Table 14: Existing Canberra Fast Food Parking Provisions

Chain	Location	Indicative Floor Area[1]	Parking Provision	Indicative Parking Rate
McDonalds	Badham Street, Dickson	550m^2	36 spaces	6.5 spaces / 100m^2
	Namatjira Drive, Weston Creek	440m^2	29 spaces	6.6 spaces / 100m^2
	Lahotsky Street, Charnwood	460m^2	33 spaces	7.2 spaces / 100m^2
KFC	Badham Street, Dickson	275m^2	21 spaces	7.6 spaces / 100m^2
	Canberra Avenue, Fyshwick	300m^2	31 spaces	10.3 spaces / 100m^2
	Coniston Street, Hawker	300m^2	32 spaces	10.6 spaces / 100m^2
			Average	8.1 spaces / 100m^2

1 – Based on aerial photograph

The review of other existing fast food restaurants in Canberra indicates that there is a varying level of parking provision from approximately 6.5 spaces/100m^2 to 10.6 spaces/100m^2. The average of the sites reviewed was 8.1 spaces/100m^2. Critically the actual number of spaces provided only ranged between 21 and 36 spaces with an average of 30 spaces, indicating that the relationship between floor area and parking demand may not be strong for fast food restaurants.

Applying the average rate (8.1 spaces/100m^2) to the proposed fast food restaurant (400m^2) results in a parking demand of 32 parking spaces.

In view of the above parking for the fast food component should be provided between 32-40 spaces. This results in the requirement for between 7-15 additional parking spaces to be provided for the fast food component.

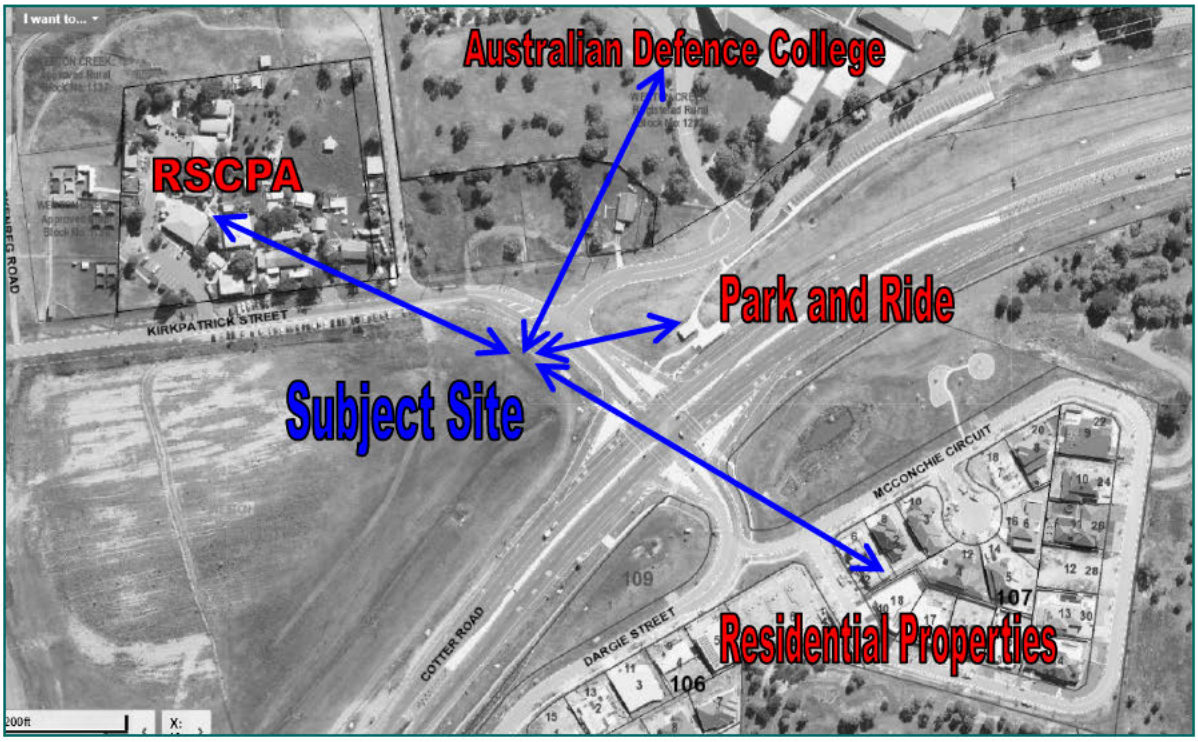
6. PEDESTRIAN AND CYCLIST ASSESSMENT

The proposed development will generate a level of pedestrian and cyclist activity in the local area. Specifically, the service station convenience store and the fast food restaurant are likely to generate pedestrian activity.

The most likely origins / destinations for pedestrians generated by the proposed development include:

- Park and Ride Facility – Kirkpatrick Street (eastern section),
- Australian Defence College - Kirkpatrick Street (eastern section),
- RSPCA Facility – Kirkpatrick Street (western section), and
- Residential Properties – South of Cotter Road.

Figure 13 below presents a summary of the likely pedestrian desire lines associated with these locations.



Source: ACTMAPI

Figure 13: Likely Pedestrian Desire Lines

The likely pedestrian desire lines for the residential properties generally occurs along the route of existing pedestrian facilities including a footpath on the northern side of Dargie Street and the pedestrian crosswalks at the Cotter Street / Kirkpatrick Street / Dargie Street intersection. In the final section of the route between the Cotter Street intersection and the subject site there is no footpath, which should be provided between the intersection and the subject site.

The likely pedestrian desire line for the RSPCA occurs on western section of Kirkpatrick Street which carries a minor level of vehicle traffic. On this basis, no formal pedestrian facility is likely to be required to accommodate pedestrian movements across Kirkpatrick Street, however the provision of a footpath would provide for improved pedestrian amenity.

The likely desire lines for the Park and Ride / Australian Defence College could result in pedestrians crossing on the Kirkpatrick Street approach to the Cotter Street signal. Given the moderate traffic volume expected to utilise this section of Kirkpatrick Street and the proximity to the traffic signals,

uncontrolled pedestrian crossings should be avoided. It is recommended that pedestrians along these desire lines are guided to utilise the existing pedestrian crosswalk on the north-western leg of the Cotter Street signals. This approach may require the installation of pedestrian fencing to encourage movements to utilise the existing formal crossing.

7. CONCLUSION

Based on the traffic impact assessment undertaken for the proposed commercial development at Block 1218 Kirkpatrick Street, Weston Creek we are of the opinion that:

- The key intersections in the vicinity of the subject site (Cotter Road/Kirkpatrick Street/Dargie Street, Kirkpatrick Street/Kirkpatrick Street and Kirkpatrick Street/Brackenreg Road) currently operate satisfactorily with LOS A and LOS B operating conditions.
- The proposed development will generate up to 440 vehicle trips in the PM peak hour including 206 trips associated with 'passing trade' and 234 'stand alone' trips. All traffic associated with the proposed development will access the wider road network via the Cotter Road/Kirkpatrick Street/Dargie Street intersection and the existing traffic flows have been utilised to determine the traffic distribution.
- Intersection analysis for the post development conditions indicates that the key intersections of Cotter Road/Kirkpatrick Street/Dargie Street and Kirkpatrick Street/Kirkpatrick Street will continue to operate satisfactorily following full development of the subject site (LOS A and LOS B). The intersection of Kirkpatrick Street/Brackenreg Road will continue to operate at LOS A.
- The total parking demand for the proposed development based on the ACTPLA *Parking and Vehicular Access General Code* (May 2013) is approximately 58 spaces (18 spaces associated with the service station component and 40 spaces associated with the fast food restaurant component). A total of 33 parking spaces are proposed to support the development and therefore there is a shortfall of 25 parking spaces.
- The proposed service station component includes a provision of 8 parking spaces (6 bowser spaces and 2 spaces adjacent to the convenience store). It is recommended that the provision adjacent to the convenience store is increased by 10 to meet the requirements of the ACTPLA Code.
- Typically fast food restaurants generate lower parking demands compared to traditional 'sit down' restaurants and on this basis a review of existing fast food restaurants around Canberra was undertaken. The review indicates an average parking provision of approximately 8.1 spaces/100m^2 for existing fast food restaurants which when applied to the subject site results in a requirement for 32 parking spaces. Given that 25 spaces are proposed for the fast food component, it is recommended that an additional 7-15 parking spaces are provided to meet parking demands for the fast food.
- The proposed development is likely to generate pedestrian demands for the local area including from the park and ride facility, the Australian Defence College, the RSPCA facility and the existing residential properties. To cater for the likely pedestrian demand footpaths in the vicinity of the subject site should be provided to improve the quality of the pedestrian conditions. Furthermore, it is recommended that pedestrian movements are guided to utilise the existing pedestrian crosswalk on the north-western leg of the Cotter Street signals. This approach may require the installation of pedestrian fencing to encourage movements to utilise the existing formal crossing.

Appendix A

Traffic Survey Information

Cotter Road / Kirkpatrick Street / Dargie Street - SCATS Summary

TraffixGroup
Traffic Engineers and Transport Planners

Data Range: Monday, 1st September, 2014-Saturday, 6th September, 2014

Weekday Average													
Time	Cotter Road			Dargie Street			Cotter Road			Kirkpatrick Street			Total
	North-East Approach			South-East Approach			South-West Approach			North-West Approach			
	14 - Left	3&4&12 - Through	6 - Right	15 - Left	Through	Right	13 - Left	1&2&11 - Through	5 - Right	16 - Left	Through	Right	
1:00	0	27	0	0	0	0	1	13	0	1	0	0	42
2:00	2	14	0	0	0	0	0	5	0	0	0	0	21
3:00	1	10	0	0	0	1	0	5	0	0	0	0	17
4:00	0	8	0	0	0	0	0	9	0	0	0	0	17
5:00	1	11	1	0	0	0	0	26	0	1	0	0	40
6:00	3	53	0	0	0	2	0	96	0	0	0	0	155
7:00	22	446	9	2	0	7	1	346	2	1	0	0	836
8:00	60	417	72	3	1	19	12	873	5	7	0	2	1,471
9:00	211	524	139	4	7	137	44	1,214	7	13	0	6	2,306
10:00	46	495	35	5	3	55	13	690	6	16	0	5	1,369
11:00	23	392	26	5	1	19	10	465	4	27	1	9	982
12:00	27	445	17	6	1	23	8	443	3	25	1	10	1,009
13:00	28	473	19	5	1	19	16	463	4	56	2	24	1,110
14:00	30	460	23	4	1	19	15	420	4	29	1	15	1,021
15:00	69	583	21	6	1	27	11	461	6	61	1	12	1,260
16:00	101	750	18	7	5	106	5	666	4	52	1	14	1,730
17:00	35	898	13	4	3	57	6	575	4	67	1	13	1,675
18:00	59	1,219	23	3	2	39	6	615	3	53	1	12	2,035
19:00	31	772	6	4	1	26	3	422	2	11	0	4	1,282
20:00	17	411	2	3	1	11	1	261	3	24	0	5	738
21:00	8	282	1	2	0	7	1	165	1	7	0	2	477
22:00	6	245	1	2	0	9	1	143	1	2	0	1	411
23:00	6	170	1	1	0	3	0	83	1	1	0	1	267
0:00	3	86	0	0	0	3	0	42	0	0	0	0	134
TOTAL	**789**	**9,191**	**427**	**66**	**30**	**590**	**154**	**8,501**	**60**	**454**	**9**	**135**	

G17691: Kirkpatrick Street, Weston Creek
Turning Movement Count

Date Tuesday, 16th September 2014
Time 7 00am-9 00am

Standard Vehicles													
Time	Kirkpatrick Street South-East Approach		Kirkpatrick Street North-East Approach		Kirkpatrick Street North-West Approach		Kirkpatrick Street East Approach		Brackenreg Street North Approach		Kirkpatrick Street West Approach		Total
	1 - Through	2 - Right	3 - Left	4 - Right	5 - Left	6 - Through	7 - Through	8 - Right	9 - Left	10 - Right	11 - Left	12 -Through	
7:00	0	11	0	0	0	0	0	0	0	0	0	0	11
7:15	0	16	1	0	0	0	0	0	0	0	0	0	17
7:30	1	27	2	0	0	0	1	0	0	0	0	0	31
7:45	4	30	0	0	0	0	4	0	0	0	0	0	38
8:00	9	62	0	1	4	0	10	0	0	1	1	3	91
8:15	12	65	0	0	1	4	12	0	0	0	0	5	99
8:30	16	31	5	0	0	6	14	1	0	0	0	6	79
8:45	11	9	1	0	0	6	11	0	0	0	0	6	44
TOTAL	53	251	9	1	5	16	52	1	0	1	1	20	410
PEAK	48	167	6	1	5	16	47	1	0	1	1	20	

Heavy Vehicles													
Time	Kirkpatrick Street South-East Approach		Kirkpatrick Street North-East Approach		Kirkpatrick Street North-West Approach		Kirkpatrick Street East Approach		Brackenreg Street North Approach		Kirkpatrick Street West Approach		Total
	1 - Through	2 - Right	3 - Left	4 - Right	5 - Left	6 - Through	7 - Through	8 - Right	9 - Left	10 - Right	11 - Left	12 -Through	
7:00	2	0	0	0	0	0	2	0	0	0	0	0	4
7:15	0	0	0	0	0	1	0	0	0	0	0	1	2
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	1	0	0	0	0	0	1	2
8:00	1	0	0	0	0	0	1	0	0	0	0	0	2
8:15	1	2	0	0	0	0	1	0	0	0	0	0	4
8:30	0	0	0	0	0	3	0	0	0	0	0	3	6
8:45	1	0	0	0	0	0	1	0	0	0	0	0	2
TOTAL	5	2	0	0	0	5	5	0	0	0	0	5	22
PEAK	3	2	0	0	0	3	3	0	0	0	0	3	

Bicycles													
Time	Kirkpatrick Street South-East Approach		Kirkpatrick Street North-East Approach		Kirkpatrick Street North-West Approach		Kirkpatrick Street East Approach		Brackenreg Street North Approach		Kirkpatrick Street West Approach		Total
	1 - Through	2 - Right	3 - Left	4 - Right	5 - Left	6 - Through	7 - Through	8 - Right	9 - Left	10 - Right	11 - Left	12 -Through	
7:00	1	0	0	0	0	1	0	1	0	0	0	1	4
7:15	0	0	0	0	0	1	0	0	0	0	0	1	2
7:30	0	0	0	0	0	3	0	0	0	0	0	3	6
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00	3	0	0	0	1	1	3	0	0	0	0	2	10
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	1	0	0	0	0	1	1	0	0	0	0	1	4
TOTAL	5	0	0	0	1	7	4	1	0	0	0	8	26
PEAK	4	0	0	0	1	2	4	0	0	0	0	3	

TOTAL													
Time	Kirkpatrick Street South-East Approach		Kirkpatrick Street North-East Approach		Kirkpatrick Street North-West Approach		Kirkpatrick Street East Approach		Brackenreg Street North Approach		Kirkpatrick Street West Approach		Total
	1 - Through	2 - Right	3 - Left	4 - Right	5 - Left	6 - Through	7 - Through	8 - Right	9 - Left	10 - Right	11 - Left	12 -Through	
7:00	3	11	0	0	0	1	2	1	0	0	0	1	19
7:15	0	16	1	0	0	2	0	0	0	0	0	2	21
7:30	1	27	2	0	0	3	1	0	0	0	0	3	37
7:45	4	30	0	0	0	1	4	0	0	0	0	1	40
8:00	13	62	0	1	5	1	14	0	0	1	1	5	103
8:15	13	67	0	0	1	4	13	0	0	0	0	5	103
8:30	16	31	5	0	0	9	14	1	0	0	0	9	85
8:45	13	9	1	0	0	7	13	0	0	0	0	7	50
TOTAL	63	253	9	1	6	28	61	2	0	1	1	33	458

G17691: Kirkpatrick Street, Weston Creek
Turning Movement Count

Date Tuesday, 16th September, 2014
Time 4 00pm-6 00pm

Standard Vehicles

Time	Kirkpatrick Street South-East Approach		Kirkpatrick Street North-East Approach		Kirkpatrick Street North-West Approach		Kirkpatrick Street East Approach		Brackenreg Street North Approach		Kirkpatrick Street West Approach		Total
	1 - Through	2 - Right	3 - Left	4 - Right	5 - Left	6 - Through	7 - Through	8 - Right	9 - Left	10 - Right	11 - Left	12 -Through	
16:00	2	2	11	0	0	3	2	0	0	0	0	3	23
16:15	6	2	16	0	0	7	6	0	0	0	0	7	44
16:30	6	1	6	0	0	4	6	0	0	0	0	4	27
16:45	3	0	11	0	0	7	3	0	0	0	0	7	31
17:00	0	0	12	0	0	16	0	0	0	0	0	15	43
17:15	1	2	15	0	0	7	1	0	0	0	0	7	33
17:30	2	1	10	0	0	1	2	0	0	0	0	1	17
17:45	1	5	6	0	0	4	1	0	0	0	0	4	21
TOTAL	21	13	87	0	0	49	21	0	0	0	0	48	239
PEAK	4	8	43	0	0	28	4	0	0	0	0	27	

Heavy Vehicles

Time	Kirkpatrick Street South-East Approach		Kirkpatrick Street North-East Approach		Kirkpatrick Street North-West Approach		Kirkpatrick Street East Approach		Brackenreg Street North Approach		Kirkpatrick Street West Approach		Total
	1 - Through	2 - Right	3 - Left	4 - Right	5 - Left	6 - Through	7 - Through	8 - Right	9 - Left	10 - Right	11 - Left	12 -Through	
16:00	0	0	0	0	0	1	0	0	0	0	0	1	2
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	1	0	0	0	0	0	1	2
PEAK	0	0	0	0	0	0	0	0	0	0	0	0	

Bicycles

Time	Kirkpatrick Street South-East Approach		Kirkpatrick Street North-East Approach		Kirkpatrick Street North-West Approach		Kirkpatrick Street East Approach		Brackenreg Street North Approach		Kirkpatrick Street West Approach		Total
	1 - Through	2 - Right	3 - Left	4 - Right	5 - Left	6 - Through	7 - Through	8 - Right	9 - Left	10 - Right	11 - Left	12 -Through	
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	1	0	0	0	0	0	0	0	0	1
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	1	0	0	0	0	1	1	0	0	0	0	1	4
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	0	0	1	0	1	1	0	0	0	0	1	5
PEAK	1	0	0	0	0	1	1	0	0	0	0	1	

TOTAL

Time	Kirkpatrick Street South-East Approach		Kirkpatrick Street North-East Approach		Kirkpatrick Street North-West Approach		Kirkpatrick Street East Approach		Brackenreg Street North Approach		Kirkpatrick Street West Approach		Total
	1 - Through	2 - Right	3 - Left	4 - Right	5 - Left	6 - Through	7 - Through	8 - Right	9 - Left	10 - Right	11 - Left	12 -Through	
16:00	2	2	11	0	0	4	2	0	0	0	0	4	25
16:15	6	2	16	1	0	7	6	0	0	0	0	7	45
16:30	6	1	6	0	0	4	6	0	0	0	0	4	27
16:45	3	0	11	0	0	7	3	0	0	0	0	7	31
17:00	0	0	12	0	0	16	0	0	0	0	0	15	43
17:15	1	2	15	0	0	7	1	0	0	0	0	7	33
17:30	3	1	10	0	0	2	3	0	0	0	0	2	21
17:45	1	5	6	0	0	4	1	0	0	0	0	4	21
TOTAL	22	13	87	1	0	51	22	0	0	0	0	50	246

Appendix B

Signal Phasing and Timing Observations

Intructions:
- Record each phase time in seconds for each complete cycle
- The phase time start as soon as the lights display 'green' and ends when the next phase displays 'green' (i.e. includes 'green' time, 'amber' time, and 'all red' time)
- Every phase will not be likley to run in each cycle, show a dash in the column if the phase does not run
- A cycle is complete, when the first phase runs again

Phase No.	Phase A	Phase B	Phase C	Phase D	Phase E	Phase F	Phase F1	Phase F2	Cycle Time
AM PEAK PERIOD									
Start Time	**7:45-8:00**								
Cycle 1	69	0	17	11	0	0	0	0	97
Cycle 2	80	0	15	15	0	0	0	0	110
Cycle 3	84	0	23	15	0	0	0	0	122
Cycle 4	78	0	0	13	0	15	0	4	110
Cycle 5	78	0	13	15	0	0	0	0	106
Start Time	**8:30-8:45**								
Cycle 1	82	0	0	13	14	19	0	0	128
Cycle 2	63	0	22	20	9	0	0	0	114
Cycle 3	58	0	22	18	0	0	0	0	98
Cycle 4	74	0	13	21	0	0	0	0	108
Cycle 5	81	0	16	22	0	0	0	0	119
AM Peak Summary									
Minimum	**58**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**97**
Maximum	**84**	**0**	**23**	**22**	**14**	**19**	**0**	**4**	**128**
Average	**75**	**0**	**14**	**16**	**2**	**3**	**0**	**0**	**111**
PM PEAK PERIOD									
Start Time	**16:45-17:00**								
Cycle 1	65	0	0	14	13	0	0	0	92
Cycle 2	66	0	13	16	0	0	0	0	95
Cycle 3	44	0	0	15	0	0	0	0	59
Cycle 4	76	0	0	0	20	0	0	0	96
Cycle 5	70	0	0	14	0	0	0	0	84
Start Time	**17:30-17:45**								
Cycle 1	198	0	0	0	0	0	14	0	212
Cycle 2	93	0	0	15	0	0	0	0	108
Cycle 3	66	0	0	14	0	0	0	0	80
Cycle 4	102	0	0	14	0	0	0	0	116
Cycle 5	102	0	0	15	0	0	0	0	117
PM Peak Summary									
Minimum	**44**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**59**
Maximum	**198**	**0**	**13**	**16**	**20**	**0**	**14**	**0**	**212**
Average	**88**	**0**	**1**	**12**	**3**	**0**	**1**	**0**	**106**

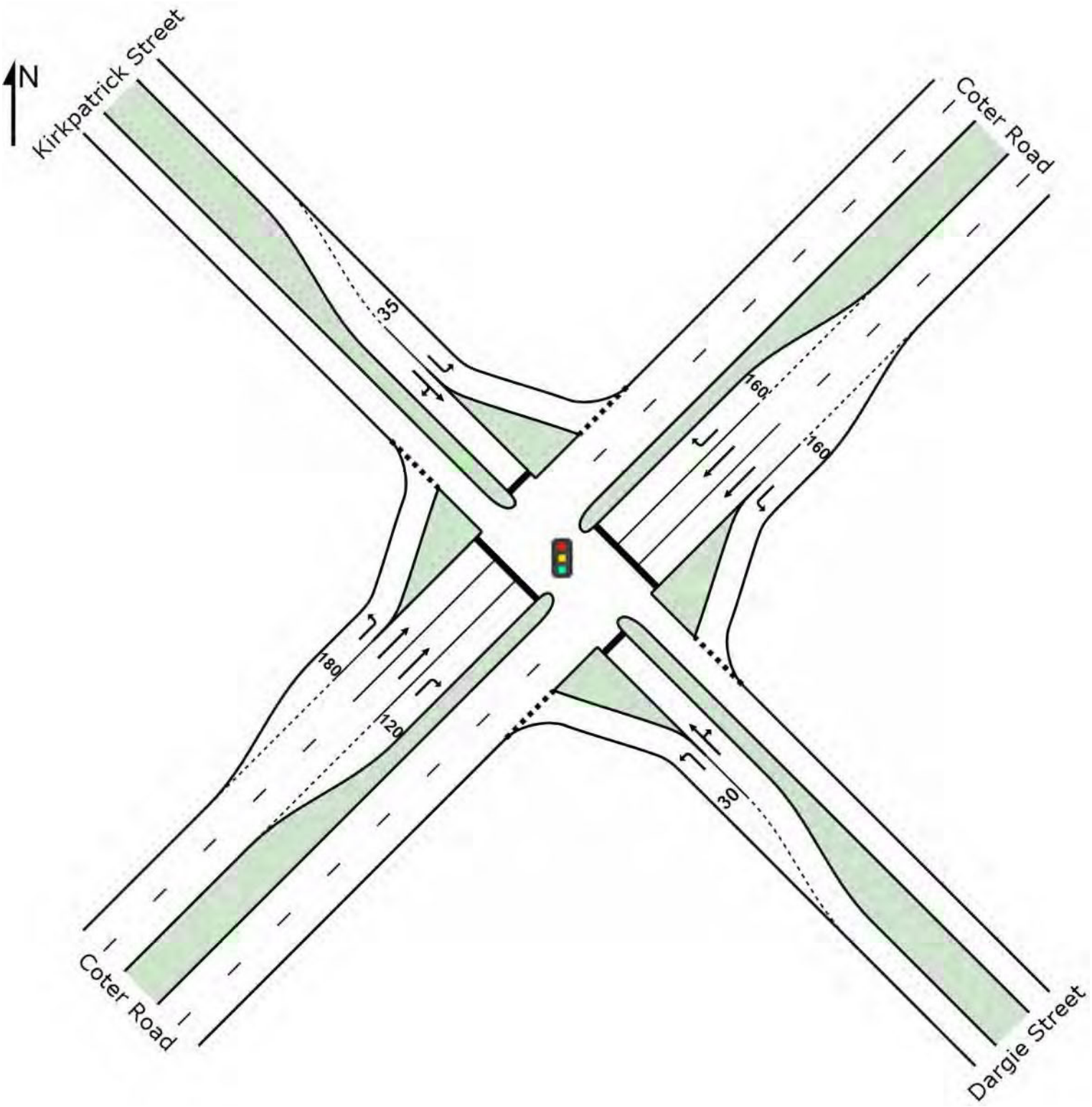
Appendix C

SIDRA Intersection Analysis – Existing Conditions

SITE LAYOUT

Site: Existing AM

Coter Road / Kirkpatrick Street / Dargie Street
Signals - Fixed Time



MOVEMENT SUMMARY

Site: Existing AM

Coter Road / Kirkpatrick Street / Dargie Street
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Dargie Street											
21	L2	4	5.0	0.005	6.3	LOS A	0.0	0.1	0.15	0.57	53.5
22	T1	7	5.0	0.933	72.2	LOS E	10.0	72.7	1.00	1.07	26.5
23	R2	144	5.0	0.933	77.9	LOS E	10.0	72.7	1.00	1.07	26.2
Approach		156	5.0	0.933	75.7	LOS E	10.0	72.7	0.98	1.06	26.6
NorthEast: Coter Road											
24	L2	222	5.0	0.131	5.9	LOS A	0.7	5.3	0.07	0.57	53.9
25	T1	552	5.0	0.194	4.1	LOS A	4.2	30.3	0.31	0.27	56.2
26	R2	146	5.0	0.748	43.0	LOS D	6.5	47.2	1.00	0.85	34.5
Approach		920	5.0	0.748	10.7	LOS B	6.5	47.2	0.36	0.43	50.6
NorthWest: Kirkpatrick Street											
27	L2	14	5.0	0.021	9.9	LOS A	0.2	1.4	0.33	0.61	50.9
28	T1	1	5.0	0.224	65.5	LOS E	0.4	3.3	1.00	0.65	27.9
29	R2	6	5.0	0.224	71.1	LOS E	0.4	3.3	1.00	0.65	27.6
Approach		21	5.0	0.224	31.1	LOS C	0.4	3.3	0.56	0.62	39.3
SouthWest: Coter Road											
30	L2	46	5.0	0.028	5.9	LOS A	0.2	1.1	0.07	0.56	53.9
31	T1	1278	5.0	0.539	12.2	LOS B	19.0	138.8	0.61	0.55	49.9
32	R2	7	5.0	0.151	67.7	LOS E	0.4	3.1	1.00	0.65	28.0
Approach		1332	5.0	0.539	12.3	LOS B	19.0	138.8	0.59	0.55	49.9
All Vehicles		2428	5.0	0.933	15.9	LOS B	19.0	138.8	0.53	0.54	47.3

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PHASING SUMMARY

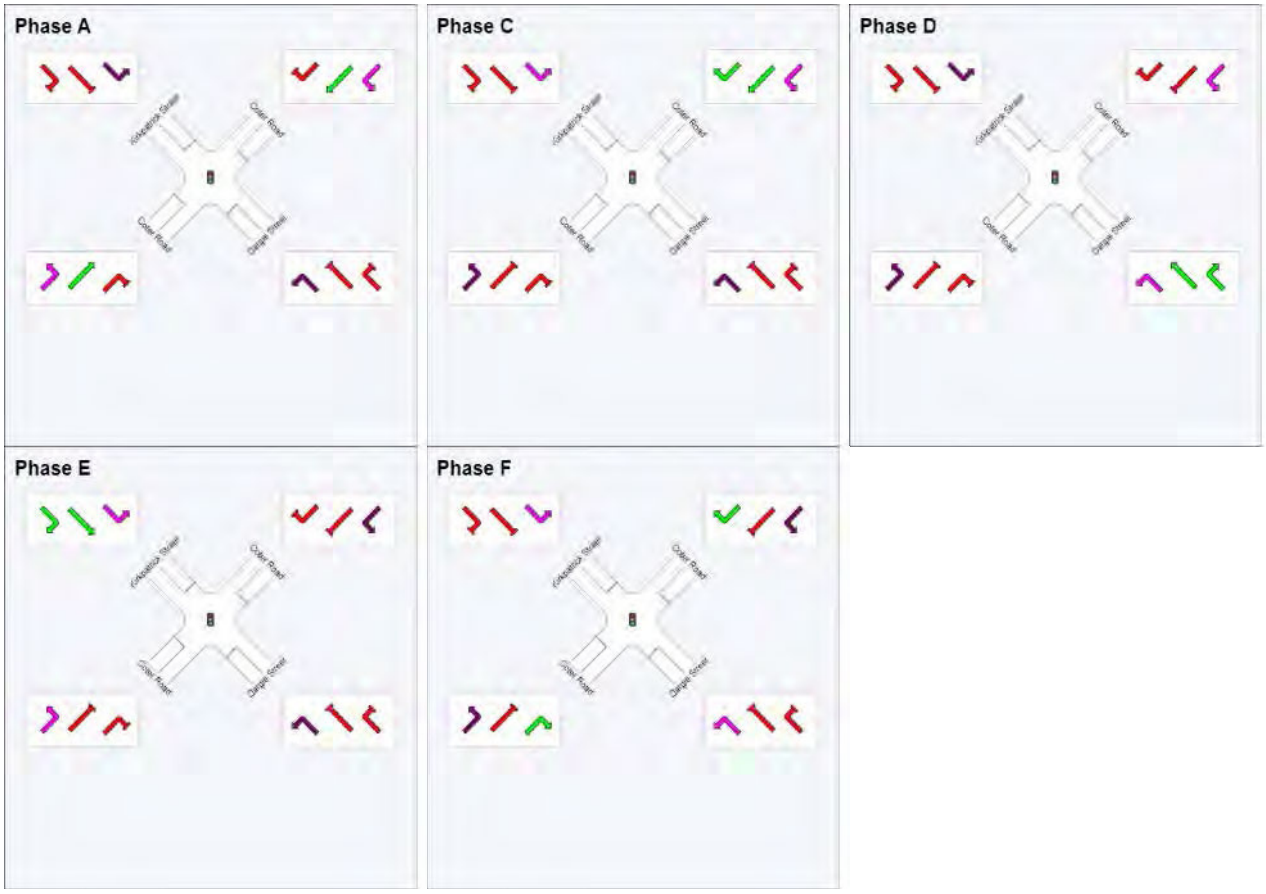
Site: Existing AM

Coter Road / Kirkpatrick Street / Dargie Street
Signals - Fixed Time Cycle Time = 110 seconds (User-Given Phase Times)

Phase times specified by the user
Sequence: Variable Phasing
Movement Class: All Movement Classes
Input Sequence: A, C, D, E, F
Output Sequence: A, C, D, E, F

Phase Timing Results

Phase	A	C	D	E	F
Reference Phase	Yes	No	No	No	No
Phase Change Time (sec)	0	70	84	100	107
Green Time (sec)	69	8	10	1	2
Yellow Time (sec)	4	4	4	0	0
All-Red Time (sec)	2	2	2	1	1
Phase Time (sec)	75	14	16	2	3
Phase Split	68 %	13 %	15 %	2 %	3 %



Normal Movement
Permitted/Opposed
Slip/Bypass-Lane Movement
Opposed Slip/Bypass-Lane
Stopped Movement
Turn On Red
Other Movement Class Running
Other Movement Class Stopped
Mixed Running & Stopped Movement Classes
Undetected Movement
Phase Transition Applied

MOVEMENT SUMMARY

Site: Existing PM

Coter Road / Kirkpatrick Street / Dargie Street
Signals - Fixed Time Cycle Time = 105 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Dargie Street											
21	L2	3	5.0	0.002	5.9	LOS A	0.0	0.1	0.07	0.56	53.9
22	T1	2	5.0	0.365	53.0	LOS D	2.2	16.4	0.99	0.74	30.7
23	R2	41	5.0	0.365	58.7	LOS E	2.2	16.4	0.99	0.74	30.3
Approach		46	5.0	0.365	54.8	LOS D	2.2	16.4	0.92	0.73	31.3
NorthEast: Coter Road											
24	L2	62	5.0	0.037	5.8	LOS A	0.2	1.3	0.06	0.56	53.9
25	T1	1283	5.0	0.401	1.9	LOS A	7.4	54.2	0.25	0.23	58.1
26	R2	24	5.0	0.709	71.0	LOS E	1.5	10.6	1.00	0.78	27.3
Approach		1369	5.0	0.709	3.3	LOS A	7.4	54.2	0.25	0.25	56.8
NorthWest: Kirkpatrick Street											
27	L2	56	5.0	0.033	5.8	LOS A	0.2	1.2	0.06	0.56	53.9
28	T1	1	5.0	0.266	59.9	LOS E	0.8	5.6	1.00	0.68	29.1
29	R2	13	5.0	0.266	65.6	LOS E	0.8	5.6	1.00	0.68	28.7
Approach		69	5.0	0.266	17.5	LOS B	0.8	5.6	0.25	0.59	46.0
SouthWest: Coter Road											
30	L2	6	5.0	0.004	5.9	LOS A	0.0	0.2	0.07	0.56	53.8
31	T1	647	5.0	0.214	2.7	LOS A	3.9	28.5	0.26	0.23	57.5
32	R2	3	5.0	0.092	67.0	LOS E	0.2	1.3	1.00	0.62	28.2
Approach		657	5.0	0.214	3.0	LOS A	3.9	28.5	0.26	0.23	57.2
All Vehicles		2142	5.0	0.709	4.8	LOS A	7.4	54.2	0.27	0.27	55.5

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PHASING SUMMARY

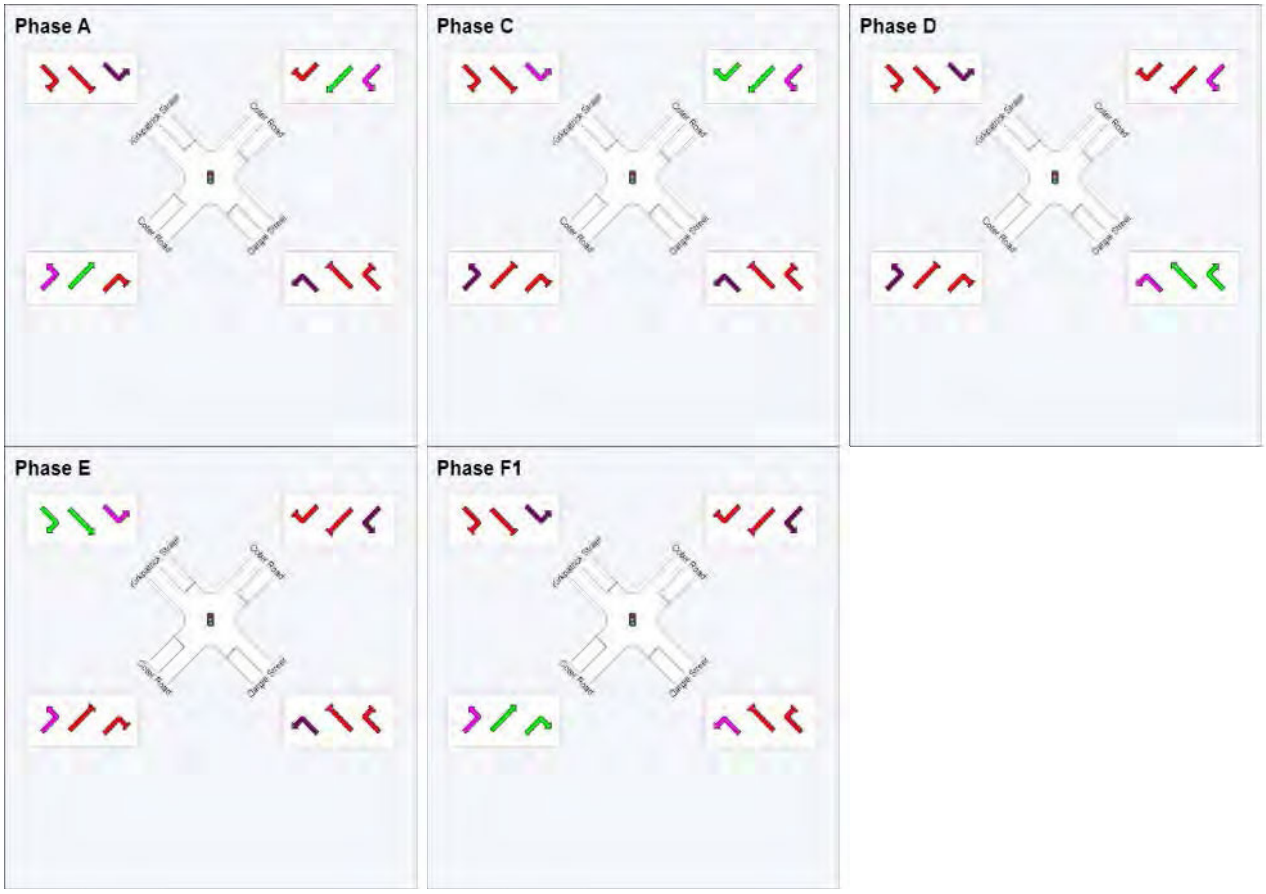
Site: Existing PM

Coter Road / Kirkpatrick Street / Dargie Street
Signals - Fixed Time Cycle Time = 105 seconds (User-Given Phase Times)

Phase times specified by the user
Sequence: Variable Phasing
Movement Class: All Movement Classes
Input Sequence: A, C, D, E, F1
Output Sequence: A, C, D, E, F1

Phase Timing Results

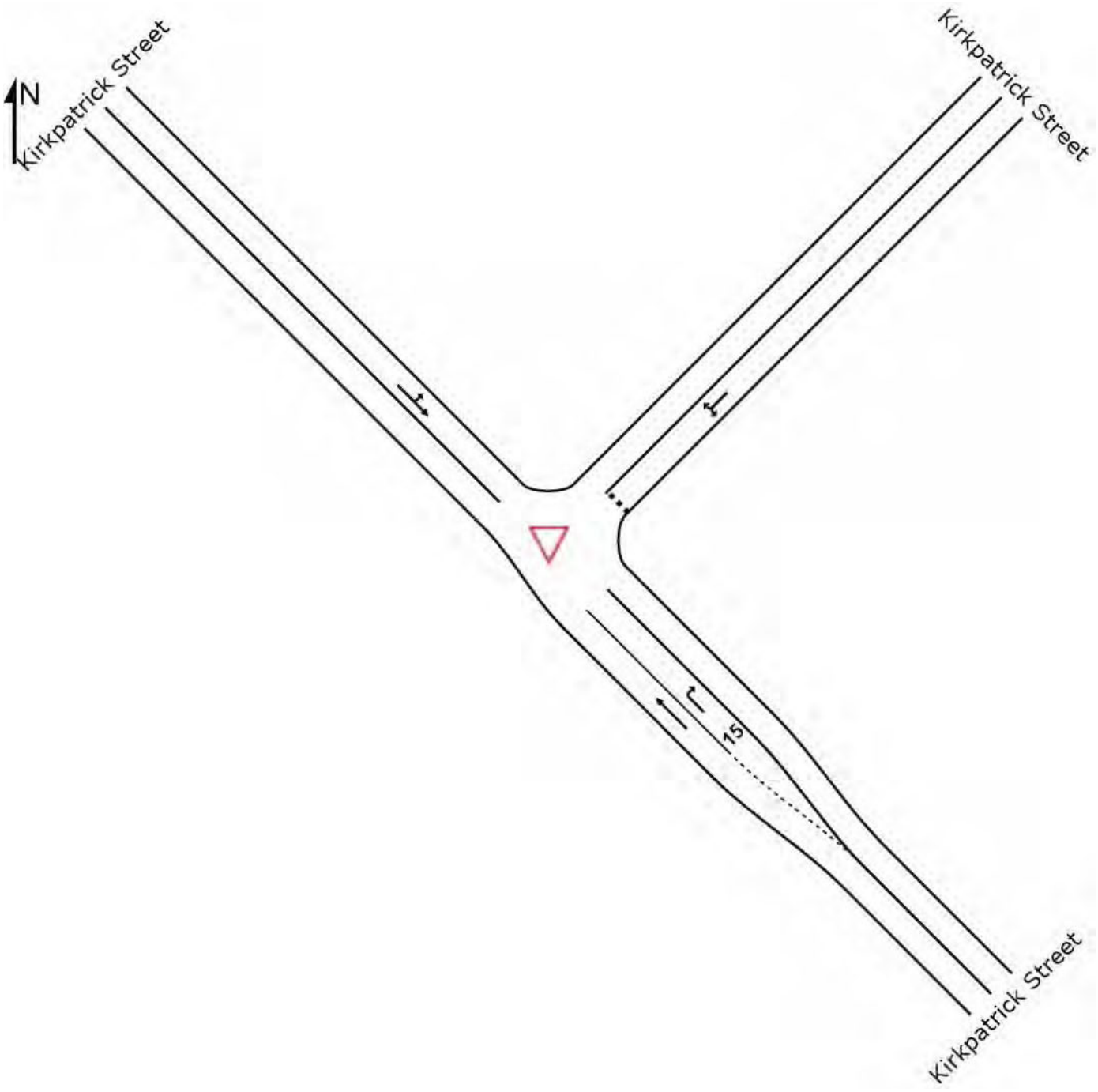
Phase	A	C	D	E	F1
Reference Phase	Yes	No	No	No	No
Phase Change Time (sec)	0	82	89	95	103
Green Time (sec)	82	1	6	2	1
Yellow Time (sec)	4	0	4	0	0
All-Red Time (sec)	2	0	2	1	0
Phase Time (sec)	88	1	12	3	1
Phase Split	84 %	1 %	11 %	3 %	1 %



SITE LAYOUT

Site: Exisitng AM

Kirkpatrick Street / Kirkpatrick Street
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: Exisitng AM

Kirkpatrick Street / Kirkpatrick Street
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Kirkpatrick Street											
22	T1	58	0.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R2	178	0.0	0.101	5.5	LOS A	0.5	3.4	0.10	0.57	52.9
Approach		236	0.0	0.101	4.2	NA	0.5	3.4	0.08	0.43	54.4
NorthEast: Kirkpatrick Street											
24	L2	6	0.0	0.005	5.8	LOS A	0.0	0.1	0.06	0.56	53.4
26	R2	1	0.0	0.005	5.7	LOS A	0.0	0.1	0.06	0.56	52.9
Approach		7	0.0	0.005	5.8	LOS A	0.0	0.1	0.06	0.56	53.4
NorthWest: Kirkpatrick Street											
27	L2	6	0.0	0.015	5.5	LOS A	0.0	0.0	0.00	0.13	57.2
28	T1	22	0.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.13	58.8
Approach		28	0.0	0.015	1.2	NA	0.0	0.0	0.00	0.13	58.4
All Vehicles		272	0.0	0.101	3.9	NA	0.5	3.4	0.07	0.40	54.8

Level of Service (LOS) Method: Delay (HCM 2000).
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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: Exisitng PM

Kirkpatrick Street / Kirkpatrick Street
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

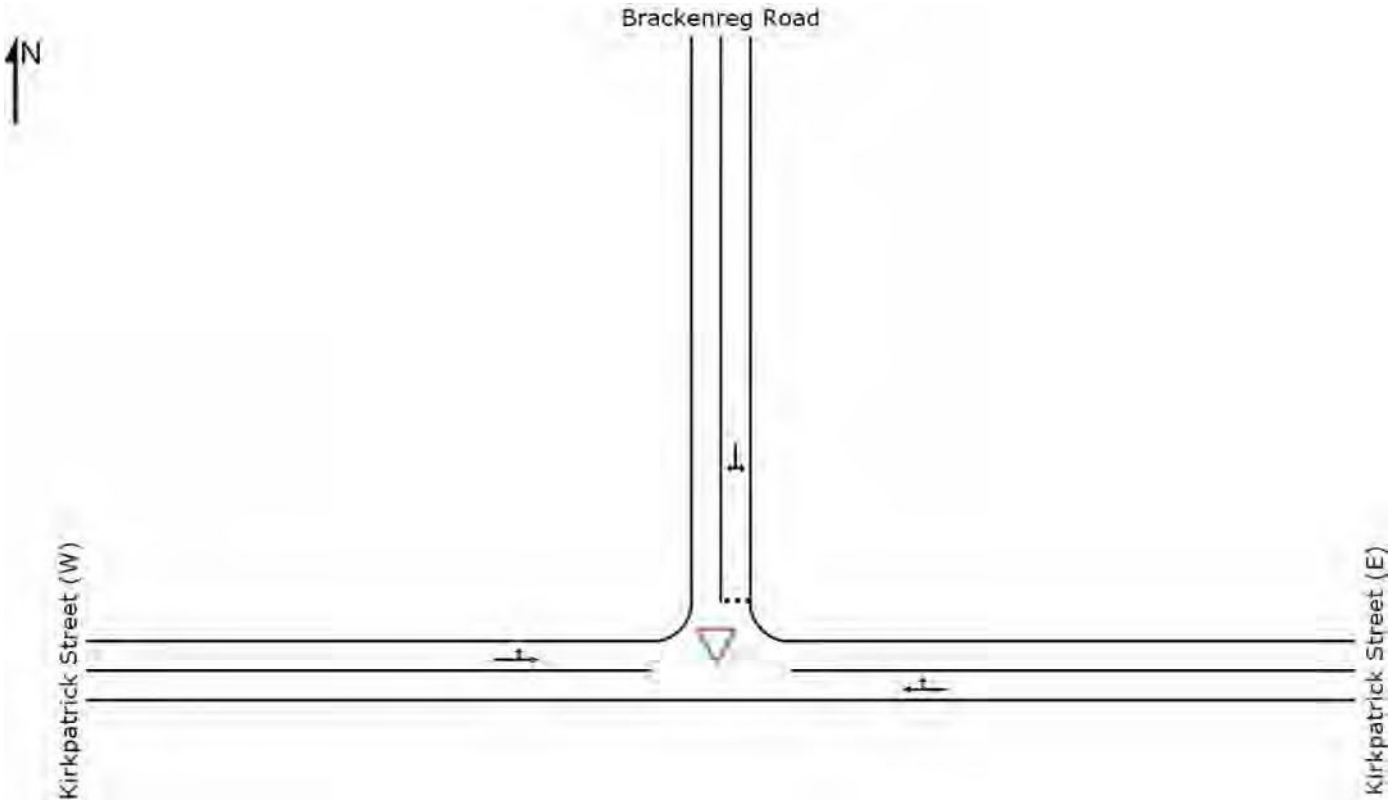
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Kirkpatrick Street											
22	T1	5	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R2	8	0.0	0.005	5.5	LOS A	0.0	0.2	0.10	0.56	52.9
Approach		14	0.0	0.005	3.4	NA	0.0	0.2	0.06	0.35	55.4
NorthEast: Kirkpatrick Street											
24	L2	45	0.0	0.029	5.6	LOS A	0.1	0.8	0.09	0.54	53.3
26	R2	1	0.0	0.029	5.5	LOS A	0.1	0.8	0.09	0.54	52.8
Approach		46	0.0	0.029	5.6	LOS A	0.1	0.8	0.09	0.54	53.3
NorthWest: Kirkpatrick Street											
27	L2	1	0.0	0.016	5.5	LOS A	0.0	0.0	0.00	0.02	58.2
28	T1	31	0.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		32	0.0	0.016	0.2	NA	0.0	0.0	0.00	0.02	59.8
All Vehicles		92	0.0	0.029	3.4	NA	0.1	0.8	0.06	0.33	55.7

Level of Service (LOS) Method: Delay (HCM 2000).
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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: Exisitng AM

Kirkpatrick Street - Brackenreg Road
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: Exisitng AM

Kirkpatrick Street - Brackenreg Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Kirkpatrick Street (E)											
5	T1	57	0.0	0.030	0.1	LOS A	0.2	1.1	0.10	0.01	59.5
6	R2	1	0.0	0.030	5.5	LOS A	0.2	1.1	0.10	0.01	57.3
Approach		58	0.0	0.030	0.2	NA	0.2	1.1	0.10	0.01	59.4
North: Brackenreg Road											
7	L2	1	0.0	0.002	5.7	LOS A	0.0	0.0	0.09	0.56	53.4
9	R2	1	0.0	0.002	5.6	LOS A	0.0	0.0	0.09	0.56	52.9
Approach		2	0.0	0.002	5.7	LOS A	0.0	0.0	0.09	0.56	53.1
West: Kirkpatrick Street (W)											
10	L2	1	0.0	0.015	5.5	LOS A	0.0	0.0	0.00	0.02	58.2
11	T1	27	0.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		28	0.0	0.015	0.2	NA	0.0	0.0	0.00	0.02	59.7
All Vehicles		88	0.0	0.030	0.3	NA	0.2	1.1	0.06	0.03	59.4

Level of Service (LOS) Method: Delay (HCM 2000).
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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: Exisitng PM

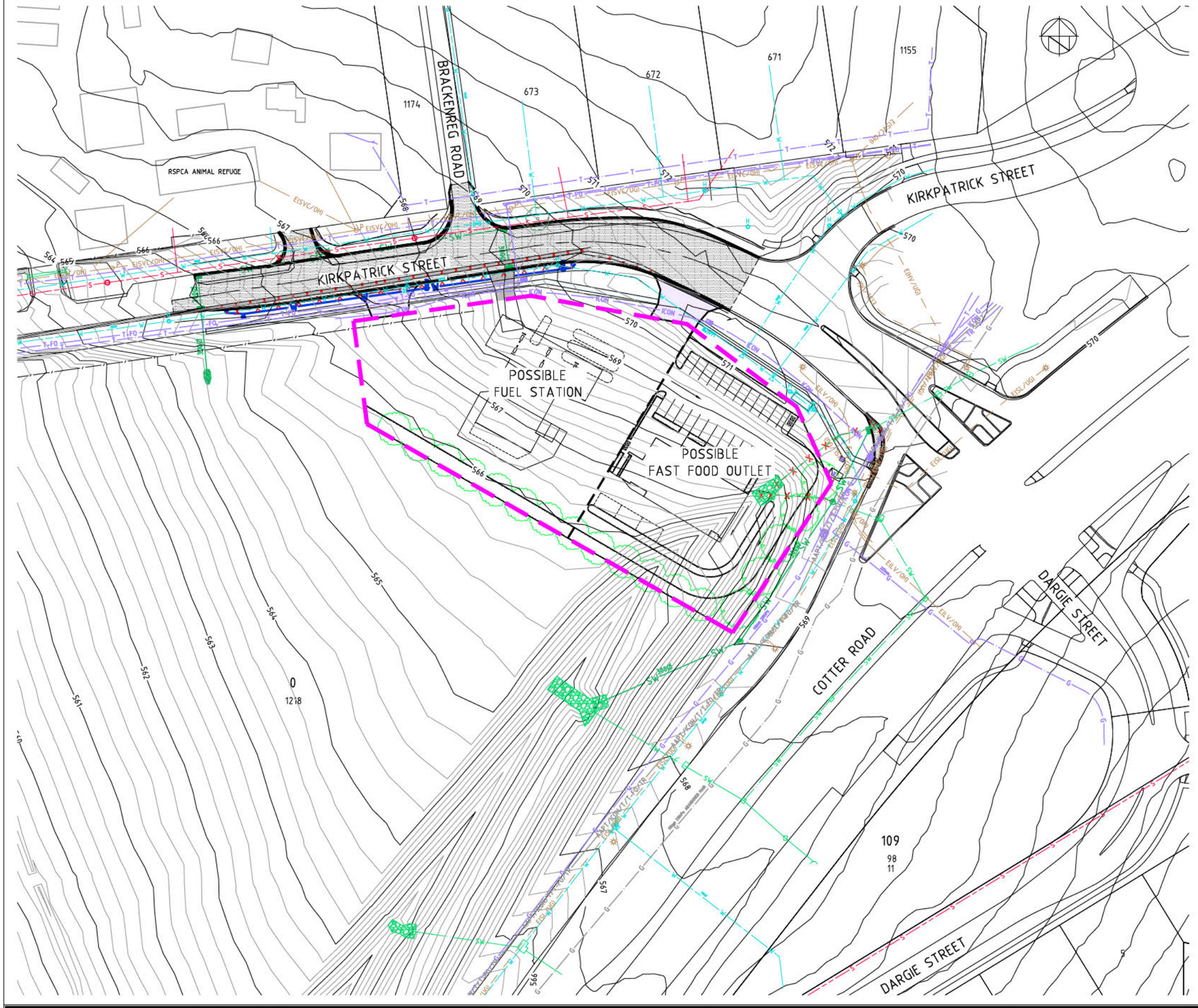
Kirkpatrick Street - Brackenreg Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Kirkpatrick Street (E)											
5	T1	5	0.0	0.003	0.1	LOS A	0.0	0.1	0.10	0.10	58.7
6	R2	1	0.0	0.003	5.5	LOS A	0.0	0.1	0.10	0.10	56.5
Approach		6	0.0	0.003	1.0	NA	0.0	0.1	0.10	0.10	58.3
North: Brackenreg Road											
7	L2	1	0.0	0.002	5.6	LOS A	0.0	0.0	0.09	0.55	53.4
9	R2	1	0.0	0.002	5.5	LOS A	0.0	0.0	0.09	0.55	52.9
Approach		2	0.0	0.002	5.6	LOS A	0.0	0.0	0.09	0.55	53.1
West: Kirkpatrick Street (W)											
10	L2	1	0.0	0.016	5.5	LOS A	0.0	0.0	0.00	0.02	58.2
11	T1	29	0.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		31	0.0	0.016	0.2	NA	0.0	0.0	0.00	0.02	59.8
All Vehicles		39	0.0	0.016	0.6	NA	0.0	0.1	0.02	0.06	59.1

Level of Service (LOS) Method: Delay (HCM 2000).
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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix D

Indicative Development Plan



LEGEND

EXISTING SERVICES

- SEWER MAIN (MAINTENANCE HOLE)
- STORMWATER MAIN (SUMP, MAINTENANCE HOLE)
- WATER MAIN (SLUICE VALVE, HYDRANT)
- ELECTRICITY HIGH VOLTAGE OVERHEAD (POLE)
- ELECTRICITY HIGH VOLTAGE UNDERGROUND
- ELECTRICITY LOW VOLTAGE OVERHEAD
- ELECTRICITY SERVICE OVERHEAD
- ELECTRICITY SERVICE UNDERGROUND
- ELECTRICITY STREETLIGHTING UNDERGROUND (STREETLIGHT POLE)
- AAPT
- AAPT,ICON,TELSTRA F-O, TELSTRA, TRANSACT SHARED CONDUIT
- ICON
- TELSTRA
- TELSTRA FIBRE OPTIC
- TRANSACT (SERVICE PIT)
- GAS
- GAS ABANDONED
- FENCE
- BOLLARDS
- EASEMENT
- CONTOUR MAJOR (558.0)
- CONTOUR MINOR
- BUILDING OUTLINE
- BLOCK BOUNDARY
- 229 SECTION NUMBER
- 13 BLOCK NUMBER

PROPOSED

- SITE BOUNDARY
- STORMWATER
- WATER
- DRIVEWAY
- FOOTPATH

NOTE:

1. CONTOUR DATA CAPTURED 2014, LAND DATA SURVEYS.
2. THE FOLLOWING INFORMATION REGARDING EXISTING SERVICES IS BASED ON WORK AS EXECUTED AND DIAL BEFORE YOU DIG INFORMATION PROVIDED BY ACT GOVERNMENT AUTHORITIES, ACTEWAGL CORPORATION LTD AND UTILITY SERVICES AUTHORITIES. WHILST EVERY EFFORT HAS BEEN MADE TO ENSURE THE COMPLETENESS AND ACCURACY OF THIS INFORMATION NEITHER IS WARRANTED OR GUARANTEED BY INDESCO PTY LIMITED. THE INFORMATION SHOULD BE CONFIRMED BY A FIELD SURVEY.

   CONSEQUENTLY PROPOSALS REGARDING FURTHER SERVICING OF THE SUBJECT LAND, WHILST BASED ON SOUND ENGINEERING PRINCIPLES AND JUDGEMENT, ARE SUBJECT TO THE COMPLETENESS AND ACCURACY OF THE INFORMATION REGARDING THE EXISTING SERVICES.
3. DRAWING TO BE READ CONJUNCTION WITH INDESCO REPORT.

A1 PLOT 500 10 5 0 5 10 15 20 A3 PLOT 1000

No.	AMENDMENT	APPROVED	DATE	AMENDED BY
A	FOR INFORMATION	AN	11.08.14	CLA

DEVELOPMENT TEAM: Knight Frank

CLIENT: Land Development Agency CANBERRA FIRST

INDESCO — CONSULT AUSTRALIA — ASNZS ISO 9001 Certified

APPROVED	AN	DATE	11.08.14
CHECKED	AN	DATE	11.08.14
DESIGNED BY	CLA		
DRAWN BY	CLA		
CAD FILE	H:\5417 Weston Ck Fuel Station\Acad\Current Drawings\5417 Block Boundary.dwg		
SCALE	AS SHOWN	SHEET No.	

PROJECT: **WESTON CREEK FUEL STATION**

DRAWING TITLE: **BLOCK BOUNDARY**

PROJECT No.	DRAWING No.	AMDT
5417	001	A

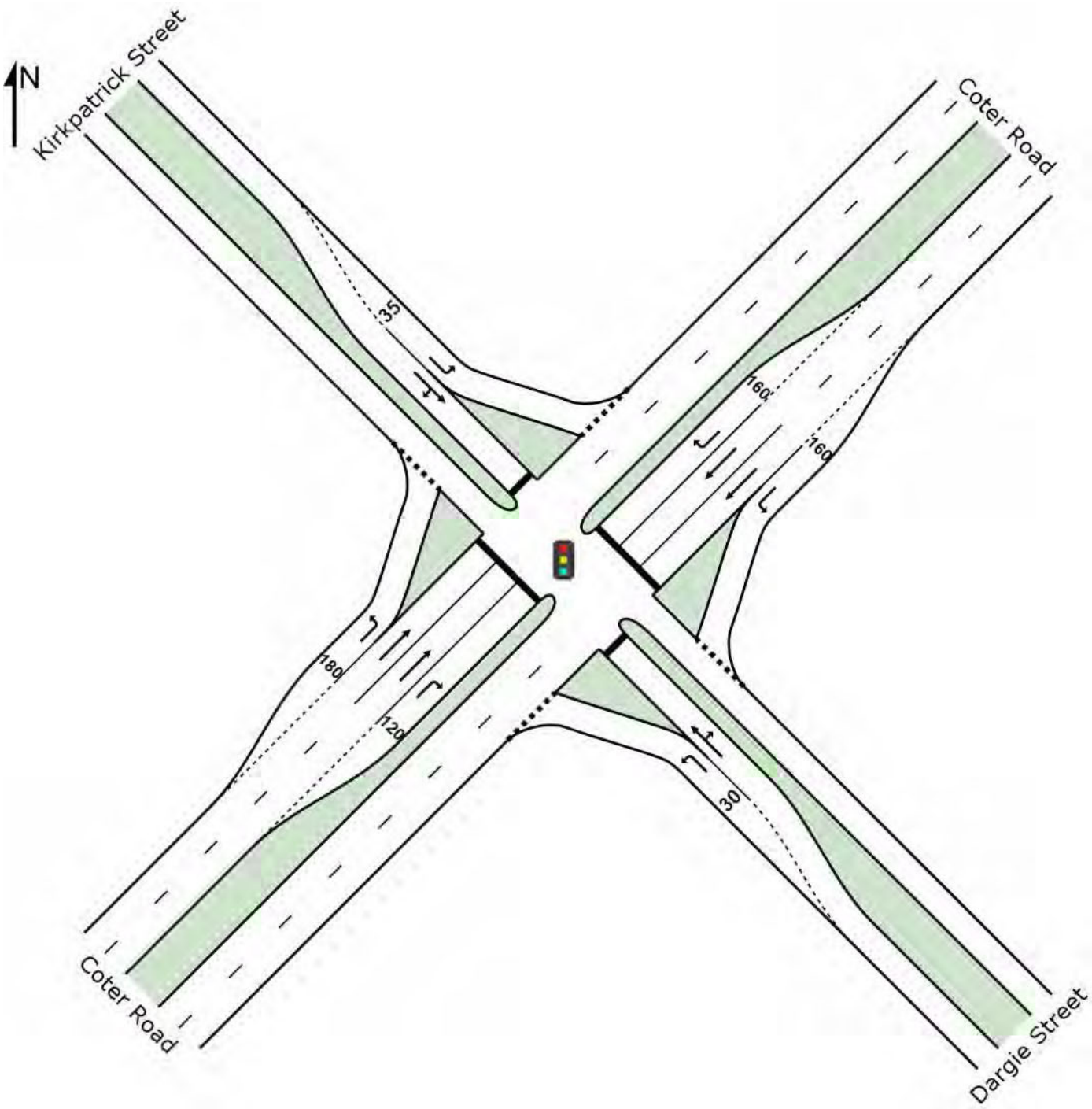
Appendix E

SIDRA Intersection Analysis – Post Development Conditions

SITE LAYOUT

Site: Post Development PM

Coter Road / Kirkpatrick Street / Dargie Street
Signals - Fixed Time



MOVEMENT SUMMARY

Site: Post Development PM

Coter Road / Kirkpatrick Street / Dargie Street
Signals - Fixed Time Cycle Time = 105 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Dargie Street											
21	L2	3	5.0	0.005	9.0	LOS A	0.0	0.3	0.29	0.58	51.5
22	T1	11	5.0	0.498	55.8	LOS E	2.8	20.2	1.00	0.74	30.2
23	R2	41	5.0	0.498	61.4	LOS E	2.8	20.2	1.00	0.74	29.9
Approach		55	5.0	0.498	57.3	LOS E	2.8	20.2	0.96	0.73	30.7
NorthEast: Coter Road											
24	L2	62	5.0	0.038	5.9	LOS A	0.2	1.3	0.09	0.57	53.8
25	T1	1212	5.0	0.495	10.2	LOS B	15.9	115.7	0.56	0.51	51.4
26	R2	187	5.0	0.577	31.8	LOS C	6.5	47.5	0.96	0.80	38.6
Approach		1461	5.0	0.577	12.8	LOS B	15.9	115.7	0.59	0.55	49.4
NorthWest: Kirkpatrick Street											
27	L2	192	5.0	0.168	7.6	LOS A	2.0	14.3	0.24	0.62	52.5
28	T1	4	5.0	0.711	54.8	LOS D	5.9	43.2	1.00	0.85	30.2
29	R2	105	5.0	0.711	60.5	LOS E	5.9	43.2	1.00	0.85	29.9
Approach		301	5.0	0.711	26.8	LOS C	5.9	43.2	0.51	0.70	41.2
SouthWest: Coter Road											
30	L2	66	5.0	0.048	7.2	LOS A	0.5	3.9	0.23	0.60	52.8
31	T1	611	5.0	0.346	19.0	LOS B	9.9	71.9	0.68	0.58	45.7
32	R2	3	5.0	0.031	58.1	LOS E	0.2	1.2	0.97	0.63	30.2
Approach		680	5.0	0.346	18.0	LOS B	9.9	71.9	0.64	0.59	46.2
All Vehicles		2497	5.0	0.711	16.9	LOS B	15.9	115.7	0.60	0.58	46.8

Level of Service (LOS) Method: Delay (HCM 2000).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PHASING SUMMARY

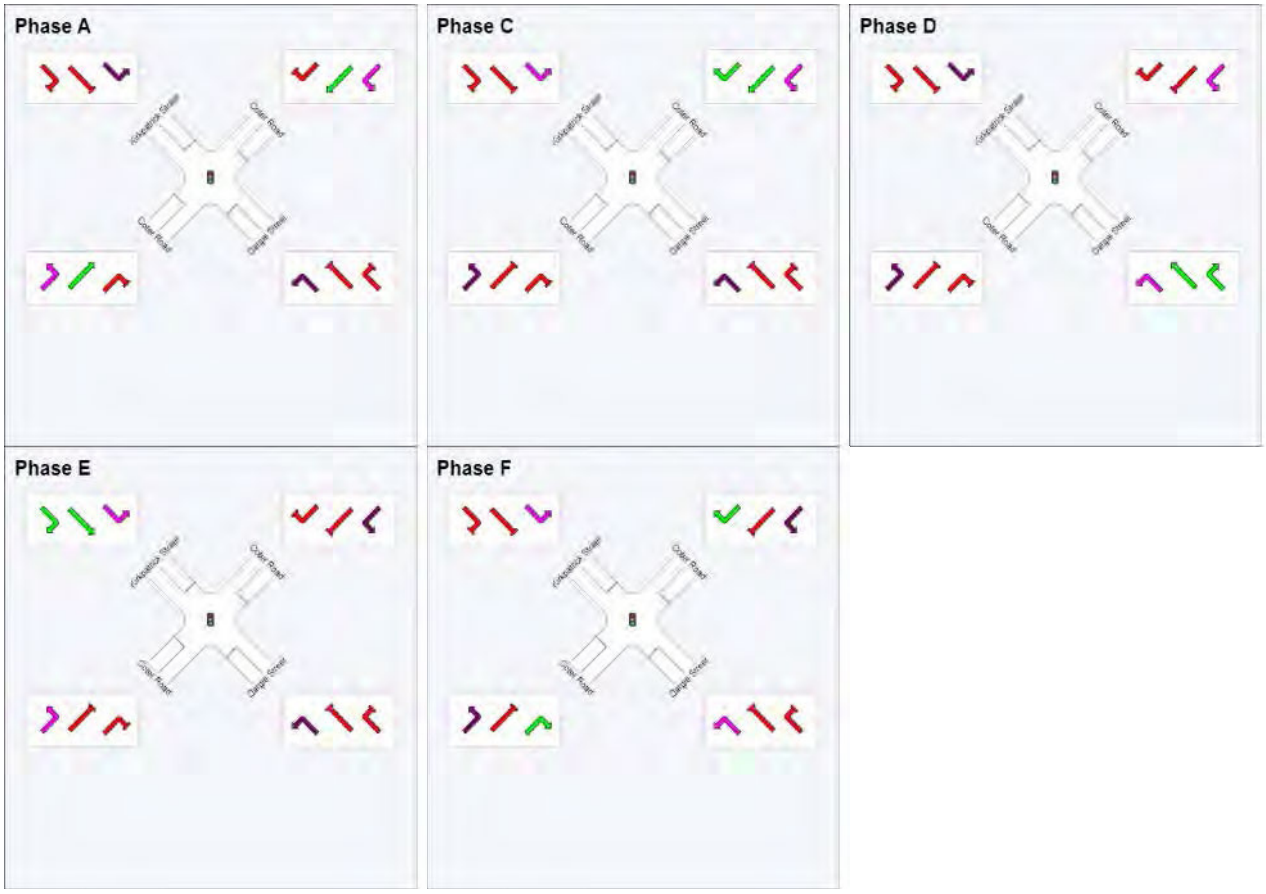
Site: Post Development PM

Coter Road / Kirkpatrick Street / Dargie Street
Signals - Fixed Time Cycle Time = 105 seconds (User-Given Phase Times)

Phase times specified by the user
Sequence: Variable Phasing
Movement Class: All Movement Classes
Input Sequence: A, C, D, E, F
Output Sequence: A, C, D, E, F

Phase Timing Results

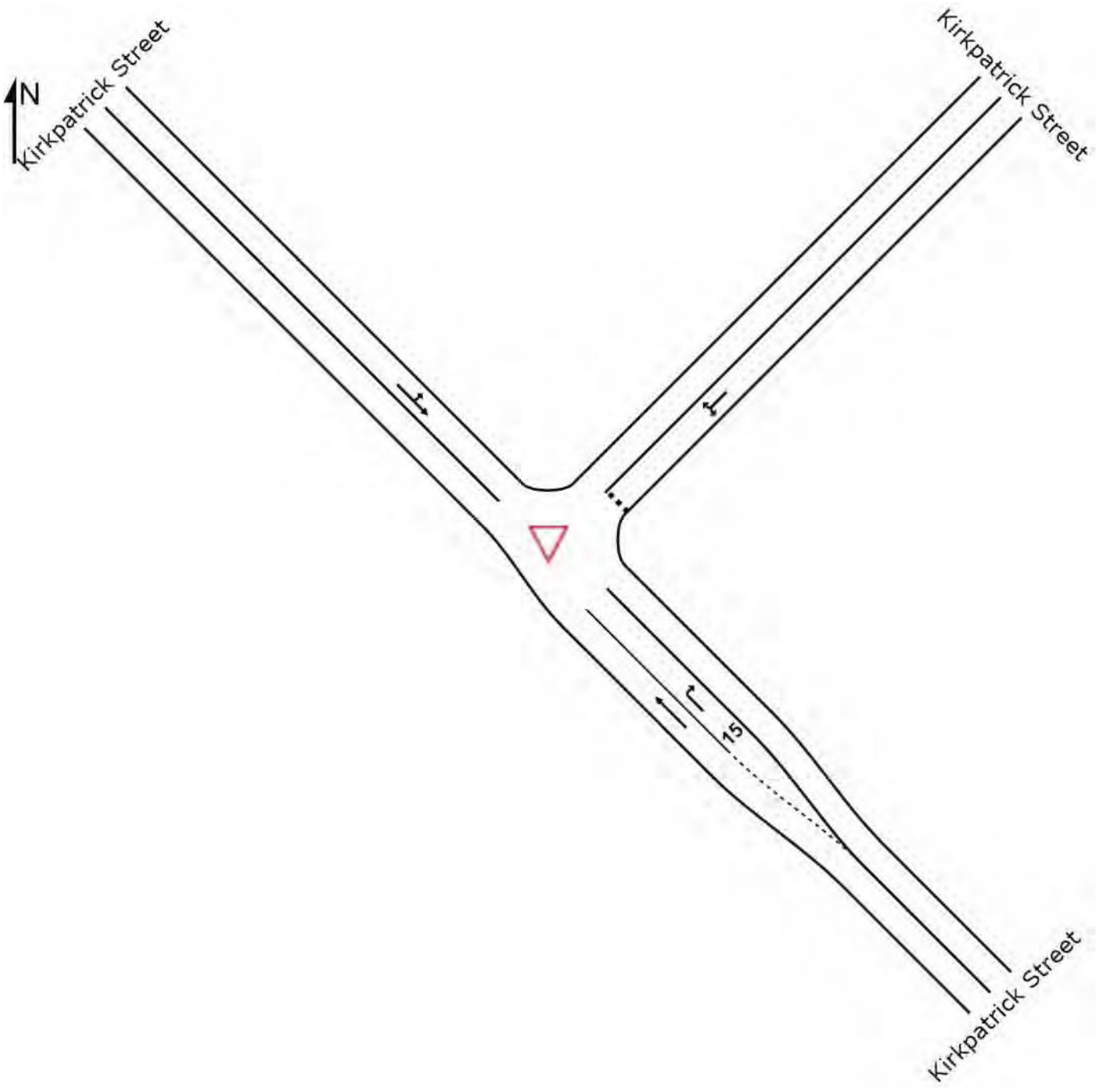
Phase	A	C	D	E	F
Reference Phase	Yes	No	No	No	No
Phase Change Time (sec)	0	55	74	85	96
Green Time (sec)	49	13	5	8	6
Yellow Time (sec)	4	4	2	2	4
All-Red Time (sec)	2	2	1	1	2
Phase Time (sec)	55	19	8	11	12
Phase Split	52 %	18 %	8 %	10 %	11 %



SITE LAYOUT

Site: Post Devleopment PM

Kirkpatrick Street / Kirkpatrick Street
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: Post Devleopment PM

Kirkpatrick Street / Kirkpatrick Street
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

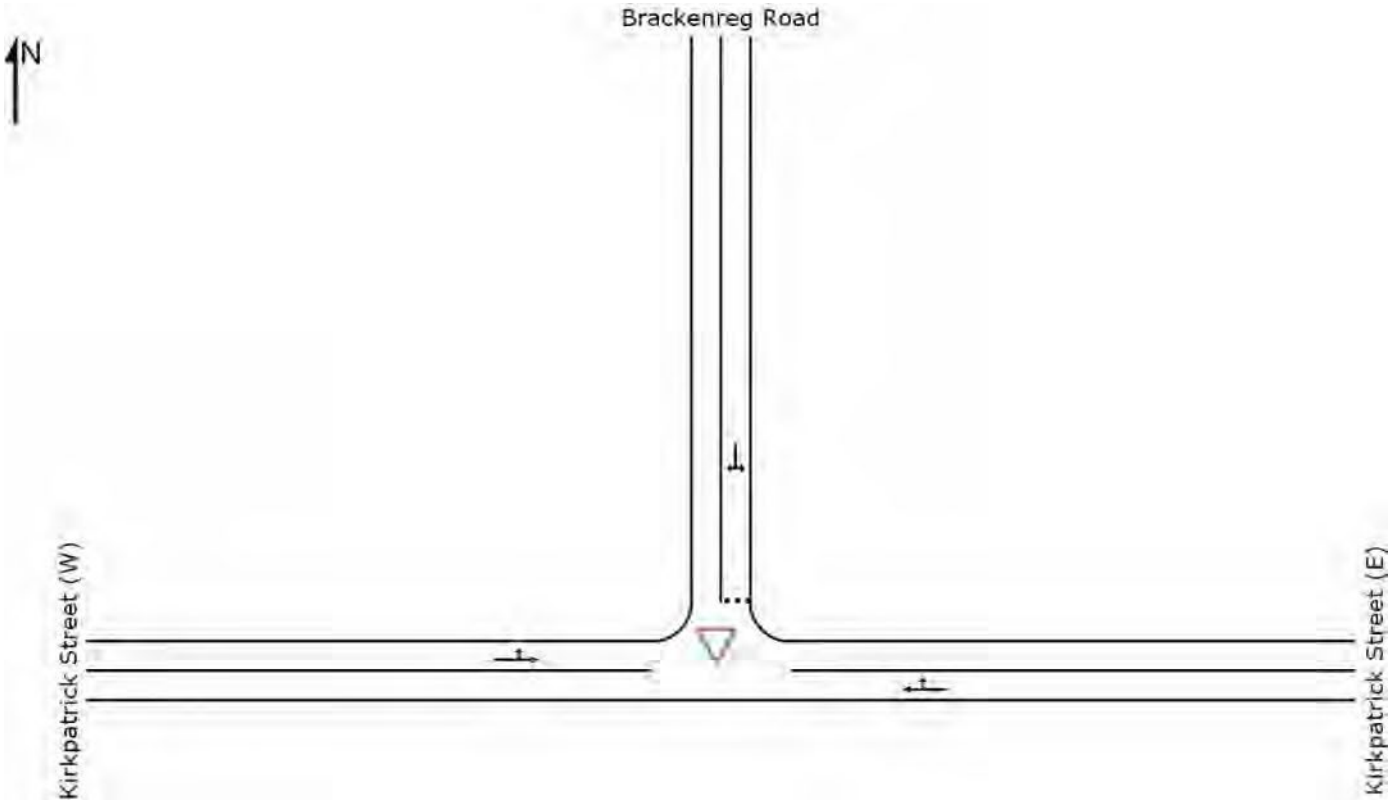
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Kirkpatrick Street											
22	T1	237	0.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R2	8	0.0	0.006	6.2	LOS A	0.0	0.2	0.35	0.55	52.2
Approach		245	0.0	0.121	0.2	NA	0.0	0.2	0.01	0.02	59.7
NorthEast: Kirkpatrick Street											
24	L2	45	0.0	0.037	6.4	LOS A	0.1	1.0	0.33	0.58	52.6
26	R2	1	0.0	0.037	6.3	LOS A	0.1	1.0	0.33	0.58	52.1
Approach		46	0.0	0.037	6.4	LOS A	0.1	1.0	0.33	0.58	52.6
NorthWest: Kirkpatrick Street											
27	L2	1	0.0	0.135	5.6	LOS A	0.0	0.0	0.00	0.00	58.3
28	T1	262	0.0	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		263	0.0	0.135	0.0	NA	0.0	0.0	0.00	0.00	59.9
All Vehicles		555	0.0	0.135	0.7	NA	0.1	1.0	0.03	0.06	59.1

Level of Service (LOS) Method: Delay (HCM 2000).
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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: Post Dev PM

Kirkpatrick Street - Brackenreg Road
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: Post Dev PM

Kirkpatrick Street - Brackenreg Road
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Kirkpatrick Street (E)											
5	T1	61	0.0	0.032	0.2	LOS A	0.2	1.2	0.18	0.01	59.1
6	R2	1	0.0	0.032	5.7	LOS A	0.2	1.2	0.18	0.01	56.9
Approach		62	0.0	0.032	0.3	NA	0.2	1.2	0.18	0.01	59.1
North: Brackenreg Road											
7	L2	1	0.0	0.002	5.9	LOS A	0.0	0.0	0.18	0.54	53.1
9	R2	1	0.0	0.002	5.8	LOS A	0.0	0.0	0.18	0.54	52.6
Approach		2	0.0	0.002	5.8	LOS A	0.0	0.0	0.18	0.54	52.9
West: Kirkpatrick Street (W)											
10	L2	1	0.0	0.044	5.5	LOS A	0.0	0.0	0.00	0.01	58.3
11	T1	85	0.0	0.044	0.0	LOS A	0.0	0.0	0.00	0.01	59.9
Approach		86	0.0	0.044	0.1	NA	0.0	0.0	0.00	0.01	59.9
All Vehicles		151	0.0	0.044	0.3	NA	0.2	1.2	0.08	0.02	59.4

Level of Service (LOS) Method: Delay (HCM 2000).
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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Attachment F

AHERN CONSULTING ENGINEERS
10 SEVERNE STREET QUEANBEYAN NSW
PHONE: 02 62842215 / 0406779235
ABN: 46 164 742 643

29/09/2014

Indesco
6A Thesiger Court
Deakin ACT 2600

Attention: Anna Nagalingam

RE: **WESTON CREEK BLOCK 1218 – LIGHTING REQUIREMENTS**

I have put together a number of points regarding the lighting of the proposed development on the Block 1218.

It is a draft list as I would like to speak with the representative from LDA or whoever the requirements are being prepared for to ensure I am meeting their brief. It would also be good to talk with someone from the Observatory to ensure all factors are considered.

Block 1218 Lighting Requirements:

Developments surrounding the Mount Stromlo Observatory are required to protect the night sky from light pollution to aid in the ongoing operations of the Observatory.

The developer will need to comply with following lighting requirements within the development of Block 1218.

- Minimise excessive lighting of external areas;
- Areas to be lit to as close as possible to recommended levels in relevant Australian Standards;
- Signage lighting to be directed at the sign from above not below;
- Avoid lights that point upwards or horizontally;
- Minimise or limit the use of external ornamental lighting;
- Limit reflectance of building surfaces and illumination levels;
- Prevent lights reflecting on white or other surfaces;
- Shield or screen outside lights and direct the lights only to where it is needed;
- Prevent inside lights from shining outside where possible;
- Lights to be switched off when they are not needed;
- Install time switches and motion detector switches for external lighting;
- Low Pressure Sodium or High Pressure Sodium lamps with full cut off should be used for external lighting;
- LED lighting to be similar spectrum to the Low Pressure Sodium or High Pressure Sodium lamps;
- Limit luminous intensities of signs to AS4282 for curfew hours in dark surrounds

Yours Faithfully

Gordon Ahern, B.E. (Elec)
Principal Electrical Engineer
AHERN CONSULTING ENGINEERS

ATTACHMENT A

ActewAGL

NEW STREETLIGHTS : DESIGN INFORMATION STEPS FOR POWER SUPPLY CONNECTIONS

Project Name	Kirkpatrick Street
Developer / Client Name	Act Government
Name of Design Company	Ahern Consulting Engineers Pty. Ltd.
Name of Design Company Representative	Gordon Ahern
Position of Design Company Representative	Electrical Engineer

Step 1 : Contacts With ActewAGL to Obtain Suitable Supply Point Connections

ActewAGL Representative	Stephen Mudford
Dates of Initial and subsequent meetings	22-09-2014 14/10/2014

Step 2 : Acknowledged Completed Supply Point Negotiations With ActewAGL

ActewAGL Representative - Name	Stephen Mudford
ActewAGL Connection Approval No:	141019-000485
ActewAGL Representative – Signature and Date	[redacted] 19/10/2014

Step 3 : ACT Govt's Acknowledgment of Completed Supply Point Negotiations

DUS, City Management Representative - Name	
DUS, City Management Representative – Signature and Date	

Attachment G

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Preliminary Geotechnical Investigation

Future Development
Part Rural Block 1218, Weston Creek

Prepared for
Land Development Agency

Project 46231.58
September 2014

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	46231.58	Document No.	1
Document title	Report on Preliminary Geotechnical Investigation Proposed Future Development		
Site address	Part Block 1218, Weston Creek		
Report prepared for	Land Development Agency		
File name	\\Dpcannas01\projects\46231 Molonglo\46231.58 Weston Creek, Rural Block 1218, Preliminary Geotechnical Investigation\Docs\46231.58 Weston Creek Rural Block 1218, Prelim Geotech.doc		

Document status and review

Revision	Prepared by	Reviewed by	Date issued
DR	A Radulovich	M Jones	24/09/14
0	A Radulovich	M Jones	01/10/14

Distribution of copies

Revision	Electronic	Paper	Issued to
DR	1	0	Land Development Agency
0	1	0	Land Development Agency

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author	[redacted] for A Radulovich	01/10/14
Reviewer	[redacted]	01/10/14

NCS INTERNATIONAL CERTIFIED QUALITY MANAGEMENT SYSTEM

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Report on Preliminary Geotechnical Investigation
Future Development
Part Rural Block 1218, Weston Creek

1. Introduction

This report presents the results of a preliminary geotechnical investigation carried out for the future development of part of Rural Block 1218 Weston Creek, ACT. The work was commissioned by the Land Development Agency, site owners.

It is understood that the north-eastern corner of Rural Block 1218, Weston Creek will be subject to future redevelopment most likely consisting of commercial land use. Site investigation was carried out to provide limited information on subsurface conditions with preliminary comments given on site classification, site preparation measures, excavation conditions, the performance of suitable foundation systems, likely bearing pressures and pavement design parameters.

The investigation comprised test pit excavation with in-situ testing and sampling of the subsurface strata, followed by laboratory testing, engineering evaluation and analysis. Details of the work undertaken are given in the report.

This report must be read in conjunction with the attached notes “About This Report” which are included in Appendix A.

2. Site Description

The site is bounded by Kirkpatrick Street to the north and north-east, Cotter Road to the east/south-east and by undeveloped land to the south and west. The portion of Rural Block 1218 which was the subject of this investigation comprises an irregular shaped area of about 6,500 m^2, with maximum north-south and east-west dimensions of 75 m and 120 m respectively.

Site levels fall in a south westerly direction generally at approximate grades from 1 in 5 to 1 in 25 (vertical in horizontal). A swale was observed within the south eastern part of the site, following a north east to south west path (parallel to Cotter Road), with a concrete culvert and wire meshed covered ballast rock adjacent to it at the northern end (where the swale starts) and another one just south of site boundary (for groundwater flow below Cotter Road). The site is grass vegetated with some weeds up to approximately 0.3 m. Current access to the site is unrestricted (refer Drawing 1, Appendix B). Figure 1 below shows the condition of the site at the time of the investigation.

Figure 1: View looking south-west from the eastern part of the site with Cotter Road to the left and swale drain mid-photo.

3. Regional Geology

Reference to the Canberra 1:100 000 Geological Series Sheet (Ref 1) indicates that the site is underlain by rock units of the Deakin Volcanics. The Deakin Volcanics typically comprise dacitic ignimbrite with minor volcaniclastic and argillaceous sedimentary rocks. The subsurface investigations have confirmed the presence of dacite underlying the site.

4. Field Work Methods

The field investigation comprised the excavation of seven test pits (Pits 1 – 7) to depths of 0.8 – 3.4 m using a Kubota KX057-4 mini excavator fitted with a 450 mm wide bucket working under the direction of a geotechnical engineer. Disturbed samples of the soils encountered in the test pits were collected for laboratory testing and to assist in strata identification. The approximate locations of the test pits are shown on Drawing 1 included in Appendix B.

5. Field Work Results

Details of the subsurface conditions encountered are given in the test pit logs included in Appendix C which must be read in conjunction with accompanied explanatory notes that define classification methods and terms used to describe the soils and rocks. In summary, the test pits generally

encountered variable subsurface conditions underlying the site with the principal succession of strata broadly summarised as follows:

- TOPSOIL FILLING: variably wet to dry mixture of silt, clay and sand topsoil filling with rootlets to depths of 0.1 – 0.3 m.
- FILLING (CONTROLLED): Well compacted, moist to dry silty clayey sand/sandy clay filling with some gravel and cobbles in Pits 2 and 6 to depths of 2.4 m and 1.7 m, respectively.
- FILLING (UNCONTROLLED): Moderately compacted, moist mixture of silt, clay and sand filling in Pits 1, 4 and 7 to depths of 0.6 m, 0.3 m and 1.8 m. Some minor debris (asphalt fragments, wire and grass clumps) were noted in Pits 1 and 4. Extensive debris (wire, metal pipes and ceramics) and over-sized boulders (up to 700 mm by 500 mm by 400 mm) were observed in Pit 7 from 0.7 – 1.8 m depth. Figures 2 and 3 below show the conditions encountered in Pit 7.
- SILTY SAND / SANDY SILT: medium dense to dense/very stiff to hard, moist silty sand and sandy silt with varying amounts of clay and gravel in Pits 1, 3 and 6 to depths of 0.5 – 2.6 m and to the limit of investigation depth of 3.0 m in Pit 2.
- SILTY CLAY / CLAY: variably firm to very stiff, moist, medium to high plasticity clay in Pit 5 to a depth of 0.9 m and to the limit of investigation depth of 3.4 m in Pit 6.
- BEDROCK: generally initially very low to low strength, highly weathered dacite in Pits 1, 3 – 5 and 7 below depths of 0.3 – 1.8 m, increasing in strength up to medium to high strength to slow progress depths of 1.7 m and 2.3 m in Pits 1 and 7 and refusal and near refusal depths of 0.8 – 2.2 m in Pits 3 – 5.

Figures 2 & 3: Wire and concrete (left) and oversize boulders (right) excavated from Pit 7.

No free groundwater was observed during excavation of the test pits. The pits were backfilled immediately following excavation precluding longer term monitoring of groundwater levels.

Groundwater conditions rarely remain constant and can change seasonally due to variations in rainfall, temperature and soil permeability. For these reasons, it is noted that the moisture condition of the site soils can vary considerably from the time of the investigation compared to at the time of construction.

6. Laboratory Testing

Two samples collected from the test pits were tested in the laboratory for measurement of field moisture content and either California bearing ratio (CBR) and compaction properties or plasticity properties. The detailed laboratory test report sheets are given in Appendix D with the results summarised in Table 1.

Table 1 – Summary of Laboratory Testing

Pit	Depth (m)	LL (%)	PI (%)	LS (%)	FMC (%)	OMC (%)	MDD (t/m^3)	CBR (%)	Swell (%)	Field Description
Pit 2	0.5	31	16	9.0	12.7	-	-	-	-	Filling – Silty Clayey Sand/Sandy Clay
Pit 5	0.4 – 0.6	-	-	-	19.5	13.0	1.88	2.0	6.4	Silty Sandy Clay

Where LL = Liquid limit
PI = Plasticity Index
LS = Linear shrinkage
FMC = Field moisture content
OMC = Optimum moisture content
MDD = Maximum dry density (modified)
CBR = California bearing ratio

The sample tested for CBR was compacted to about 95% modified dry density ratio at about optimum moisture content and soaked for four days under a surcharge loading of 4.5 kg. The measured CBR value was quite low, at 2.0 %.

The compaction test result indicate that the soil tested from Pit 5 was 6.5 % wet of modified optimum moisture content.

The Atterberg limit test results indicate that the fines content in the filling material tested is of medium plasticity.

7. Comments

7.1 General

The following comments are based on the results of limited subsurface investigation and Douglas Partners (DP) experience with similar projects. Whilst development details for the block have yet to be determined, it is likely that commercial development will be undertaken. As such, excavation depths of up to 3 m are considered likely.

7.2 Site Classification

Based on the subsurface profiles encountered in the test pits, the majority of the site would be classified as Class M* (moderately reactive/filled block) when reference is made to AS 2870 – 2011 *'Residential Slabs and Footings'* (Ref 2). It must be noted however that Class P conditions exist where uncontrolled filling depths exceed 0.4 m i.e: in the vicinity of Pits 1, 4 and 7. If the uncontrolled filling is fully removed, the site could be reclassified.

It is noted that the classification is appropriate for the areas investigated in its present condition and is independent of the proposed site preparation measures and construction. In addition, reference to Clause 3.1.1 of AS 2870 – 2011 indicates that the foundation details given in AS 2870 are not applicable to buildings longer than 30 m.

7.3 Earthworks and Site Preparation

7.3.1 Stripping

Site preparation for the construction of pavement areas and structures should include the removal of uncontrolled filling, topsoils, vegetation and other deleterious materials such as organic matter and / or tree affected soils from the proposed construction areas.

Based on the results of the investigation, it is expected the topsoil stripping depth will be around 0.1 – 0.3 m. If the development area includes the northern and eastern boundaries of the site, stripping of the uncontrolled filling material would likely be an additional 0.3 – 0.4 m along the northern boundary and up to 1.7 m on the eastern boundary, depending on the proposed development. It is noted that a capping layer thickness of 0.7 m of well compacted filling overlayed the debris encountered in Pit 7

Silty soils were encountered underlying the topsoil in Pits 1 and 3 up to 0.8 m depth and allowance should be made for at least partial removal (say 0.3 – 0.4 m following topsoil stripping) of these soils. The extent of removal of silty soils underlying the site to be stripped would largely be dependent on the weather conditions at the time of stripping and the intended land use.

It is recommended that prior to any stripping of this material, inspection be undertaken by a suitably qualified geotechnical engineer in the presence of the earthworks contractor and Superintendent to assess the extent of removal required.

7.3.2 Site Trafficability

Following periods of wet weather, the natural surface across the site will be boggy and effectively untrafficable to all but tracked construction vehicles.

Some measures that can be undertaken to reduce the impact of wet weather on the earthworks construction include:

- retain grass cover wherever possible;
- provide cut surfaces with an slight but even cross-gradient to assist surface drainage;
- "seal" exposed fill surfaces at the end of each work day by running over with a smooth-wheeled roller;
- armour temporary access roads with rockfill; and

7.3.3 Excavation Conditions

Removal of the filling, topsoil, natural soils and extremely low to low strength bedrock should be readily achievable using conventional earthmoving plant with the exception of handling construction debris and boulders in the uncontrolled filling. Excavation of the medium strength and greater bedrock (i.e. below depths of 0.6 – 2.6 m in Pits 1, 3 – 5 and 7) will require large excavators fitted with single tyne ripper and toothed buckets. Below the depth of refusal (i.e. below depths of 0.8 – 2.2 m) pneumatic hammers may be required, and slow production rates will be experienced. The excavatability of the rock will be largely dependent on the degree of fracturing and the dip of bedding within the rock mass.

No free groundwater or groundwater seepage was observed during excavation of the test pits. However, taking into account the possibility of a deep excavation as part of the future development, groundwater seepages can not be ruled out within excavations. It is noted that the extent and volume of groundwater inflow into excavations would be dependent on prior weather conditions. Groundwater seepages should be anticipated to increase following rainfall.

7.3.4 Excavation Support

The natural soils exposed in cut would have only limited capacity to stand vertically without support over extended periods of time, whilst the uncontrolled filling would be expected to have no capacity and must not be cut without battering.

Where space permits the natural and uncontrolled filling material should be battered at 1:1 (H:V) and 2:1 (H:V) respectively for temporary excavations and 3:1 (H:V) for permanent battering. Where excavation is proposed right up to the property boundary, or where battering of the excavation is not possible, there will be a need for retaining structures to prevent lateral movement of the retained soils in order to reduce the risk of potential damage to neighbouring land, structures, footpaths and/or services. Feasible options would include either anchor piles with close shuttering or sprayed concrete infill panels or contiguous piling in the areas of uncontrolled filling.

It must be noted that significant challenges would be experienced with piling works in the area of deep uncontrolled filling with regards to obstructions. Allowance would need to be made for over-excavating obstructions and replacing with finer materials that can be compacted and drilled through.

In areas where cantilevered retaining structures are proposed, it is suggested that earth pressures on retaining walls due to the retained soils be based on a triangular pressure distribution calculated as follows:

$$h_z = \gamma k_a z$$

where,

h_z	=	horizontal pressure at depth z
γ	=	unit weight of retained soil
	=	20 kN/m^3
k_a	=	active earth pressure coefficient (long term)
	=	0.5 for uncontrolled filling
	=	0.3 for compacted filling
	=	0.3 for stiff to very stiff clay soils
	=	0.25 for dense sand soils
	=	0.25 for weathered bedrock

Drainage behind all retaining walls must be provided or, alternatively, full hydrostatic pressure allowed for in design. In the event that hydrostatic pressures are allowed, densities of the retained soils can be reduced to the buoyant values.

Where applicable, superimposed surcharge loads due to adjacent roadways, inclined surfaces etc should also be accommodated in the design of such structures.

An “at rest” pressure coefficient (k_o) of 0.5 would be appropriate where support must be provided to adjacent boundaries and where movement-intolerant services are present within the adjacent footpaths.

7.3.5 Reuse of Onsite Material

The topsoil and the silty layers (underlying the topsoil in Pit 3 and encountered at depth in Pits 2 and 6) are not considered to be soil suitable for engineering applications. The silty soil can be difficult to handle and compact, and is prone to loss of strength upon saturation. Blending of the silty soils with the site clayey soils and weathered rock may produce a suitable material suitable for inclusion in controlled filling. Alternatively, the silty soil could be placed in the verge or other non-structural applications.

The existing uncontrolled filling contains large amounts of debris and is considered unsuitable for reuse in any application without sorting. Sorting could be attempted but would be time consuming and costly.

The remaining natural soils and controlled filling material encountered on site comprised a mixture of silt, clay, sand and some gravels and cobbles. If well blended, these soils should be suitable for general or controlled filling, however not as select filling.

As excavation proceeds below the level of test pit bucket refusal, it would be expected that the rock would excavate as cobble and boulder sized fragments, which would need to be crushed (using a crushing plant) to a general maximum particle size of 75 mm prior to use within filling areas. It is possible that minimal fines would be created during the rock crushing process and that blending with site soils may be required to create a suitable (well graded) filling material.

Prior to offsite reuse of material excavated from site, a waste classification assessment should be undertaken in accordance with current ACT Environment Protection Unit guidelines.

7.3.6 Filling Selection, Placement and Compaction

In areas that require filling, the stripped surfaces must be test rolled in the presence of a geotechnical engineer. Any areas exhibiting significant deflections under proof rolling must be appropriately treated by over-excavation and replacement with granular filling. All filling material must be placed in horizontal layers of maximum 250 mm loose thickness. The material must have a moisture content within the range of ±2% of modified optimum at the time of placement.

All permanent fill batters must be constructed no steeper than 3:1 (horizontal:vertical), appropriately protected against erosion with toe and spoon drains constructed as a means of controlling surface flows on the batters and vegetation of the batter.

All filling placed within construction platforms must be compacted to a minimum 95% modified maximum dry density. To validate soil compaction, field inspections and in-situ testing of future earthworks must be undertaken in order to satisfy the requirements of a Level 1 inspection and testing service as defined in AS 3798 – 2007 (Ref 3).

7.4 Site Drainage

It is recommended that subsurface and surface drainage be installed early in the works programme and maintained at the site to minimise groundwater and overland flows. All collected stormwater, groundwater and roof runoff should be discharged into the stormwater disposal system.

7.5 Foundations

Following site preparation as outlined in Section 7.3 and subject to building design, foundation options for the future buildings/structures could include pad and strip footings or bored piers supported on either controlled filling, natural soils or weathered rock. Suggested allowable base bearing pressures are as follows:

- Stiff / medium dense natural soils 100 kPa
- Controlled filling: 150 kPa
- Very Stiff to hard natural soils 150 kPa
- Very low strength bedrock 750 kPa
- Low to medium strength bedrock 1500 kPa

All footings must found within a uniform bearing stratum and should be inspected by a suitably qualified engineer prior to placement of reinforcing steel most likely with a minimum embedment depth of 0.3 – 0.5 m and pouring of concrete to verify design assumptions. Settlements of footings will be dependent on the applied load and the sizing of the footing and at this stage cannot be determined.

Confirmation of suitable footing systems and expected settlements can be undertaken once building design is suitably advanced.

Design of footings must be taken into consideration the influence of any adjacent service trenches, retaining walls or submerged structures.

7.6 Pavement Design Considerations

Based on the results of the field investigation, limited laboratory testing undertaken to date and site preparation as detailed above, it is suggested that a subgrade CBR value of 3% be adopted for preliminary design purposes:

Subgrade replacement will be required in areas where the insitu CBR value is less than the design CBR value. In order to improve the design CBR where low CBR clays are exposed, subgrade replacement to a depth of 0.3 m can be undertaken using material with a minimum CBR value of 15%. An effective CBR value of 4% could then be adopted.

Subgrade conditions should be reviewed during construction. The review should be carried out by a suitably qualified engineer and would involve additional CBR testing to confirm the design assumptions regarding subgrade strength.

All earthworks should be undertaken under close supervision and consultation with the geotechnical consultant in order to avoid any unnecessary over excavation. The standard of construction, the selection of materials and quality of workmanship for the roads should satisfy the requirements of the latest edition of the ACT Standard Specification for Urban Infrastructure Works.

Surface and subsoil drainage should be installed and maintained to protect the pavement and subgrade. Subsoil drains should be located at a minimum of 0.5 m depth below the subgrade level.

8. Further Investigation

Further investigation of the site will be required following conceptual design to confirm the subsurface conditions encountered and to provide more detailed and specific advice on excavation conditions, support requirements, foundations options and pavement design parameters.

9. References

1. Geology of Canberra 1:100 000 Geological Series Sheet 8727, Bureau of Mineral Resources, (1992).

2. Australian Standard AS 2870 – 2011 *Residential Slabs and Footings.*

3. Australian Standard AS 3798 – 2007 *Guidelines on Earthworks for Commercial and Residential Developments.*

10. Limitations

Douglas Partners (DP) has prepared this report for the proposed future development of Part Rural Block 1218, Weston Creek. The report is provided for the exclusive use the Land Development Agency for this project only and for the purpose(s) described in the report. It should not be used for other projects or by a third party. Purchasers must make its own interpretations, deductions and conclusions from the information made available and will need to accept full responsibility for such interpretations, deductions and conclusions. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions only at the specific sampling or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of anthropogenic influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be limited by undetected variations in ground conditions between sampling locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion given in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of

potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About this Report

About this Report

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Drawing 1 – Test Location Plan

Locality Plan

LEGEND

Approximate Test Pit Location

Approximate Site Boundary

NOTE: Base image from www.nearmap.com

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Land Development Agency	TITLE: Approximate Test Location Plan Preliminary Geotechnical Investigalton Rural Block 1218, Weston Creek	PROJECT No: 46231.58
	OFFICE: Canberra / DRAWN BY: AZR		DRAWING No: 0
	SCALE: NTS / DATE: 11.09.2014		REVISION: A

Appendix C

Explanatory Notes
Results of Field Work (Pits 1 – 7)

Sampling Methods

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Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 1993. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approx Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and loner sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

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Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core Drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General


Asphalt


Road base


Concrete


Filling

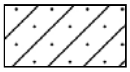
Soils


Topsoil

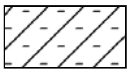

Peat


Clay

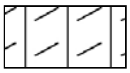

Silty clay

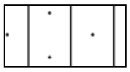

Sandy clay

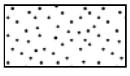

Gravelly clay

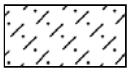

Shaly clay

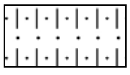

Silt


Clayey silt


Sandy silt

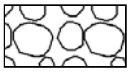

Sand

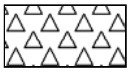

Clayey sand


Silty sand


Gravel


Sandy gravel


Cobbles, boulders

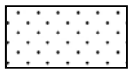

Talus

Sedimentary Rocks

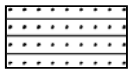

Boulder conglomerate

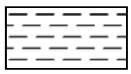

Conglomerate


Conglomeratic sandstone

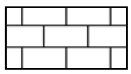

Sandstone


Siltstone


Laminite

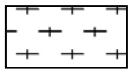

Mudstone, claystone, shale

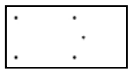

Coal


Limestone

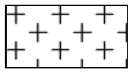
Metamorphic Rocks


Slate, phyllite, schist

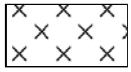

Gneiss

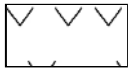

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

TEST PIT LOG

CLIENT: Land Development Agency
PROJECT: Preliminary Geotechnical Investigation
LOCATION: Rural Block 1218, Weston Creek

SURFACE LEVEL: 566 AHD
EASTING:
NORTHING:

PIT No: 1
PROJECT No: 46231.58
DATE: 10/9/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
566	0.2	TOPSOIL FILLING - moist to wet, grey-brown silty sand, with rootlets							
		FILLING - generally comprising moderately to well compacted silty sandy clay, some gravels and cobbles, silty sand - from 0.4m some grass and a wire							
	0.6	SILTY CLAYEY SAND - medium dense, moist, light orange-brown, fine to coarse grained silty clayey sand		B	0.6 0.8				
565	0.9 1	DACITE - very low strength, highly weathered, orange-brown dacite - from 1.3m low strength - from 1.5m medium strength, highly to moderately weathered							1
	1.7	Pit discontinued at 1.7m - slow progress							
564	2								2
563	3								3

RIG: Kubota KX057-4 mini excavator fitted with 450mm bucket

LOGGED: AZR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	P D	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Land Development Agency
PROJECT: Preliminary Geotechnical Investigation
LOCATION: Rural Block 1218, Weston Creek

SURFACE LEVEL: 566 AHD
EASTING:
NORTHING:

PIT No: 2
PROJECT No: 46231.58
DATE: 10/9/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
566	0.0	TOPSOIL FILLING - generally comprising moist to wet, brown sandy silt with rootlets							
	0.3	FILLING - well compacted, moist, grey-brown silty clayey sand/sandy clay, gravels and cobbles (controlled)		D	0.5				
565	1								1
				D	2.1				
564	2								2
	2.4	GRAVELLY SANDY SILT - hard, dry to moist, light brown gravelly sandy silt, trace of rootlets to 2.6m							
563	3								3
	3.0	Pit discontinued at 3.0m - limit of investigation							

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: Kubota KX057-4 mini excavator fitted with 450mm bucket

LOGGED: AZR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	P D	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

TEST PIT LOG

CLIENT: Land Development Agency
PROJECT: Preliminary Geotechnical Investigation
LOCATION: Rural Block 1218, Weston Creek

SURFACE LEVEL: 567 AHD
EASTING:
NORTHING:

PIT No: 3
PROJECT No: 46231.58
DATE: 10/9/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
567	0	TOPSOIL FILLING - generally comprising moist, grey-brown silty clayey sand with rootlets							
	0.2	SANDY SILT/SILTY SAND - very stiff/medium dense, moist, red-brown, low plasticity, fine to medium grained sandy silt/silty sand, slight clay							
	0.5	DACITE - very low strength, highly weathered, orange-yellow-brown and red-brown dacite							
566	1	- from 0.9m low strength, highly weathered							1
565	2	- from 1.8m low to medium strength, highly weathered		P	2.0				2
	2.2	Pit discontinued at 2.2m - near refusal							
564	3								3

RIG: Kubota KX057-4 mini excavator fitted with 450mm bucket **LOGGED:** AZR **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	P D	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

TEST PIT LOG

CLIENT: Land Development Agency
PROJECT: Preliminary Geotechnical Investigation
LOCATION: Rural Block 1218, Weston Creek

SURFACE LEVEL: 570 AHD
EASTING:
NORTHING:

PIT No: 4
PROJECT No: 46231.58
DATE: 10/9/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
570	0.1	TOPSOIL FILLING - generally comprising moist, grey-brown silty clayey sand with rootlets							
		FILLING - generally comprising moderately compacted, moist, brown silty clayey gravel, some asphalt fragments							
	0.3	DACITE - low strength, highly weathered, orange-yellow and brown dacite							
		- from 0.6m medium strength, moderately weathered							
	0.8	Pit discontinued at 0.8m - refusal							
569	1								1
568	2								2
567	3								3

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: Kubota KX057-4 mini excavator fitted with 450mm bucket

LOGGED: AZR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	P D	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics | Environment | Groundwater

TEST PIT LOG

CLIENT: Land Development Agency
PROJECT: Preliminary Geotechnical Investigation
LOCATION: Rural Block 1218, Weston Creek

SURFACE LEVEL: 567 AHD
EASTING:
NORTHING:

PIT No: 5
PROJECT No: 46231.58
DATE: 10/9/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
567		TOPSOIL FILLING - generally comprising moist, grey-brown silty clayey sand with rootlets							
	0.3	SILTY SANDY CLAY - stiff, moist, orange-brown and brown, medium plasticity silty sandy clay		B	0.4				
					0.6				
	0.7	SILTY CLAY - very stiff, moist, yellow-brown and grey, high plasticity silty clay		D	0.8				
	0.9	DACITE - medium strength, moderately weathered, purple-grey dacite							
566	1								1
		- from 1.8m medium to high strength, moderately weathered							
565	2	2.0 Pit discontinued at 2.0m - refusal							2
564	3								3

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: Kubota KX057-4 mini excavator fitted with 450mm bucket

LOGGED: AZR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	P D	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
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TEST PIT LOG

CLIENT: Land Development Agency
PROJECT: Preliminary Geotechnical Investigation
LOCATION: Rural Block 1218, Weston Creek

SURFACE LEVEL: 567 AHD
EASTING:
NORTHING:

PIT No: 6
PROJECT No: 46231.58
DATE: 10/9/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
567	0.2	TOPSOIL FILLING - generally comprising moist to dry, dark brown sandy clayey silt/silty clay with rootlets							
		FILLING - generally comprising moderately to well compacted, moist to dry, brown silty clayey sand/sandy clay		P	0.6				
566	1								1
	1.7	SILTY SAND - medium dense to dense, light grey-brown, fine to coarse grained silty sand, some gravel							
565	2								2
	2.2	SILTY GRAVELLY SAND - dense, moist, light grey-brown silty gravelly sand, lightly cemented zones							
	2.6	SILTY CLAY - firm to stiff, moist, light grey and brown, medium plasticity silty clay							
	2.8	CLAY - stiff, moist, blue-grey, medium to high plasticity clay		P	2.9				
564	3								3
	3.4	Pit discontinued at 3.4m - limit of investigation							

RIG: Kubota KX057-4 mini excavator fitted with 450mm bucket

LOGGED: AZR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	P D	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Land Development Agency
PROJECT: Preliminary Geotechnical Investigation
LOCATION: Rural Block 1218, Weston Creek

SURFACE LEVEL: 569 AHD
EASTING:
NORTHING:

PIT No: 7
PROJECT No: 46231.58
DATE: 10/9/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
569		TOPSOIL FILLING - generally comprising wet to moist, brown clayey silty sand and gravels							
	0.2	FILLING - generally comprising well compacted, moist to dry silty sand/sandy clay and some gravels		D	0.4				
		- from 0.7m boulders and wire, ceramic pot pieces, metal, sewer pipe fragments							
568	1								1
	1.8	DACITE - low strength, highly weathered, orange-brown dacite							
567	2								2
	2.3	- from 2.6m medium strength, moderately weathered Pit discontinued at 2.3m - slow progress							
566	3								3

RIG: Kubota KX057-4 mini excavator fitted with 450mm bucket

LOGGED: AZR

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: blow-out of pit up to 0.5m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	P D	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
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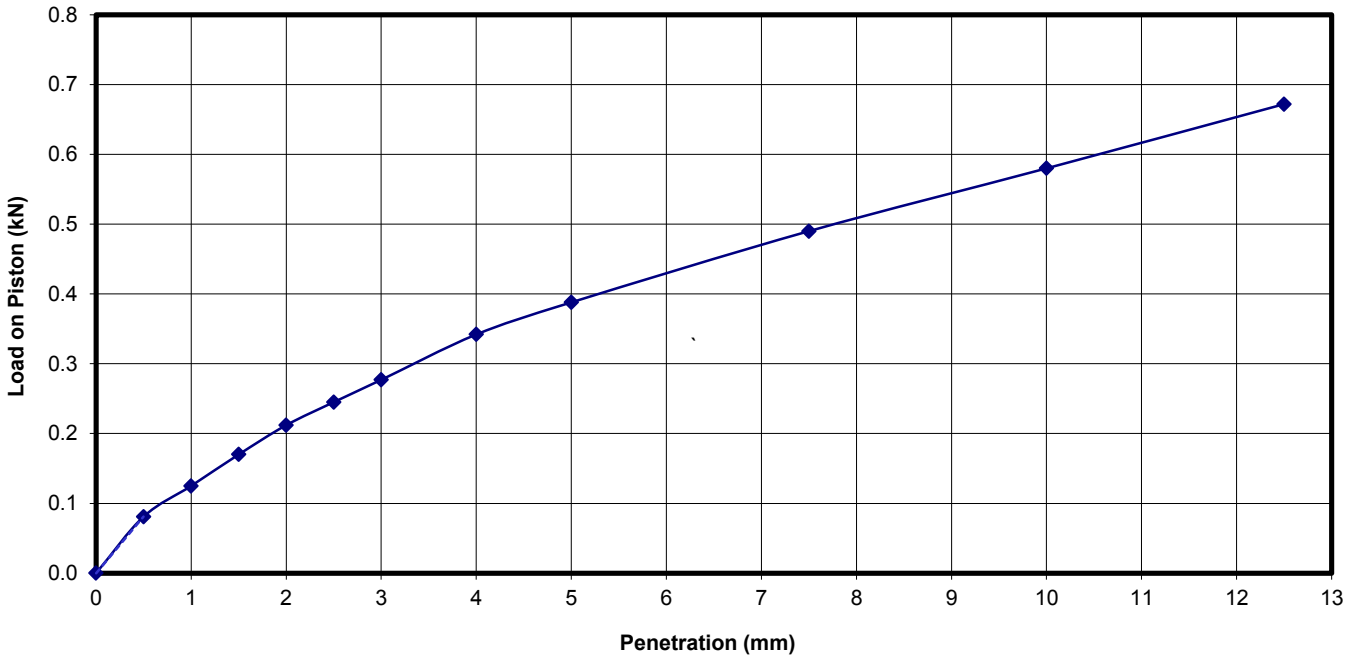
Appendix D

Results of Laboratory Tests (3 sheets)

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
1 Farquhar Street
PO Box 180
Goulburn NSW 2580
Phone 0417 498 504

Result of California Bearing Ratio Test

Client :	Douglas Partners Pty Ltd.	**Project No. :**	46231.58
		Report No. :	GL14-053B
Project :	Preliminary Geotechnical Investigation.	**Report Date :**	22/09/2014
		Date Sampled :	10/09/2014
Location :	Rural Block 1218, Weston Creek.	**Date of Test:**	15/09/2014
Test Location :	Pit 5		
Depth / Layer :	0.4 - 0.6m	**Page:**	1 of 1



Description: Silty Sandy Clay **Test Method(s):** AS 1289.6.1.1, AS 1289.2.1.1

Sampling Method(s): Sampled by Canberra Engineering Department

Remarks: -

Percentage > 19mm: 0.0%

LEVEL OF COMPACTION: 95% of MOD MDD **SURCHARGE:** 4.5 kg **SWELL:** 6.4%

MOISTURE RATIO: 101% of MOD OMC **SOAKING PERIOD:** 4 days

CONDITION		MOISTURE CONTENT %	DRY DENSITY t/m^3
At compaction		13.1	1.79
After soaking		21.7	1.68
After test	Top 30mm of sample	24.5	-
	Remainder of sample	19.2	-
Field values		19.5	-
Modified Compaction		13.0	1.88

RESULTS		
TYPE	**PENETRATION**	**CBR (%)**
TOP	**5.0mm**	**2.0**

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory Number: 828

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
Accredited for compliance with ISO/ EC 17025

Tested: MMc
Checked: TL

[redacted]

Tim Lethbridge
Laboratory Manager

Douglas Partners Pty Ltd
ABN 75 053 980 117
www douglaspartners.com.au
1 Farquhar Street
PO Box 180
Goulburn NSW 2580
Phone 0417 498 504

Results of Moisture Content Test

Client:	**Douglas Partners Pty Ltd**	**Project No:**	46231.58
		Report No:	GL14-053A
Project:	Preliminary Geotechnical Investigation	**Report Date:**	23/09/2014
		Date Sampled:	10/09/2014
Location:	Rural Block 1218, Weston Creek	**Date of Test:**	11/09/2014
		Page:	1 of 1

TEST LOCATION	DEPTH (m)	DESCRIPTION	MOISTURE CONTENT (%)
Pit 2	0.5	Filling - Silty Clayey Sand / Sandy Clay	12.7
Pit 5	0.4 - 0.6	Silty Sandy Clay	19.5

Test Method(s): AS 1289.2.1.1

Sampling Method(s): Sampled by Canberra Engineering Department

Remarks: -

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory Number 828

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025

Tested: MMC
Checked: TL

[redacted]
Tim Lethbridge
Laboratory Manager

Douglas Partners Pty Ltd
ABN 75 053 980 117
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1 Farquhar Street
PO Box 180
Goulburn NSW 2580
Phone 0417 498 504

Results of Moisture Content, Plasticity and Linear Shrinkage Tests

Client: **Douglas Partners Pty Ltd.**

Project: Preliminary Geotechnical Investigation.

Location: Rural Block 1218, Weston Creek.

Project No: 46231.58
Report No: GL14-053C
Report Date: 22/09/2014

Date Sampled: 10/09/2014
Date of Test: 16/09/2014
Page: 1 of 1

Test Location	Depth (m)	Description	Code	W_F %	W_L %	W_P %	PI %	*LS %
Pit 2	0.5	Filling-Silty clayey sand/sandy clay.	2,3,5	-	31	15	16	9.0

Legend:
W_F Field Moisture Content
W_L Liquid limit
W_P Plastic limit
PI Plasticity index
LS Linear shrinkage from liquid limit condition (Mould length250mm)

Test Methods:
Moisture Content: AS 1289 2.1.1
Liquid Limit: AS 1289 3.1.2
Plastic Limit: AS 1289 3.2.1
Plasticity Index: AS 1289 3.3.1
Linear Shrinkage: AS 1289 3.4.1

Code:
Sample history for plasticity tests
1. Air dried
2. Low temperature (<50ºC) oven dried
3. Oven (105ºC) dried
4. Unknown

Method of preparation for plasticity tests
5. Dry sieved
6. Wet sieved
7. Natural

*Specify if sample crumbled CR or curled CU

Sampling Methods: Sampled by Canberra Engineering Department

Remarks: -

NATA ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory Number 828

The results of the tests, calibrations and/or measurements included in this document are raceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025

Tested: MMc
Checked: TL

[redacted]

Tim Lethbridge
Laboratory Manager

Attachment H

WESTON CREEK FUEL STATION
RURAL BLOCK 1218

INFRASTRUCTURE UPGRADE
DESIGN SUBMISSION REPORT V2.0

JULY 2014

CANBERRA
6A Thesiger Court
DEAKIN ACT 2600
Phone: (02) 6285 1022
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SYDNEY
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Parramatta NSW 2150
M: PO Box W67
Parramatta Westfield NSW 2150
Phone: (02) 9633 2273

ABN: 37 008 581 066
ACN: 008 581 066
Web: www.Indesco.com.au
Email: Indesco@Indesco.com.au

Preparation, Review and Approval

Weston Creek Fuel Station Rural Block 1218

INFRASTRUCTURE UPGRADE

DESIGN SUBMISSION REPORT

Prepared By:	Karl Martin Date: July 2014	Signature: .....
Reviewed By:	Anna Nagalingam Date: July 2014	Signature: .....
Approved By:	John Randall Date: July 2014	Signature: .....

ATTACHM ENTS

1. PROJECT DESCRIPTION

1.1 Project References

Project Title: Weston Creek Fuel Station Rural Block 1218 Infrastructure Upgrade

Project No: 5417

1.2 Site Plan

A plan of the site of works is included in Attachment A.
The proposed works are to be completed as a single stage.

1.3 Objective of Works

The engineering works for the project include upgrades to existing infrastructure to allow the block development of a petrol station and fast food outlet located within the north eastern corner of rural block 1218 adjacent Kirkpatrick Street. The proposed works are illustrated in the detailed design drawings included with this submission (Attachment B).

The external works associated with this development include:

- Construction of two new driveways to the development;
- Reinstatement of landscaping in the verge;
- Construction of new footpath in the verge;
- Reconstruction of approximately 150m of Kirkpatrick Street including road and kerbs;
- Adjustment to road width at the intersection of Kirkpatrick Street and Cotter Road;
- Relocation of existing 300mm diameter water main;
- Removal and rerouting of existing 300mm diameter stormwater from Kirkpatrick Street;
- Removal and rerouting of existing 300mm diameter stormwater from Cotter Road;
- Removal of stormwater outlet structure within proposed site;
- Construction of new stormwater outlet structure for rerouted services;
- Construction of traffic control devices on new road section;
- Construction of stormwater drainage in Kirkpatrick Street.

2. PARTIES TO PROJECT

The following key parties were involved in the project:

Responsibility	**Agent**
Project Manager:	Knight Frank
Client:	Land Development Agency
Civil Engineering Design Consultant:	Indesco Pty Limited

3. STANDARDS

Design Standards

The following design standards are referenced:

- Design Standards for Urban Infrastructure Edition 1 Rev.4
- Actew Water Supply & Sewer Standards Release 4 with amendments, updated September 2012

The specification for construction of the project uses:

- ACT Standard Specification for Urban Infrastructure Works Edition 1 Revision 0 (September 2002); and
- Actew Water Supply & Sewer Standards Release 4 with amendments, updated September 2012

4. QUALITY ASSURANCE

Validation of the appropriate use of the Standards is ensured via Indesco's internal QA procedures. The following personnel were involved in the process:

	Personnel	
Asset	**Design**	**Validation**
Stormwater Drainage	Karl Martin	John Randall
Driveway/Footpath	Anna Nagalingam	John Randall
Verge Works	Karl Martin	John Randall

5. DRAFT CONSTRUCTION SURVEILLANCE PLAN

The draft construction surveillance plan is attached (refer Attachment C).

6. CONSULTATION

Preliminary consultation has been undertaken with Actew Water in regard to the feasibility of future site servicing.

7. DRIVEWAYS AND STREET WORKS

Two new driveways are proposed as part of the development in the north eastern and north western corners of the fuel station frontage to Kirkpatrick Street. These are detailed in the design drawings attached under appendix B of this report.

Driveway Number 1 is situated at the north western extent of the fuel stations street frontage and is to be a modified TaMS HD2 driveway. It is to be 9m wide at the property boundary and 16.8m wide at the vehicle crossing.

Driveway Number 2 is situated on the north eastern extent of the fuel station frontage is to be a modified TaMS HD2 driveway. Driveway Number 2 will be 11m wide at the property boundary, and 18.8m wide at the vehicle crossing.

The driveways to the development have been widened to accommodate turning movements of articulated fuel delivery vehicles assessed using Autoturn, this is illustrated under Appendix B drawing 5417-100.

A new footpath is to be constructed in the southern verge of Kirkpatrick Street to accommodate future pedestrian traffic through the area. This path is to be 100mm thick unreinforced concrete and is illustrated on drawing 5417-030 under Appendix B.

8. WASTE MANAGEMENT

All unsuitable and surplus material from the construction is to be used on site or removed to an approved recycling / dump site. All waste management procedures are to be completed in accordance with Territory and Municipal Services Guide for Best Practice Waste Management in the ACT.

9. LANDSCAPING

Upon completion of the works the existing verge will be reinstated using topsoil and dryland grass where necessary to match existing conditions by the contractor. The crossfall in the verge is to remain within a maximum of 2.5%.

10. ROAD CONSTRUCTION

As Part of the upgrade approximately 150m of Kirkpatrick Street is to be reconstructed. The existing road surface and kerbs are to be removed and reconstructed at a wider extent. The road is to be regraded as part of the works to allow effective stormwater drainage. The pavement specification has been matched to the existing pavement recently constructed as part of the Cotter Road / Kirkpatrick Street Development. Sections, details and set-out of the proposed road have also been provided under appendix B.

Due to the requirement for articulated vehicles to access the site the inner edge of the intersection between Kirkpatrick Street and Cotter Road requires reconfiguration to avoid trucks clipping the inner kerb with their rear axles. Two treatment options have been considered; AC pavement or 50mm raised concrete island, it has been concluded that a raised concrete island is the best way to maintain the existing preferred road alignment for regular motorists and allow the rear wheels of trucks to roll over the island. This pavement is to be reinforced 150mm thick concrete suitable for heavy vehicles, and is to be constructed such that it protrudes 50mm above the existing AC surface. As part of the reconfiguration work removal of the existing pram crossing and footpath will be required and reconstruction of a new pram crossing and footpath to suit.

11. TRAFFIC CONTROL DEVICES

Traffic control devices are to be constructed as part of the road works including line marking adjustment to kerbs, reflective pavement markers, and signage. The proposed set out of traffic control devices are illustrated in drawing 5417-TCD under appendix B.

12. STREET LIGHTING

Street lighting has been proposed along the southern verge of Kirkpatrick Street. The design has been carried about by Ahern Consulting and is included in the drawings under Attachment B. The design includes 4 new lighting columns and underground electricity supply.

13. UNDERGROUND SERVICES

13.1 Site Service Connections

As the end use of the site is only known to a conceptual level of detail the site servicing to the proposed fuel station and fast food outlet are not included in the scope of this design acceptance. A separate design acceptance submission is to be lodged in future outlining the specific details of the fuel station and the fast food outlet which will include location size and material of all service ties.

13.2 Water Main

The existing water main in the southern verge of Kirkpatrick Street will need to be cut near road chainage 205 and have 2 11.25^{o} bends installed in order to offset the main from the kerb and allow space for an additional stormwater inlet sump. This modified section of water main will reconnect with the existing main by a 22.5^{o} bend located at approximately road chainage 116. This adjustment will require thrust blocks at each bend and relocation of the existing fire hydrant from the previous alignment to the new main. An existing fire hydrant and pavement marker are to be relocated from within driveway two, to be situated a 1.5m off the eastern edge of the constructed driveway. Details of the water main adjustment are included in drawing 5417-020 under Appendix B.

13.3 Stormwater

There are two existing stormwater mains currently draining from Kirkpatrick Street and Cotter Road to an outlet structure situated in rural block 1218. The outlet structure is to be removed and the stormwater mains to be rerouted via new 300mm diameter stormwater main and 2 standard maintenance holes draining to the south in the verge of Cotter Road. The new stormwater main is to connect to an existing outlet structure located further to the south within rural block 1218.

The stormwater collected is to be transferred by overland flow which will drain directly into Coombs Pond until further development of rural block 1218 occurs.

Stormwater infrastructure is to be added to Kirkpatrick Street as part of the roadworks. This will include a total of four KIS type inlet sumps, two located on each side of the street. The pipework connecting the sumps longitudinally will be run in the northern side of the street due to service clashes in the southern verge. KIS type sumps have been selected to allow more space to the existing water main in the southern verge and to avoid clashing with existing sewer infrastructure in the northern verge of Kirkpatrick Street. The four new sumps are to drain to a new headwall and rock mattress outlet structure and tail out drain located within rural block 1218. This infrastructure is detailed on drawing 5417-020 under Appendix B.

14. TEMPORARY WORKS

In order to maintain safe access to the RSPCA during the reconstruction of KirkPatricks Street; it will be necessary to construct a temporary road within Weston Creek Rural Block 1218. Localised earthworks will be required to ensure the crossfall on the temporary road stays within 5% and does not create undue hazard to vehicular traffic.

This road is to be removed and reinstated with topsoil and grass upon completion of the roadworks on Kirkpatrick Street.

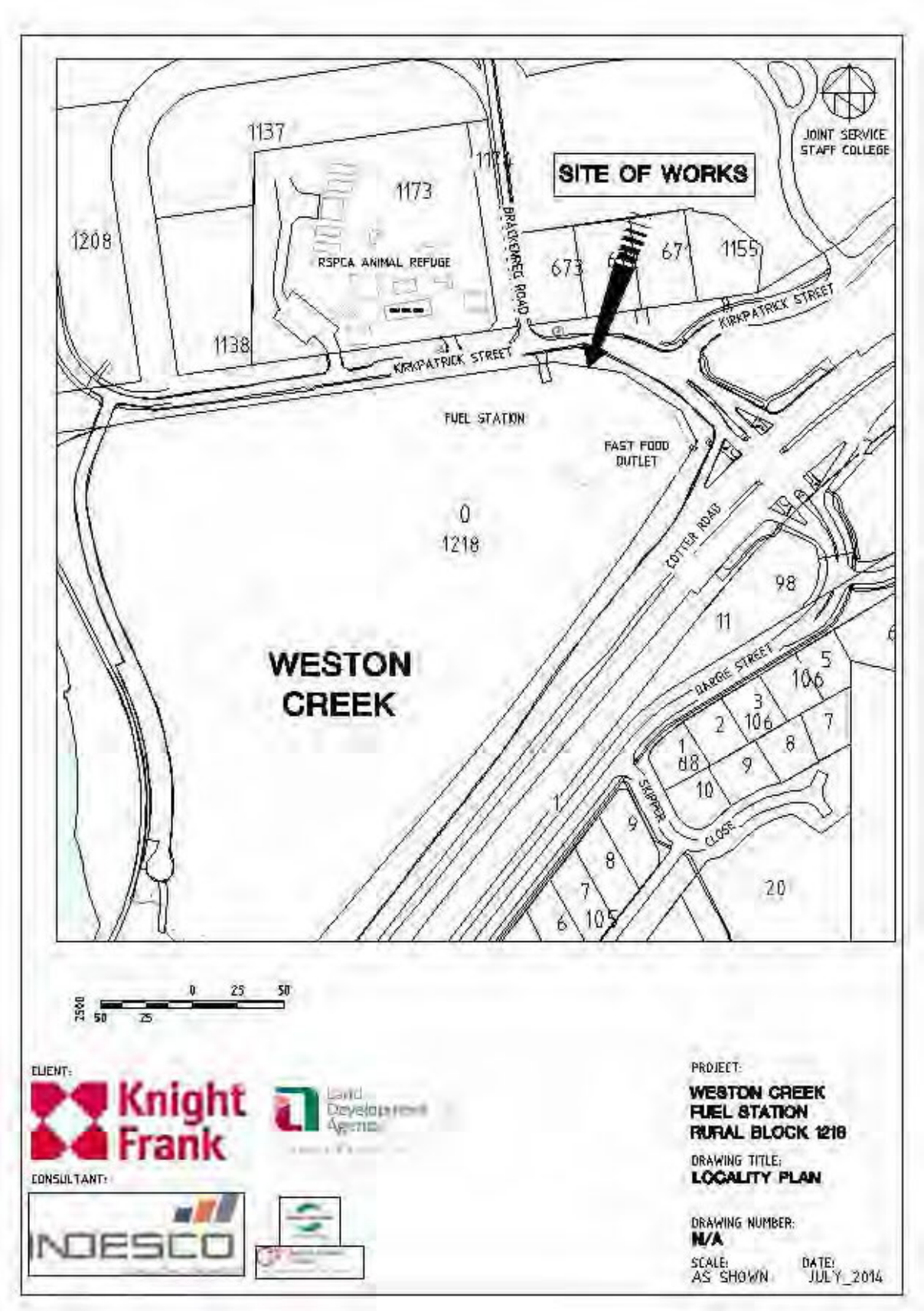
15. REFERENCES

a) TAMS Design Standards for Urban Infrastructure, Edition 1, Revision 4.
b) Standard Specification for Urban Infrastructure Works, Edition 1, Revision 0.
c) Actew's Water Supply and Sewer Standards, Release 4, with amendments, updated September 2012.

ATTACHMENTS

Attachment A	Site Plan
Attachment B	Drawing Schedule – (drawings under separate cover)
Attachment C	Draft Construction Surveillance Plan

ATTACHMENT A – SITE PLAN



ATTACHMENT B – DRAWING SCHEDULE (DRAWINGS UNDER SEPARATE COVER)

Drawing Number	Drawing Title
5417-000	COVER SHEET/ LOCALITY PLAN
5417-001	SCHEDULE OF DRAWINGS
5417-002	LEGEND ABBREVIATIONS AND GENERAL NOTES
5417-003	AERIAL OVERLAY PLAN
5417-004	GENERAL ARRANGEMENT PLAN
5417-010	DETAIL PLAN SHEET 1 OF 3
5417-011	DETAIL PLAN SHEET 2 OF 3
5417-012	DETAIL PLAN SHEET 3 OF 3
5417-020	HYDRAULIC SERVICES PLAN SHEET 1 OF 3
5417-021	HYDRAULIC SERVICES PLAN SHEET 2 OF 3
5417-022	HYDRAULIC SERVICES PLAN SHEET 3 OF 3
5417-030	PAVEMENT PLAN
5417-040	ROAD LONGITUDINAL SECTION
5417-041	DRIVEWAY LONGITUDINAL SECTION
5417-050	ROAD CROSS SECTIONS SHEET 1 OF 5
5417-051	ROAD CROSS SECTIONS SHEET 2 OF 5
5417-052	ROAD CROSS SECTIONS SHEET 3 OF 5
5417-053	ROAD CROSS SECTIONS SHEET 4 OF 5
5417-054	ROAD CROSS SECTIONS SHEET 5 OF 5
5417-055	DRIVEWAY 1 CROSS SECTIONS
5417-056	DRIVEWAY 2 CROSS SECTIONS
5417-060	ROAD SETOUT DETAILS
5417-070	KERB SETOUT DETAILS SHEET 1 OF 2
5417-071	KERB SETOUT DETAILS SHEET 2 OF 2
5417-072	KERB SETOUT LONGITUDINAL SECTIONS 1 OF 2
5417-073	KERB SETOUT LONGITUDINAL SECTIONS 2 OF 2
5417-080	DRIVEWAY DETAILS
5417-090	TRUCK MOVEMENT DIAGRAM
5417-100	SEDIMENT AND EROSION CONTROL CONCEPT PLAN
5417-101	SEDIMENT AND EROSION CONTROL NOTS & DETAILS
5417-110	TRAFFIC CONTROL DEVICES
5417-120	TEMPORARY TRAFFIC MANAGEMENT CONCEPT PLAN

ATTACHMENT C – DRAFT CONSTRUCTION SURVEILLANCE PLAN

Attachment I - (See Electronic Copy for Drawing Set)

Attachment J

ACT Government
Territory and Municipal Services

Asset Acceptance

Indesco

Contact: Frank Yu
Telephone: 6205 2970
File 2014/11076

,

Attention :John Randall

Certificate Of Design Acceptance For WESTON CREEK Block 1218 Fuel Station

On behalf of the Territory and Municipal Services Directorate (TAMS), this ***Certificate of Design Acceptance*** is issued to confirm TAMS acceptance of the Drawings and Documents listed in Attachment A.

This Certificate is issued on the basis of the Consultant's certification that each design element prepared by the Consultant complies with the design criteria and the Standards.

Note that the drawings and documents submitted have not been checked for engineering competence by TAMS and the issue of this Certificate does not in any way abrogate the Consultant's responsibility for the integrity of the design.

TAMS recommends a rigorous validation by the Consultant of all design elements prior to the calling of tenders for construction of the Works to ensure suitability of purpose.

TAMS may undertake or arrange audits during the course of construction to ensure that the Works are constructed strictly in accordance with the Drawings and Documents and best work practices.

This Certificate is issued with the following conditions:

1. The issue of this Certificate does not waive or diminish the continuing responsibilities of the Consultant with respect to the suitability and integrity of the design; nor does it absolve the Consultant of continuing obligations under the Standards.
2. Any proposed amendments to the design as accepted by this Certificate shall be submitted for acceptance prior to the amendments being implemented
3. On the satisfactory completion of all design and construction activities, a Certificate of Operational Acceptance will be issued for the project on receipt of all relevant documents as specified in TAMS Reference Document 8 - *Requirements for Works as Executed Quality Records.*

Operational Acceptance will be processed only when all documents required by TAMS Reference Document 8 are received in this office. Under special circumstances, a part submission may be accepted at the Manager's discretion to accelerate the acceptance process, however, the processing time for the issue of the certificate in such cases will be counted from the date of receipt of the last document in the package.

Yours faithfully,

[redacted]

Manager,
Asset Acceptance.
10/10/14

Attachment A

Page 1 of.1 of Attachment A to Certificate of Design Acceptance

Dated: 10/10/14

Documentation for Design Acceptance
For WESTON CREEK Block 1218 Fuel Station

Doc. Ref No	Revision No
5417-004	B
5417-010	B
5417-011	B
5417-020	D
5417-021	C
5417-130	A
14077-E1	B
5417-110	B
5417-111	A