6	5.0	6	5.0	0.193	3.4	LOS A	0.0	0.0	0.00	0.01	0.00	40.3
11	T1	340	5.0	358	5.0	0.193	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.9
Approach		346	5.0	364	5.0	0.193	0.1	NA	0.0	0.0	0.00	0.01	0.00	39.9
All Vehicles		564	5.0	594	5.0	0.193	0.8	NA	0.2	1.5	0.08	0.09	0.08	38.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2021 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Kerrigan St - E													
Lane 1	156	5.0	1766	0.088	100	0.8	LOS A	0.2	1.2	Full	150	0.0	0.0
Approach	156	5.0		0.088		0.8	NA	0.2	1.2				
North: Shakespeare Cr - N													
Lane 1	74	5.0	1524	0.048	100	4.4	LOS A	0.2	1.5	Full	150	0.0	0.0
Approach	74	5.0		0.048		4.4	LOS A	0.2	1.5				
West: Kerrigan St - W													
Lane 1	364	5.0	1887	0.193	100	0.1	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	364	5.0		0.193		0.1	NA	0.0	0.0				
Intersection	594	5.0		0.193		0.8	NA	0.2	1.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2021 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Kerrigan St - E														
5	T1	330	5.0	347	5.0	0.218	0.1	LOS A	0.4	2.9	0.09	0.06	0.09	38.9
6	R2	48	5.0	51	5.0	0.218	4.2	LOS A	0.4	2.9	0.09	0.06	0.09	38.2
Approach		378	5.0	398	5.0	0.218	0.6	NA	0.4	2.9	0.09	0.06	0.09	38.8
North: Shakespeare Cr - N														
7	L2	24	5.0	25	5.0	0.027	3.8	LOS A	0.1	0.7	0.22	0.48	0.22	35.0
9	R2	26	5.0	27	5.0	0.027	4.0	LOS A	0.1	0.7	0.22	0.48	0.22	34.1
Approach		50	5.0	53	5.0	0.027	3.9	LOS A	0.1	0.7	0.22	0.48	0.22	34.5
West: Kerrigan St - W														
10	L2	8	5.0	8	5.0	0.082	3.4	LOS A	0.0	0.0	0.00	0.03	0.00	40.1
11	T1	138	5.0	145	5.0	0.082	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	39.7
Approach		146	5.0	154	5.0	0.082	0.2	NA	0.0	0.0	0.00	0.03	0.00	39.7
All Vehicles		574	5.0	604	5.0	0.218	0.8	NA	0.4	2.9	0.08	0.09	0.08	38.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2021 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Kerrigan St - E													
Lane 1	398	5.0	1822	0.218	100	0.6	LOS A	0.4	2.9	Full	150	0.0	0.0
Approach	398	5.0		0.218		0.6	NA	0.4	2.9				
North: Shakespeare Cr - N													
Lane 1	53	5.0	1977	0.027	100	3.9	LOS A	0.1	0.7	Full	150	0.0	0.0
Approach	53	5.0		0.027		3.9	LOS A	0.1	0.7				
West: Kerrigan St - W													
Lane 1	154	5.0	1883	0.082	100	0.2	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	154	5.0		0.082		0.2	NA	0.0	0.0				
Intersection	604	5.0		0.218		0.8	NA	0.4	2.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South) - 2021 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	352	5.0	371	5.0	0.235	0.4	LOS A	0.5	3.9	0.18	0.08	0.18	39.0
3	R2	56	5.0	59	5.0	0.235	5.2	LOS A	0.5	3.9	0.18	0.08	0.18	38.6
Approach		408	5.0	429	5.0	0.235	1.0	NA	0.5	3.9	0.18	0.08	0.18	38.9
East: Daley Cr - E														
4	L2	100	5.0	105	5.0	0.079	4.7	LOS A	0.3	2.5	0.45	0.57	0.45	36.2
6	R2	8	5.0	8	5.0	0.079	4.4	LOS A	0.3	2.5	0.45	0.57	0.45	35.6
Approach		108	5.0	114	5.0	0.079	4.7	LOS A	0.3	2.5	0.45	0.57	0.45	36.1
North: Tillyard Dr - N														
7	L2	8	5.0	8	5.0	0.228	3.5	LOS A	0.0	0.0	0.00	0.01	0.00	40.1
8	T1	401	5.0	422	5.0	0.228	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.9
Approach		409	5.0	431	5.0	0.228	0.1	NA	0.0	0.0	0.00	0.01	0.00	39.9
All Vehicles		925	5.0	974	5.0	0.235	1.0	NA	0.5	3.9	0.13	0.10	0.13	39.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South) - 2021 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	429	5.0	1824	0.235	100	1.0	LOS A	0.5	3.9	Full	250	0.0	0.0
Approach	429	5.0		0.235		1.0	NA	0.5	3.9				
East: Daley Cr - E													
Lane 1	114	5.0	1431	0.079	100	4.7	LOS A	0.3	2.5	Full	250	0.0	0.0
Approach	114	5.0		0.079		4.7	LOS A	0.3	2.5				
North: Tillyard Dr - N													
Lane 1	431	5.0	1887	0.228	100	0.1	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	431	5.0		0.228		0.1	NA	0.0	0.0				
Intersection	974	5.0		0.235		1.0	NA	0.5	3.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South)- 2021 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	296	5.0	312	5.0	0.223	0.5	LOS A	0.7	5.4	0.27	0.13	0.27	38.5
3	R2	88	5.0	93	5.0	0.223	4.9	LOS A	0.7	5.4	0.27	0.13	0.27	38.1
Approach		384	5.0	404	5.0	0.223	1.5	NA	0.7	5.4	0.27	0.13	0.27	38.4
East: Daley Cr - E														
4	L2	82	5.0	86	5.0	0.064	4.5	LOS A	0.3	2.0	0.40	0.54	0.40	36.3
6	R2	12	5.0	13	5.0	0.064	4.3	LOS A	0.3	2.0	0.40	0.54	0.40	35.7
Approach		94	5.0	99	5.0	0.064	4.4	LOS A	0.3	2.0	0.40	0.54	0.40	36.2
North: Tillyard Dr - N														
7	L2	19	5.0	20	5.0	0.201	3.5	LOS A	0.0	0.0	0.00	0.02	0.00	40.0
8	T1	341	5.0	359	5.0	0.201	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	39.8
Approach		360	5.0	379	5.0	0.201	0.2	NA	0.0	0.0	0.00	0.02	0.00	39.8
All Vehicles		838	5.0	882	5.0	0.223	1.3	NA	0.7	5.4	0.17	0.13	0.17	38.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South)- 2021 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	404	5.0	1811	0.223	100	1.5	LOS A	0.7	5.4	Full	250	0.0	0.0
Approach	404	5.0		0.223		1.5	NA	0.7	5.4				
East: Daley Cr - E													
Lane 1	99	5.0	1545	0.064	100	4.4	LOS A	0.3	2.0	Full	250	0.0	0.0
Approach	99	5.0		0.064		4.4	LOS A	0.3	2.0				
North: Tillyard Dr - N													
Lane 1	379	5.0	1883	0.201	100	0.2	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	379	5.0		0.201		0.2	NA	0.0	0.0				
Intersection	882	5.0		0.223		1.3	NA	0.7	5.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (North) - 2021 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	325	5.0	342	5.0	0.241	0.3	LOS A	0.8	5.7	0.23	0.14	0.23	48.6
3	R2	100	5.0	105	5.0	0.241	6.1	LOS A	0.8	5.7	0.23	0.14	0.23	41.1
Approach		425	5.0	447	5.0	0.241	1.7	NA	0.8	5.7	0.23	0.14	0.23	46.4
East: Daley Cr - E														
4	L2	43	5.0	45	5.0	0.043	5.3	LOS A	0.2	1.2	0.32	0.57	0.32	31.1
6	R2	14	5.0	15	5.0	0.043	6.1	LOS A	0.2	1.2	0.32	0.57	0.32	28.9
Approach		57	5.0	60	5.0	0.043	5.5	LOS A	0.2	1.2	0.32	0.57	0.32	30.6
North: Tillyard Dr - N														
7	L2	8	5.0	8	5.0	0.149	4.3	LOS A	0.0	0.0	0.00	0.02	0.00	32.3
8	T1	259	5.0	273	5.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.1
Approach		267	5.0	281	5.0	0.149	0.1	NA	0.0	0.0	0.00	0.02	0.00	57.6
All Vehicles		749	5.0	788	5.0	0.241	1.4	NA	0.8	5.7	0.16	0.13	0.16	47.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (North) - 2021 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	447	5.0	1855	0.241	100	1.7	LOS A	0.8	5.7	Full	80	0.0	0.0
Approach	447	5.0		0.241		1.7	NA	0.8	5.7				
East: Daley Cr - E													
Lane 1	60	5.0	1406	0.043	100	5.5	LOS A	0.2	1.2	Full	80	0.0	0.0
Approach	60	5.0		0.043		5.5	LOS A	0.2	1.2				
North: Tillyard Dr - N													
Lane 1	281	5.0	1886	0.149	100	0.1	LOS A	0.0	0.0	Full	60	0.0	0.0
Approach	281	5.0		0.149		0.1	NA	0.0	0.0				
Intersection	788	5.0		0.241		1.4	NA	0.8	5.7				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (North) - 2021 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	244	5.0	257	5.0	0.190	0.4	LOS A	0.6	4.7	0.25	0.16	0.25	47.6
3	R2	89	5.0	94	5.0	0.190	6.1	LOS A	0.6	4.7	0.25	0.16	0.25	40.5
Approach		333	5.0	351	5.0	0.190	1.9	NA	0.6	4.7	0.25	0.16	0.25	45.3
East: Daley Cr - E														
4	L2	34	5.0	36	5.0	0.030	5.3	LOS A	0.1	0.9	0.33	0.55	0.33	31.0
6	R2	8	5.0	8	5.0	0.030	5.8	LOS A	0.1	0.9	0.33	0.55	0.33	28.9
Approach		42	5.0	44	5.0	0.030	5.4	LOS A	0.1	0.9	0.33	0.55	0.33	30.6
North: Tillyard Dr - N														
7	L2	11	5.0	12	5.0	0.156	4.3	LOS A	0.0	0.0	0.00	0.02	0.00	32.3
8	T1	268	5.0	282	5.0	0.156	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	58.8
Approach		279	5.0	294	5.0	0.156	0.2	NA	0.0	0.0	0.00	0.02	0.00	57.0
All Vehicles		654	5.0	688	5.0	0.190	1.4	NA	0.6	4.7	0.15	0.13	0.15	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (North) - 2021 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	351	5.0	1845	0.190	100	1.9	LOS A	0.6	4.7	Full	80	0.0	0.0
Approach	351	5.0		0.190		1.9	NA	0.6	4.7				
East: Daley Cr - E													
Lane 1	44	5.0	1470	0.030	100	5.4	LOS A	0.1	0.9	Full	80	0.0	0.0
Approach	44	5.0		0.030		5.4	LOS A	0.1	0.9				
North: Tillyard Dr - N													
Lane 1	294	5.0	1885	0.156	100	0.2	LOS A	0.0	0.0	Full	60	0.0	0.0
Approach	294	5.0		0.156		0.2	NA	0.0	0.0				
Intersection	688	5.0		0.190		1.4	NA	0.6	4.7				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E: SIDRA Outputs - Future – Non-Development

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2031 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
1	L2	57	5.0	60	5.0	0.234	3.5	LOS A	0.0	0.0	0.00	0.06	0.00	39.7
2	T1	360	5.0	379	5.0	0.234	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.3
Approach		417	5.0	439	5.0	0.234	0.5	NA	0.0	0.0	0.00	0.06	0.00	39.3
North: Tillyard Dr - N														
8	T1	432	5.0	455	5.0	0.402	1.3	LOS A	2.6	19.0	0.47	0.24	0.54	36.1
9	R2	230	5.0	242	5.0	0.402	5.8	LOS A	2.6	19.0	0.47	0.24	0.54	35.5
Approach		662	5.0	697	5.0	0.402	2.9	NA	2.6	19.0	0.47	0.24	0.54	35.9
West: Kerrigan St - W														
10	L2	408	5.0	429	5.0	0.388	5.2	LOS A	2.3	16.7	0.49	0.69	0.57	33.9
12	R2	141	5.0	148	5.0	0.388	5.5	LOS A	2.3	16.7	0.49	0.69	0.57	33.1
Approach		549	5.0	578	5.0	0.388	5.3	LOS A	2.3	16.7	0.49	0.69	0.57	33.7
All Vehicles		1628	5.0	1714	5.0	0.402	3.1	NA	2.6	19.0	0.36	0.35	0.41	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2031 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	439	5.0	1875	0.234	100	0.5	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	439	5.0		0.234		0.5	NA	0.0	0.0				
North: Tillyard Dr - N													
Lane 1	697	5.0	1733	0.402	100	2.9	LOS A	2.6	19.0	Full	150	0.0	0.0
Approach	697	5.0		0.402		2.9	NA	2.6	19.0				
West: Kerrigan St - W													
Lane 1	578	5.0	1490	0.388	100	5.3	LOS A	2.3	16.7	Full	150	0.0	0.0
Approach	578	5.0		0.388		5.3	LOS A	2.3	16.7				
Intersection	1714	5.0		0.402		3.1	NA	2.6	19.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2031 PM - School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
1	L2	129	5.0	136	5.0	0.268	3.5	LOS A	0.0	0.0	0.00	0.13	0.00	39.1
2	T1	345	5.0	363	5.0	0.268	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	38.6
Approach		474	5.0	499	5.0	0.268	1.0	NA	0.0	0.0	0.00	0.13	0.00	38.8
North: Tillyard Dr - N														
8	T1	372	5.0	392	5.0	0.522	3.1	LOS A	5.6	40.9	0.68	0.49	0.97	33.7
9	R2	423	5.0	445	5.0	0.522	7.1	LOS A	5.6	40.9	0.68	0.49	0.97	33.2
Approach		795	5.0	837	5.0	0.522	5.2	NA	5.6	40.9	0.68	0.49	0.97	33.4
West: Kerrigan St - W														
10	L2	180	5.0	189	5.0	0.168	4.6	LOS A	0.7	5.3	0.42	0.59	0.42	34.2
12	R2	54	5.0	57	5.0	0.168	5.3	LOS A	0.7	5.3	0.42	0.59	0.42	33.4
Approach		234	5.0	246	5.0	0.168	4.7	LOS A	0.7	5.3	0.42	0.59	0.42	34.0
All Vehicles		1503	5.0	1582	5.0	0.522	3.8	NA	5.6	40.9	0.42	0.39	0.58	35.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2031 PM - School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	499	5.0	1862	0.268	100	1.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	499	5.0		0.268		1.0	NA	0.0	0.0				
North: Tillyard Dr - N													
Lane 1	837	5.0	1602	0.522	100	5.2	LOS A	5.6	40.9	Full	150	0.0	0.0
Approach	837	5.0		0.522		5.2	NA	5.6	40.9				
West: Kerrigan St - W													
Lane 1	246	5.0	1464	0.168	100	4.7	LOS A	0.7	5.3	Full	150	0.0	0.0
Approach	246	5.0		0.168		4.7	LOS A	0.7	5.3				
Intersection	1582	5.0		0.522		3.8	NA	5.6	40.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2031 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Kerrigan St - E														
5	T1	197	5.0	207	5.0	0.139	0.6	LOS A	0.3	2.4	0.18	0.07	0.18	38.3
6	R2	26	5.0	27	5.0	0.139	6.4	LOS A	0.3	2.4	0.18	0.07	0.18	37.6
Approach		223	5.0	235	5.0	0.139	1.3	NA	0.3	2.4	0.18	0.07	0.18	38.2
North: Shakespeare Cr - N														
7	L2	101	5.0	106	5.0	0.089	5.2	LOS A	0.4	2.8	0.51	0.63	0.51	33.8
9	R2	5	5.0	5	5.0	0.089	4.3	LOS A	0.4	2.8	0.51	0.63	0.51	33.0
Approach		106	5.0	112	5.0	0.089	5.2	LOS A	0.4	2.8	0.51	0.63	0.51	33.8
West: Kerrigan St - W														
10	L2	9	5.0	9	5.0	0.290	3.5	LOS A	0.0	0.0	0.00	0.01	0.00	40.3
11	T1	510	5.0	537	5.0	0.290	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.8
Approach		519	5.0	546	5.0	0.290	0.1	NA	0.0	0.0	0.00	0.01	0.00	39.8
All Vehicles		848	5.0	893	5.0	0.290	1.0	NA	0.4	2.8	0.11	0.10	0.11	38.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2031 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Kerrigan St - E													
Lane 1	235	5.0	1689	0.139	100	1.3	LOS A	0.3	2.4	Full	150	0.0	0.0
Approach	235	5.0		0.139		1.3	NA	0.3	2.4				
North: Shakespeare Cr - N													
Lane 1	112	5.0	1256	0.089	100	5.2	LOS A	0.4	2.8	Full	150	0.0	0.0
Approach	112	5.0		0.089		5.2	LOS A	0.4	2.8				
West: Kerrigan St - W													
Lane 1	546	5.0	1887	0.290	100	0.1	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	546	5.0		0.290		0.1	NA	0.0	0.0				
Intersection	893	5.0		0.290		1.0	NA	0.4	2.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2031 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Kerrigan St - E														
5	T1	495	5.0	521	5.0	0.332	0.2	LOS A	0.7	5.4	0.13	0.07	0.13	38.7
6	R2	72	5.0	76	5.0	0.332	4.8	LOS A	0.7	5.4	0.13	0.07	0.13	38.0
Approach		567	5.0	597	5.0	0.332	0.8	NA	0.7	5.4	0.13	0.07	0.13	38.6
North: Shakespeare Cr - N														
7	L2	36	5.0	38	5.0	0.044	4.0	LOS A	0.2	1.2	0.29	0.52	0.29	34.7
9	R2	39	5.0	41	5.0	0.044	4.3	LOS A	0.2	1.2	0.29	0.52	0.29	33.9
Approach		75	5.0	79	5.0	0.044	4.2	LOS A	0.2	1.2	0.29	0.52	0.29	34.3
West: Kerrigan St - W														
10	L2	12	5.0	13	5.0	0.122	3.4	LOS A	0.0	0.0	0.00	0.03	0.00	40.1
11	T1	207	5.0	218	5.0	0.122	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	39.7
Approach		219	5.0	231	5.0	0.122	0.2	NA	0.0	0.0	0.00	0.03	0.00	39.7
All Vehicles		861	5.0	906	5.0	0.332	0.9	NA	0.7	5.4	0.11	0.10	0.11	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2031 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Kerrigan St - E													
Lane 1	597	5.0	1800	0.332	100	0.8	LOS A	0.7	5.4	Full	150	0.0	0.0
Approach	597	5.0		0.332		0.8	NA	0.7	5.4				
North: Shakespeare Cr - N													
Lane 1	79	5.0	1778	0.044	100	4.2	LOS A	0.2	1.2	Full	150	0.0	0.0
Approach	79	5.0		0.044		4.2	LOS A	0.2	1.2				
West: Kerrigan St - W													
Lane 1	231	5.0	1883	0.122	100	0.2	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	231	5.0		0.122		0.2	NA	0.0	0.0				
Intersection	906	5.0		0.332		0.9	NA	0.7	5.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South) - 2031 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	528	5.0	556	5.0	0.371	1.0	LOS A	1.4	10.4	0.27	0.09	0.34	38.4
3	R2	84	5.0	88	5.0	0.371	7.3	LOS A	1.4	10.4	0.27	0.09	0.34	38.0
Approach		612	5.0	644	5.0	0.371	1.9	NA	1.4	10.4	0.27	0.09	0.34	38.4
East: Daley Cr - E														
4	L2	150	5.0	158	5.0	0.153	5.9	LOS A	0.6	4.7	0.57	0.71	0.57	35.8
6	R2	12	5.0	13	5.0	0.153	5.2	LOS A	0.6	4.7	0.57	0.71	0.57	35.2
Approach		162	5.0	171	5.0	0.153	5.8	LOS A	0.6	4.7	0.57	0.71	0.57	35.7
North: Tillyard Dr - N														
7	L2	12	5.0	13	5.0	0.343	3.5	LOS A	0.0	0.0	0.00	0.01	0.00	40.1
8	T1	602	5.0	634	5.0	0.343	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	39.8
Approach		614	5.0	646	5.0	0.343	0.1	NA	0.0	0.0	0.00	0.01	0.00	39.8
All Vehicles		1388	5.0	1461	5.0	0.371	1.6	NA	1.4	10.4	0.19	0.13	0.22	38.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South) - 2031 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	644	5.0	1739	0.371	100	1.9	LOS A	1.4	10.4	Full	250	0.0	0.0
Approach	644	5.0		0.371		1.9	NA	1.4	10.4				
East: Daley Cr - E													
Lane 1	171	5.0	1112	0.153	100	5.8	LOS A	0.6	4.7	Full	250	0.0	0.0
Approach	171	5.0		0.153		5.8	LOS A	0.6	4.7				
North: Tillyard Dr - N													
Lane 1	646	5.0	1887	0.343	100	0.1	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	646	5.0		0.343		0.1	NA	0.0	0.0				
Intersection	1461	5.0		0.371		1.6	NA	1.4	10.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South)- 2031 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	444	5.0	467	5.0	0.356	1.2	LOS A	1.8	12.9	0.38	0.16	0.44	38.0
3	R2	132	5.0	139	5.0	0.356	6.6	LOS A	1.8	12.9	0.38	0.16	0.44	37.6
Approach		576	5.0	606	5.0	0.356	2.5	NA	1.8	12.9	0.38	0.16	0.44	37.9
East: Daley Cr - E														
4	L2	123	5.0	129	5.0	0.118	5.3	LOS A	0.5	3.6	0.51	0.65	0.51	36.0
6	R2	18	5.0	19	5.0	0.118	4.9	LOS A	0.5	3.6	0.51	0.65	0.51	35.4
Approach		141	5.0	148	5.0	0.118	5.2	LOS A	0.5	3.6	0.51	0.65	0.51	35.9
North: Tillyard Dr - N														
7	L2	29	5.0	31	5.0	0.302	3.5	LOS A	0.0	0.0	0.00	0.02	0.00	40.0
8	T1	512	5.0	539	5.0	0.302	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	39.7
Approach		541	5.0	569	5.0	0.302	0.2	NA	0.0	0.0	0.00	0.02	0.00	39.8
All Vehicles		1258	5.0	1324	5.0	0.356	1.8	NA	1.8	12.9	0.23	0.16	0.26	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South)- 2031 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	606	5.0	1705	0.356	100	2.5	LOS A	1.8	12.9	Full	250	0.0	0.0
Approach	606	5.0		0.356		2.5	NA	1.8	12.9				
East: Daley Cr - E													
Lane 1	148	5.0	1262	0.118	100	5.2	LOS A	0.5	3.6	Full	250	0.0	0.0
Approach	148	5.0		0.118		5.2	LOS A	0.5	3.6				
North: Tillyard Dr - N													
Lane 1	569	5.0	1883	0.302	100	0.2	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	569	5.0		0.302		0.2	NA	0.0	0.0				
Intersection	1324	5.0		0.356		1.8	NA	1.8	12.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (North) - 2031 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	488	5.0	514	5.0	0.376	0.8	LOS A	1.7	12.2	0.33	0.16	0.36	46.9
3	R2	150	5.0	158	5.0	0.376	7.1	LOS A	1.7	12.2	0.33	0.16	0.36	40.0
Approach		638	5.0	672	5.0	0.376	2.3	NA	1.7	12.2	0.33	0.16	0.36	44.9
East: Daley Cr - E														
4	L2	65	5.0	68	5.0	0.079	5.8	LOS A	0.3	2.1	0.43	0.63	0.43	30.4
6	R2	21	5.0	22	5.0	0.079	7.6	LOS A	0.3	2.1	0.43	0.63	0.43	28.3
Approach		86	5.0	91	5.0	0.079	6.2	LOS A	0.3	2.1	0.43	0.63	0.43	29.9
North: Tillyard Dr - N														
7	L2	12	5.0	13	5.0	0.224	4.3	LOS A	0.0	0.0	0.00	0.02	0.00	32.3
8	T1	389	5.0	409	5.0	0.224	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.0
Approach		401	5.0	422	5.0	0.224	0.1	NA	0.0	0.0	0.00	0.02	0.00	57.6
All Vehicles		1125	5.0	1184	5.0	0.376	1.8	NA	1.7	12.2	0.22	0.15	0.24	46.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (North) - 2031 AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	672	5.0	1787	0.376	100	2.3	LOS A	1.7	12.2	Full	80	0.0	0.0
Approach	672	5.0		0.376		2.3	NA	1.7	12.2				
East: Daley Cr - E													
Lane 1	91	5.0	1149	0.079	100	6.2	LOS A	0.3	2.1	Full	80	0.0	0.0
Approach	91	5.0		0.079		6.2	LOS A	0.3	2.1				
North: Tillyard Dr - N													
Lane 1	422	5.0	1886	0.224	100	0.1	LOS A	0.0	0.0	Full	60	0.0	0.0
Approach	422	5.0		0.224		0.1	NA	0.0	0.0				
Intersection	1184	5.0		0.376		1.8	NA	1.7	12.2				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (North) - 2031 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	366	5.0	385	5.0	0.298	0.8	LOS A	1.2	9.0	0.35	0.18	0.35	46.0
3	R2	134	5.0	141	5.0	0.298	6.9	LOS A	1.2	9.0	0.35	0.18	0.35	39.4
Approach		500	5.0	526	5.0	0.298	2.4	NA	1.2	9.0	0.35	0.18	0.35	43.9
East: Daley Cr - E														
4	L2	51	5.0	54	5.0	0.054	5.8	LOS A	0.2	1.5	0.43	0.62	0.43	30.4
6	R2	12	5.0	13	5.0	0.054	6.9	LOS A	0.2	1.5	0.43	0.62	0.43	28.3
Approach		63	5.0	66	5.0	0.054	6.0	LOS A	0.2	1.5	0.43	0.62	0.43	30.1
North: Tillyard Dr - N														
7	L2	17	5.0	18	5.0	0.234	4.3	LOS A	0.0	0.0	0.00	0.02	0.00	32.2
8	T1	402	5.0	423	5.0	0.234	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	58.7
Approach		419	5.0	441	5.0	0.234	0.2	NA	0.0	0.0	0.00	0.02	0.00	56.8
All Vehicles		982	5.0	1034	5.0	0.298	1.7	NA	1.2	9.0	0.21	0.14	0.21	46.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (North) - 2031 PM School (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	526	5.0	1763	0.298	100	2.4	LOS A	1.2	9.0	Full	80	0.0	0.0
Approach	526	5.0		0.298		2.4	NA	1.2	9.0				
East: Daley Cr - E													
Lane 1	66	5.0	1237	0.054	100	6.0	LOS A	0.2	1.5	Full	80	0.0	0.0
Approach	66	5.0		0.054		6.0	LOS A	0.2	1.5				
North: Tillyard Dr - N													
Lane 1	441	5.0	1885	0.234	100	0.2	LOS A	0.0	0.0	Full	60	0.0	0.0
Approach	441	5.0		0.234		0.2	NA	0.0	0.0				
Intersection	1034	5.0		0.298		1.7	NA	1.2	9.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix F: SIDRA Outputs - Future – Post-Development

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2031 AM - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
1	L2	57	5.0	60	5.0	0.234	3.5	LOS A	0.0	0.0	0.00	0.06	0.00	39.7
2	T1	360	5.0	379	5.0	0.234	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	39.3
Approach		417	5.0	439	5.0	0.234	0.5	NA	0.0	0.0	0.00	0.06	0.00	39.3
North: Tillyard Dr - N														
8	T1	432	5.0	455	5.0	0.492	2.2	LOS A	4.7	34.1	0.59	0.37	0.77	34.9
9	R2	360	5.0	379	5.0	0.492	6.4	LOS A	4.7	34.1	0.59	0.37	0.77	34.3
Approach		792	5.0	834	5.0	0.492	4.1	NA	4.7	34.1	0.59	0.37	0.77	34.6
West: Kerrigan St - W														
10	L2	544	5.0	573	5.0	0.496	5.7	LOS A	3.7	26.9	0.53	0.76	0.71	33.5
12	R2	141	5.0	148	5.0	0.496	6.5	LOS A	3.7	26.9	0.53	0.76	0.71	32.7
Approach		685	5.0	721	5.0	0.496	5.9	LOS A	3.7	26.9	0.53	0.76	0.71	33.3
All Vehicles		1894	5.0	1994	5.0	0.496	3.9	NA	4.7	34.1	0.44	0.44	0.58	35.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2031 AM - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	439	5.0	1875	0.234	100	0.5	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	439	5.0		0.234		0.5	NA	0.0	0.0				
North: Tillyard Dr - N													
Lane 1	834	5.0	1694	0.492	100	4.1	LOS A	4.7	34.1	Full	150	0.0	0.0
Approach	834	5.0		0.492		4.1	NA	4.7	34.1				
West: Kerrigan St - W													
Lane 1	721	5.0	1455	0.496	100	5.9	LOS A	3.7	26.9	Full	150	0.0	0.0
Approach	721	5.0		0.496		5.9	LOS A	3.7	26.9				
Intersection	1994	5.0		0.496		3.9	NA	4.7	34.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2031 PM - School - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
1	L2	129	5.0	136	5.0	0.268	3.5	LOS A	0.0	0.0	0.00	0.13	0.00	39.1
2	T1	345	5.0	363	5.0	0.268	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	38.6
Approach		474	5.0	499	5.0	0.268	1.0	NA	0.0	0.0	0.00	0.13	0.00	38.8
North: Tillyard Dr - N														
8	T1	372	5.0	392	5.0	0.605	3.9	LOS A	7.9	57.7	0.75	0.62	1.19	32.7
9	R2	535	5.0	563	5.0	0.605	7.9	LOS A	7.9	57.7	0.75	0.62	1.19	32.2
Approach		907	5.0	955	5.0	0.605	6.3	NA	7.9	57.7	0.75	0.62	1.19	32.4
West: Kerrigan St - W														
10	L2	287	5.0	302	5.0	0.248	4.7	LOS A	1.2	8.4	0.44	0.60	0.44	34.1
12	R2	54	5.0	57	5.0	0.248	5.8	LOS A	1.2	8.4	0.44	0.60	0.44	33.3
Approach		341	5.0	359	5.0	0.248	4.8	LOS A	1.2	8.4	0.44	0.60	0.44	34.0
All Vehicles		1722	5.0	1813	5.0	0.605	4.5	NA	7.9	57.7	0.48	0.48	0.71	34.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Kerrigan St Int - 2031 PM - School - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	499	5.0	1862	0.268	100	1.0	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	499	5.0		0.268		1.0	NA	0.0	0.0				
North: Tillyard Dr - N													
Lane 1	955	5.0	1579	0.605	100	6.3	LOS A	7.9	57.7	Full	150	0.0	0.0
Approach	955	5.0		0.605		6.3	NA	7.9	57.7				
West: Kerrigan St - W													
Lane 1	359	5.0	1447	0.248	100	4.8	LOS A	1.2	8.4	Full	150	0.0	0.0
Approach	359	5.0		0.248		4.8	LOS A	1.2	8.4				
Intersection	1813	5.0		0.605		4.5	NA	7.9	57.7				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2031 AM-Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Kerrigan St - E														
5	T1	327	5.0	344	5.0	0.218	0.7	LOS A	0.5	3.4	0.15	0.04	0.15	38.3
6	R2	26	5.0	27	5.0	0.218	8.2	LOS A	0.5	3.4	0.15	0.04	0.15	37.6
Approach		353	5.0	372	5.0	0.218	1.3	NA	0.5	3.4	0.15	0.04	0.15	38.2
North: Shakespeare Cr - N														
7	L2	101	5.0	106	5.0	0.107	6.0	LOS A	0.4	3.2	0.58	0.71	0.58	33.4
9	R2	5	5.0	5	5.0	0.107	4.7	LOS A	0.4	3.2	0.58	0.71	0.58	32.6
Approach		106	5.0	112	5.0	0.107	6.0	LOS A	0.4	3.2	0.58	0.71	0.58	33.3
West: Kerrigan St - W														
10	L2	9	5.0	9	5.0	0.365	3.5	LOS A	0.0	0.0	0.00	0.01	0.00	40.2
11	T1	646	5.0	680	5.0	0.365	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	39.8
Approach		655	5.0	689	5.0	0.365	0.1	NA	0.0	0.0	0.00	0.01	0.00	39.8
All Vehicles		1114	5.0	1173	5.0	0.365	1.0	NA	0.5	3.4	0.10	0.08	0.10	38.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2031 AM-Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Kerrigan St - E													
Lane 1	372	5.0	1702	0.218	100	1.3	LOS A	0.5	3.4	Full	150	0.0	0.0
Approach	372	5.0		0.218		1.3	NA	0.5	3.4				
North: Shakespeare Cr - N													
Lane 1	112	5.0	1045	0.107	100	6.0	LOS A	0.4	3.2	Full	150	0.0	0.0
Approach	112	5.0		0.107		6.0	LOS A	0.4	3.2				
West: Kerrigan St - W													
Lane 1	689	5.0	1887	0.365	100	0.1	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	689	5.0		0.365		0.1	NA	0.0	0.0				
Intersection	1173	5.0		0.365		1.0	NA	0.5	3.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2031 PM School - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Kerrigan St - E														
5	T1	607	5.0	639	5.0	0.401	0.4	LOS A	1.1	7.9	0.15	0.06	0.17	38.6
6	R2	72	5.0	76	5.0	0.401	5.8	LOS A	1.1	7.9	0.15	0.06	0.17	38.0
Approach		679	5.0	715	5.0	0.401	1.0	NA	1.1	7.9	0.15	0.06	0.17	38.6
North: Shakespeare Cr - N														
7	L2	36	5.0	38	5.0	0.050	4.3	LOS A	0.2	1.3	0.37	0.57	0.37	34.4
9	R2	39	5.0	41	5.0	0.050	4.7	LOS A	0.2	1.3	0.37	0.57	0.37	33.6
Approach		75	5.0	79	5.0	0.050	4.5	LOS A	0.2	1.3	0.37	0.57	0.37	34.0
West: Kerrigan St - W														
10	L2	12	5.0	13	5.0	0.182	3.4	LOS A	0.0	0.0	0.00	0.02	0.00	40.2
11	T1	314	5.0	331	5.0	0.182	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	39.8
Approach		326	5.0	343	5.0	0.182	0.1	NA	0.0	0.0	0.00	0.02	0.00	39.8
All Vehicles		1080	5.0	1137	5.0	0.401	1.0	NA	1.1	7.9	0.12	0.08	0.13	38.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Kerrigan St / Shakespeare Cr Int - 2031 PM School - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Kerrigan St - E													
Lane 1	715	5.0	1782	0.401	100	1.0	LOS A	1.1	7.9	Full	150	0.0	0.0
Approach	715	5.0		0.401		1.0	NA	1.1	7.9				
North: Shakespeare Cr - N													
Lane 1	79	5.0	1570	0.050	100	4.5	LOS A	0.2	1.3	Full	150	0.0	0.0
Approach	79	5.0		0.050		4.5	LOS A	0.2	1.3				
West: Kerrigan St - W													
Lane 1	343	5.0	1885	0.182	100	0.1	LOS A	0.0	0.0	Full	150	0.0	0.0
Approach	343	5.0		0.182		0.1	NA	0.0	0.0				
Intersection	1137	5.0		0.401		1.0	NA	1.1	7.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South) - 2031 AM - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	664	5.0	699	5.0	0.463	1.5	LOS A	2.2	15.8	0.30	0.08	0.44	38.0
3	R2	84	5.0	88	5.0	0.463	9.6	LOS A	2.2	15.8	0.30	0.08	0.44	37.6
Approach		748	5.0	787	5.0	0.463	2.4	NA	2.2	15.8	0.30	0.08	0.44	37.9
East: Daley Cr - E														
4	L2	150	5.0	158	5.0	0.186	6.8	LOS A	0.8	5.5	0.62	0.79	0.62	35.1
6	R2	12	5.0	13	5.0	0.186	5.9	LOS A	0.8	5.5	0.62	0.79	0.62	34.6
Approach		162	5.0	171	5.0	0.186	6.8	LOS A	0.8	5.5	0.62	0.79	0.62	35.1
North: Tillyard Dr - N														
7	L2	12	5.0	13	5.0	0.415	3.5	LOS A	0.0	0.0	0.00	0.01	0.00	40.1
8	T1	732	5.0	771	5.0	0.415	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	39.8
Approach		744	5.0	783	5.0	0.415	0.2	NA	0.0	0.0	0.00	0.01	0.00	39.8
All Vehicles		1654	5.0	1741	5.0	0.463	1.8	NA	2.2	15.8	0.20	0.12	0.26	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South) - 2031 AM - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	787	5.0	1701	0.463	100	2.4	LOS A	2.2	15.8	Full	250	0.0	0.0
Approach	787	5.0		0.463		2.4	NA	2.2	15.8				
East: Daley Cr - E													
Lane 1	171	5.0	915	0.186	100	6.8	LOS A	0.8	5.5	Full	250	0.0	0.0
Approach	171	5.0		0.186		6.8	LOS A	0.8	5.5				
North: Tillyard Dr - N													
Lane 1	783	5.0	1887	0.415	100	0.2	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	783	5.0		0.415		0.2	NA	0.0	0.0				
Intersection	1741	5.0		0.463		1.8	NA	2.2	15.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South)- 2031 PM School - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Tillyard Dr - S														
2	T1	551	5.0	580	5.0	0.433	1.8	LOS A	2.6	18.8	0.40	0.15	0.56	37.5
3	R2	132	5.0	139	5.0	0.433	8.1	LOS A	2.6	18.8	0.40	0.15	0.56	37.1
Approach		683	5.0	719	5.0	0.433	3.0	NA	2.6	18.8	0.40	0.15	0.56	37.5
East: Daley Cr - E														
4	L2	123	5.0	129	5.0	0.137	5.9	LOS A	0.6	4.1	0.57	0.72	0.57	35.7
6	R2	18	5.0	19	5.0	0.137	5.4	LOS A	0.6	4.1	0.57	0.72	0.57	35.2
Approach		141	5.0	148	5.0	0.137	5.9	LOS A	0.6	4.1	0.57	0.72	0.57	35.7
North: Tillyard Dr - N														
7	L2	29	5.0	31	5.0	0.364	3.5	LOS A	0.0	0.0	0.00	0.02	0.00	40.0
8	T1	623	5.0	656	5.0	0.364	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	39.7
Approach		652	5.0	686	5.0	0.364	0.2	NA	0.0	0.0	0.00	0.02	0.00	39.7
All Vehicles		1476	5.0	1554	5.0	0.433	2.1	NA	2.6	18.8	0.24	0.15	0.31	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

▽ Site: 101 [Tillyard Dr / Daley Cr Int (South)- 2031 PM School - Dev (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Tillyard Dr - S													
Lane 1	719	5.0	1659	0.433	100	3.0	LOS A	2.6	18.8	Full	250	0.0	0.0
Approach	719	5.0		0.433		3.0	NA	2.6	18.8				
East: Daley Cr - E													
Lane 1	148	5.0	1087	0.137	100	5.9	LOS A	0.6	4.1	Full	250	0.0	0.0
Approach	148	5.0		0.137		5.9	LOS A	0.6	4.1				
North: Tillyard Dr - N													
Lane 1	686	5.0	1884	0.364	100	0.2	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	686	5.0		0.364		0.2	NA	0.0	0.0				
Intersection	1554	5.0		0.433		2.1	NA	2.6	18.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.