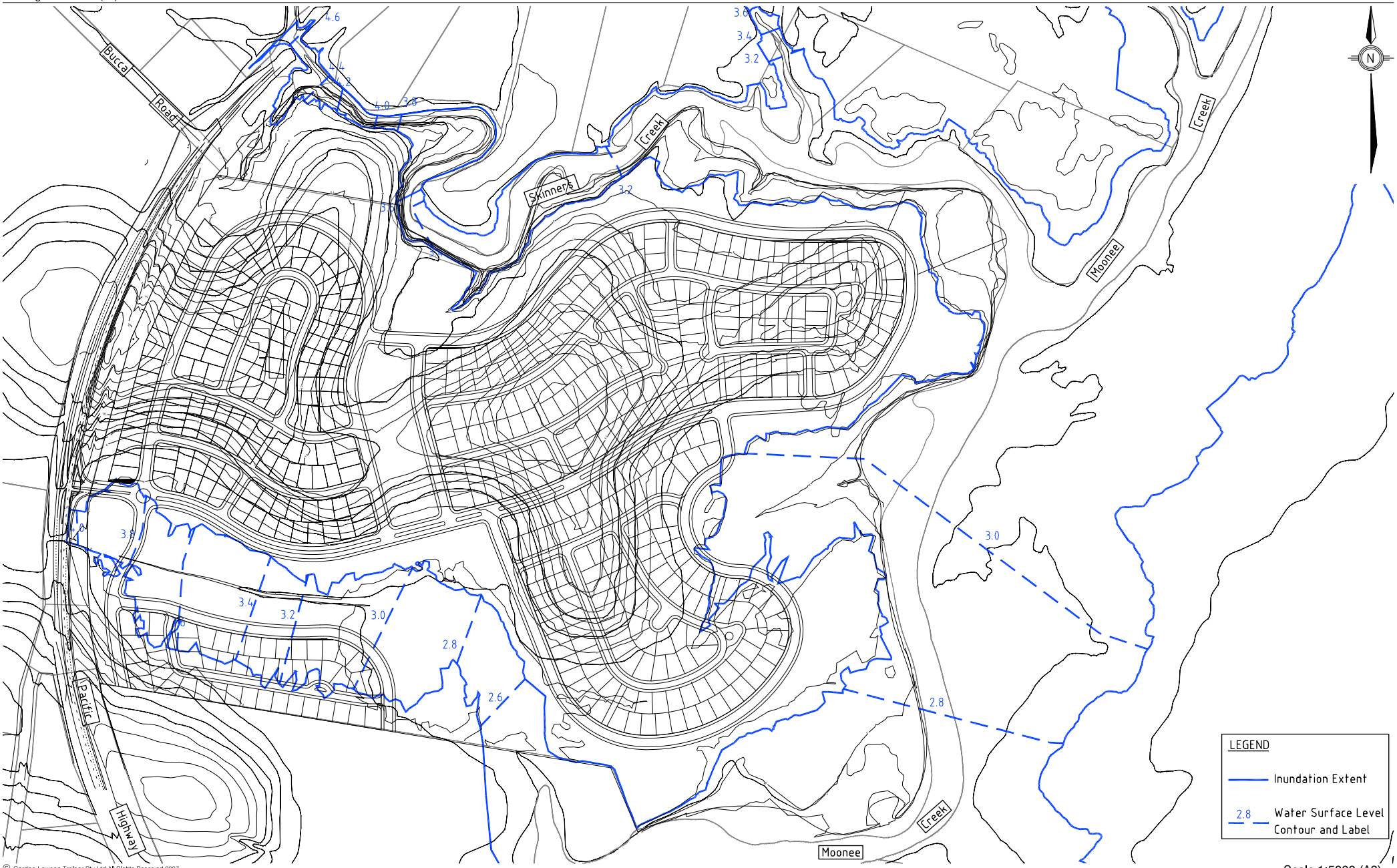

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Scale 1:5000 (A3)

FIGURE 3

1% AEP FLOOD EVENT INUNDATION EXTENT (EXISTING)

Rev: Orig. Date: March 2007

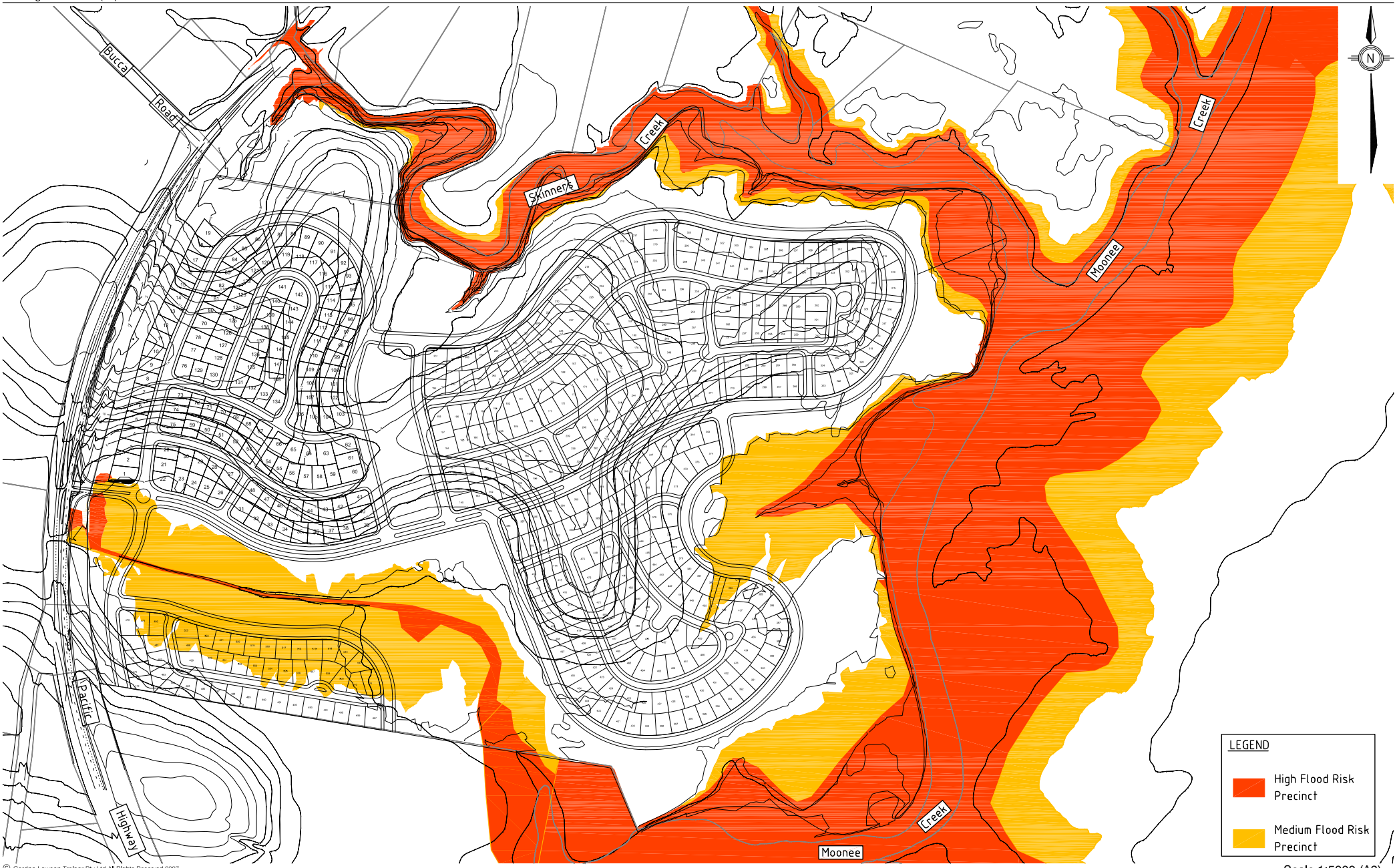
Project No.: LJ8596

Auspacific

CAD FILE: G:\WorkLAT\J8596_2\Figures\Figure3-4.dwg
XREFs: DGR SUBMIT 148 Lots

PRINT DATE: 04 April, 2007 - 8:21am

Cardno Lawson Treloar



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Scale 1:5000 (A3)

FIGURE 4
SITE FLOOD RISK PRECINCTS

Rev: 0 Date: March 2007

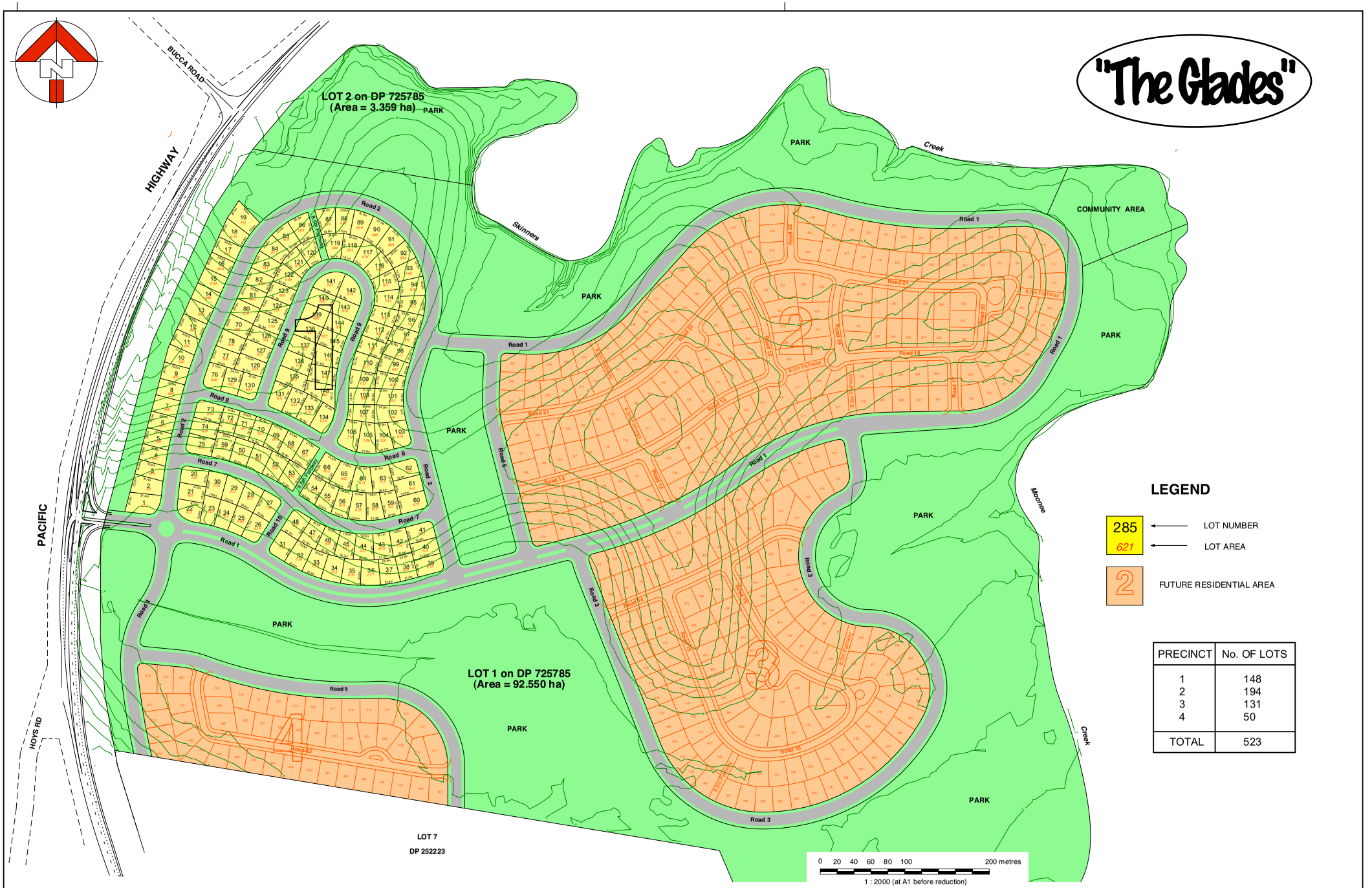
Project No.: LJ8596

Auspacific

CAD FILE: G:\WorkLAT\LJ8596_2\Figures\Figure3-4.dwg
XREFs: DGR SUBMIT 148 Lots

PRINT DATE: 04 April, 2007 - 8:22am

REFERENCE DRAWING



PRECINCT	No. OF LOTS
1	148
2	194
3	131
4	50
TOTAL	523

amdt no.	date	amendment
B	OCT 07	DRAWING TITLE AMENDMENT
A	SEPT 07	CONCEPT PLAN & PRECINCT NOTED

DISCLAIMER: This is a preliminary concept plan prepared by Auspacific Engineers Pty Ltd ("the consultant")
The concept plan has been prepared by the Consultant for the benefit of the entity to which it is address ("the Client") and is in response to certain instructions and requests given by the Client. The concept plan therefore may only be relied upon by the Client for the purpose for which it has been prepared and for no other purpose. The concept plan does not represent the Consultant's professional advice, but is merely an overview of potential development outcome and as stated is "preliminary" in nature.
No third party is entitled to rely upon the information contained in the preliminary report and any definitive advice as to budgets, yields, etc., should be sought directly from the consultant.

PRELIMINARY LOT LAYOUT

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AS SHOWN		
design	drawn	
RKH	JM	
date	signed	
NOV 2006		

client: THE ROTHWELL BOYS PTY LTD

project: PROPOSED RESIDENTIAL SUBDIVISION
MOONEE BEACH COFFS HARBOUR

dwg no.: P1

amendment: B

04-1600

APPENDIX A

Detailed MIKE11 Results

Peak Flood Levels (mAHD)

Branch	Chainage	1% AEP WSL (ENVELOPE)			5% AEP WSL			20% AEP WSL		
		Existing	Developed	Diff	Existing	Developed	Diff	Existing	Developed	Diff
MOONEE	0	10.418	10.418	0.000	10.286	10.286	0.000	10.167	10.167	0.000
MOONEE	20	10.434	10.434	0.000	10.295	10.295	0.000	10.177	10.177	0.000
MOONEE	70	10.055	10.055	0.000	10.025	10.025	0.000	9.983	9.983	0.000
MOONEE	300	8.907	8.907	0.000	8.889	8.889	0.000	8.864	8.864	0.000
MOONEE	330	8.786	8.786	0.000	8.763	8.763	0.000	8.733	8.733	0.000
MOONEE	570	7.985	7.985	0.000	7.930	7.930	0.000	7.889	7.889	0.000
MOONEE	680	7.756	7.756	0.000	7.702	7.702	0.000	7.666	7.666	0.000
MOONEE	850	7.235	7.235	0.000	7.146	7.146	0.000	7.094	7.094	0.000
MOONEE	1050	6.960	6.960	0.000	6.778	6.778	0.000	6.524	6.524	0.000
MOONEE	1420	5.856	5.856	0.000	5.547	5.547	0.000	5.134	5.134	0.000
MOONEE	1750	5.687	5.687	0.000	5.337	5.337	0.000	4.867	4.867	0.000
MOONEE	2480	4.573	4.573	0.000	4.215	4.215	0.000	3.789	3.789	0.000
MOONEE	3025	4.095	4.095	0.000	3.779	3.779	0.000	3.413	3.413	0.000
MOONEE	3570	3.865	3.865	0.000	3.574	3.574	0.000	3.221	3.221	0.000
MOONEE	4050	3.588	3.588	0.000	3.282	3.282	0.000	2.926	2.926	0.000
MOONEE	4250	3.256	3.256	0.000	2.883	2.883	0.000	2.500	2.500	0.000
MOONEE	4350	3.222	3.222	0.000	2.856	2.856	0.000	2.478	2.478	0.000
MOONEE	4700	3.168	3.168	0.000	2.806	2.806	0.000	2.438	2.438	0.000
MOONEE	5550	3.103	3.104	**0.001**	2.748	2.748	0.000	2.385	2.385	0.000
MOONEE	5600	3.101	3.101	0.000	2.745	2.745	0.000	2.382	2.382	0.000
MOONEE	5950	3.078	3.078	0.000	2.719	2.719	0.000	2.354	2.354	0.000
MOONEE	6050	3.052	3.052	0.000	2.695	2.695	0.000	2.330	2.330	0.000
MOONEE	6180	3.048	3.048	0.000	2.689	2.689	0.000	2.323	2.323	0.000
MOONEE	6420	2.940	2.940	0.000	2.587	2.587	0.000	2.234	2.234	0.000
MOONEE	6580	2.764	2.764	0.000	2.435	2.435	0.000	2.112	2.112	0.000
MOONEE	6900	2.691	2.693	**0.002**	2.284	2.284	0.000	1.971	1.971	0.000
MOONEE	7200	2.645	2.645	0.000	1.888	1.887	-0.001	1.619	1.618	-0.001
MOONEE	7280	2.643	2.642	-0.001	1.870	1.870	0.000	1.605	1.604	-0.001
MOONEE	7400	2.640	2.639	-0.001	1.844	1.843	-0.001	1.583	1.582	-0.001
MOONEE	7800	2.631	2.630	-0.001	1.745	1.745	0.000	1.498	1.498	0.000
MOONEE	8150	2.620	2.619	-0.001	1.541	1.541	0.000	1.328	1.328	0.000
MOONEE	8420	2.615	2.615	0.000	1.399	1.399	0.000	1.204	1.204	0.000
MOONEE	8760	2.611	2.611	0.000	1.211	1.211	0.000	1.020	1.019	-0.001
MOONEE	8960	2.606	2.606	0.000	1.042	1.041	-0.001	0.877	0.876	-0.001
MOONEE	9200	2.603	2.603	0.000	0.848	0.848	0.000	0.740	0.740	0.000
MOONEE	9400	2.600	2.600	0.000	0.600	0.600	0.000	0.600	0.600	0.000
LINE-B	0	6.478	6.478	0.000	6.375	6.375	0.000	6.276	6.276	0.000
LINE-B	90	6.409	6.409	0.000	6.321	6.321	0.000	6.235	6.235	0.000
LINE-B	110	6.259	6.259	0.000	6.051	6.051	0.000	5.860	5.860	0.000
LINE-B	170	6.258	6.258	0.000	6.046	6.046	0.000	5.849	5.849	0.000
LINE-B	200	5.965	5.965	0.000	5.823	5.823	0.000	5.695	5.695	0.000
LINE-B	380	5.881	5.881	0.000	5.636	5.636	0.000	5.367	5.367	0.000
TIKI	300	5.881	5.881	0.000	5.636	5.636	0.000	5.367	5.367	0.000
TIKI	350	5.022	5.022	0.000	4.973	4.973	0.000	4.938	4.938	0.000
TIKI	550	4.850	4.850	0.000	4.760	4.760	0.000	4.660	4.660	0.000
TIKI	650	4.560	4.560	0.000	4.502	4.502	0.000	4.448	4.448	0.000
TIKI	850	3.148	3.148	0.000	2.796	2.796	0.000	2.423	2.423	0.000
TIKI	1000	3.135	3.135	0.000	2.784	2.784	0.000	2.414	2.414	0.000
SKINNERS	0	12.851	12.851	0.000	12.531	12.531	0.000	12.231	12.231	0.000
SKINNERS	180	11.336	11.336	0.000	11.037	11.037	0.000	10.775	10.775	0.000
SKINNERS	450	8.828	8.828	0.000	8.673	8.673	0.000	8.545	8.545	0.000
SKINNERS	600	7.739	7.739	0.000	7.656	7.656	0.000	7.583	7.583	0.000
SKINNERS	950	5.820	5.820	0.000	5.759	5.759	0.000	5.692	5.692	0.000

Peak Flood Levels (mAHD)

Branch	Chainage	1% AEP WSL (ENVELOPE)			5% AEP WSL			20% AEP WSL		
		Existing	Developed	Diff	Existing	Developed	Diff	Existing	Developed	Diff
SKINNERS	1270	4.709	4.709	0.000	4.252	4.252	0.000	3.819	3.819	0.000
SKINNERS	1300	4.519	4.519	0.000	4.098	4.098	0.000	3.700	3.700	0.000
SKINNERS	1360	4.443	4.443	0.000	4.015	4.015	0.000	3.607	3.607	0.000
SKINNERS	1460	4.025	4.025	0.000	3.605	3.605	0.000	3.222	3.222	0.000
SKINNERS	1600	3.720	3.720	0.000	3.315	3.315	0.000	2.921	2.920	-0.001
SKINNERS	1820	3.537	3.537	0.000	3.126	3.126	0.000	2.715	2.715	0.000
SKINNERS	1980	3.280	3.280	0.000	2.914	2.913	-0.001	2.535	2.535	0.000
SKINNERS	2140	3.221	3.221	0.000	2.863	2.863	0.000	2.490	2.490	0.000
SKINNERS	2200	3.197	3.197	0.000	2.844	2.844	0.000	2.474	2.474	0.000
SKINNERS	2380	3.163	3.163	0.000	2.811	2.810	-0.001	2.440	2.440	0.000
SKINNERS	2500	3.135	3.135	0.000	2.784	2.784	0.000	2.414	2.414	0.000
SKINNERS	2650	3.094	3.094	0.000	2.738	2.738	0.000	2.375	2.375	0.000
SKINNERS	2820	3.084	3.084	0.000	2.725	2.725	0.000	2.360	2.360	0.000
SKINNERS	2900	3.081	3.081	0.000	2.722	2.722	0.000	2.357	2.357	0.000
SKINNERS	3000	3.078	3.078	0.000	2.719	2.719	0.000	2.354	2.354	0.000
BUCCA	0	7.084	7.084	0.000	7.024	7.024	0.000	6.968	6.968	0.000
BUCCA	300	6.812	6.812	0.000	6.783	6.783	0.000	6.752	6.752	0.000
BUCCA	500	5.067	5.067	0.000	4.891	4.891	0.000	4.744	4.744	0.000
BUCCA	680	5.063	5.063	0.000	4.881	4.881	0.000	4.694	4.694	0.000
BUCCA	720	4.348	4.341	-0.007	4.304	4.302	-0.002	4.240	4.239	-0.001
BUCCA	760	4.052	4.061	**0.009**	4.031	4.033	**0.002**	4.008	4.009	**0.001**
BUCCA	800	3.920	3.982	**0.062**	3.890	3.902	**0.012**	3.849	3.838	-0.011
BUCCA	810	3.909	3.979	**0.070**	3.877	3.894	**0.017**	3.834	3.823	-0.011
BUCCA	840	3.849	3.965	**0.116**	3.816	3.865	**0.049**	3.772	3.774	**0.002**
BUCCA	866	3.771	3.806	**0.035**	3.739	3.774	**0.035**	3.707	3.736	**0.029**
BUCCA	900	3.714	3.765	**0.051**	3.679	3.732	**0.053**	3.645	3.697	**0.052**
BUCCA	1030	3.457	3.512	**0.055**	3.415	3.467	**0.052**	3.369	3.414	**0.045**
BUCCA	1100	3.224	3.339	**0.115**	3.167	3.307	**0.140**	3.132	3.274	**0.142**
BUCCA	1270	3.007	3.033	**0.026**	2.962	2.985	**0.023**	2.921	2.939	**0.018**
BUCCA	1350	2.843	2.869	**0.026**	2.786	2.814	**0.028**	2.727	2.758	**0.031**
BUCCA	1520	2.682	2.680	-0.002	2.464	2.449	-0.015	2.353	2.352	-0.001
BUCCA	1800	2.645	2.645	0.000	1.888	1.887	-0.001	1.619	1.618	-0.001

Peak Flows (m^3/s)

Branch	Chainage	1% AEP FLOWS (ENVELOPE)			5% AEP FLOWS			20% AEP FLOWS		
		Existing	Developed	Diff	Existing	Developed	Diff	Existing	Developed	Diff
MOONEE	10	187.15	187.15	0.00	150.34	150.34	0.00	108.22	108.22	0.00
MOONEE	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MOONEE	185	21.97	21.97	0.00	19.70	19.70	0.00	16.89	16.89	0.00
MOONEE	315	12.18	12.18	0.00	11.51	11.51	0.00	10.98	10.98	0.00
MOONEE	450	12.17	12.17	0.00	11.50	11.50	0.00	10.98	10.98	0.00
MOONEE	625	12.15	12.15	0.00	11.50	11.50	0.00	10.98	10.98	0.00
MOONEE	765	12.13	12.13	0.00	11.50	11.50	0.00	10.98	10.98	0.00
MOONEE	950	12.01	12.01	0.00	11.51	11.51	0.00	11.04	11.04	0.00
MOONEE	1235	50.25	50.25	0.00	36.69	36.69	0.00	24.34	24.34	0.00
MOONEE	1585	47.86	47.86	0.00	35.12	35.12	0.00	23.78	23.78	0.00
MOONEE	2115	129.78	129.78	0.00	90.22	90.22	0.00	59.10	59.10	0.00
MOONEE	2752.5	123.25	123.25	0.00	86.42	86.42	0.00	58.25	58.25	0.00
MOONEE	3297.5	117.10	117.10	0.00	83.31	83.31	0.00	57.18	57.18	0.00
MOONEE	3810	117.86	117.85	-0.01	82.70	82.70	0.00	56.69	56.69	**0.00**
MOONEE	4150	116.94	116.93	-0.01	82.56	82.56	0.00	56.60	56.60	**0.00**
MOONEE	4300	131.82	131.82	0.00	93.13	93.13	0.00	65.17	65.17	**0.00**
MOONEE	4525	131.91	131.90	-0.01	93.34	93.34	0.00	65.16	65.16	0.00
MOONEE	5125	136.02	136.03	**0.01**	96.00	95.99	-0.01	66.35	66.35	0.00
MOONEE	5575	159.30	159.32	**0.02**	114.69	114.67	-0.01	80.79	80.79	0.00
MOONEE	5775	160.61	160.64	**0.03**	115.90	115.89	-0.02	81.58	81.57	-0.01
MOONEE	6000	206.73	206.67	-0.06	151.99	151.99	**0.00**	110.33	110.35	**0.02**
MOONEE	6115	206.24	206.18	-0.06	151.68	151.68	**0.00**	109.94	109.95	**0.01**
MOONEE	6300	205.88	205.86	-0.02	151.53	151.53	0.00	109.74	109.74	**0.00**
MOONEE	6500	205.88	205.86	-0.02	151.56	151.56	-0.01	109.72	109.72	0.00
MOONEE	6740	206.02	206.00	-0.02	151.68	151.66	-0.01	109.79	109.79	-0.01
MOONEE	7050	209.98	209.97	-0.01	154.13	154.12	-0.02	111.38	111.37	-0.01
MOONEE	7240	217.05	217.03	-0.02	159.22	159.21	-0.01	114.95	114.94	-0.01
MOONEE	7340	217.44	217.42	-0.02	159.36	159.35	-0.01	115.05	115.04	-0.01
MOONEE	7600	241.38	241.36	-0.02	176.15	176.10	-0.06	125.34	125.26	-0.08
MOONEE	7975	241.13	241.12	-0.01	175.93	175.87	-0.06	125.13	125.05	-0.08
MOONEE	8285	241.12	241.11	-0.01	175.90	175.84	-0.06	125.15	125.09	-0.06
MOONEE	8590	245.86	245.85	-0.01	179.31	179.25	-0.05	127.46	127.37	-0.09
MOONEE	8860	245.99	245.98	-0.01	179.54	179.48	-0.06	127.93	127.84	-0.09
MOONEE	9080	246.12	246.11	-0.01	179.74	179.68	-0.06	128.23	128.15	-0.09
MOONEE	9300	346.90	346.74	-0.16	256.00	255.81	-0.19	182.60	182.46	-0.15
LINE-B	45	14.88	14.88	0.00	11.20	11.20	0.00	8.16	8.16	0.00
LINE-B	100	14.88	14.88	0.00	11.19	11.19	0.00	8.16	8.16	0.00
LINE-B	140	14.62	14.62	0.00	10.99	10.99	0.00	8.02	8.02	0.00
LINE-B	190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINE-B	290	60.77	60.77	0.00	40.46	40.46	0.00	21.82	21.82	0.00
TIKI	330	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TIKI	400	27.57	27.57	0.00	16.54	16.54	0.00	8.48	8.48	0.00
TIKI	600	15.03	15.03	0.00	8.96	8.96	0.00	5.67	5.67	0.00
TIKI	750	14.93	14.93	0.00	8.61	8.61	0.00	4.33	4.33	0.00
TIKI	925	13.99	14.00	**0.01**	8.17	8.17	0.00	4.20	4.20	0.00
SKINNERS	90	76.34	76.34	0.00	56.81	56.81	0.00	40.67	40.67	0.00
SKINNERS	315	76.12	76.12	0.00	56.54	56.54	0.00	40.90	40.90	0.00
SKINNERS	525	75.42	75.42	0.00	56.30	56.30	0.00	39.95	39.95	0.00
SKINNERS	775	29.64	29.64	0.00	27.17	27.17	0.00	25.20	25.20	0.00
SKINNERS	1110	29.67	29.67	0.00	27.31	27.31	0.00	25.29	25.29	0.00
SKINNERS	1285	80.89	80.89	0.00	57.85	57.85	0.00	42.68	42.68	0.00
SKINNERS	1330	77.20	77.20	0.00	56.17	56.17	0.00	41.22	41.22	0.00

Peak Flows (m^3/s)

Branch	Chainage	1% AEP FLOWS (ENVELOPE)			5% AEP FLOWS			20% AEP FLOWS		
		Existing	Developed	Diff	Existing	Developed	Diff	Existing	Developed	Diff
SKINNERS	1410	77.04	77.04	0.00	56.07	56.07	**0.00**	41.18	41.18	0.00
SKINNERS	1530	76.93	76.93	0.00	56.00	56.00	**0.00**	41.14	41.14	0.00
SKINNERS	1710	75.55	75.55	0.00	54.98	54.98	0.00	40.70	40.70	0.00
SKINNERS	1900	75.30	75.30	0.00	54.73	54.73	0.00	40.56	40.56	0.00
SKINNERS	2060	74.92	74.92	0.00	54.40	54.40	0.00	40.35	40.35	0.00
SKINNERS	2170	74.50	74.51	**0.01**	54.04	54.04	0.00	40.11	40.11	0.00
SKINNERS	2290	81.00	81.00	0.00	58.70	58.70	0.00	43.76	43.76	0.00
SKINNERS	2440	79.25	79.25	0.00	57.41	57.41	0.00	42.85	42.85	0.00
SKINNERS	2575	90.23	90.24	**0.01**	64.51	64.51	0.00	44.07	44.07	0.00
SKINNERS	2735	89.09	89.09	0.00	63.60	63.60	0.00	43.54	43.54	0.00
SKINNERS	2860	86.96	86.97	**0.01**	61.85	61.85	0.00	42.49	42.48	0.00
SKINNERS	2950	85.27	85.28	**0.01**	60.69	60.69	0.00	41.79	41.79	0.00
BUCCA	150	6.29	6.29	0.00	4.61	4.61	0.00	3.25	3.25	0.00
BUCCA	400	6.83	6.83	0.00	5.01	5.01	0.00	3.57	3.57	0.00
BUCCA	590	5.62	5.62	0.00	4.32	4.32	0.00	3.19	3.19	0.00
BUCCA	700	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BUCCA	740	4.22	4.22	0.00	3.22	3.22	0.00	2.29	2.29	0.00
BUCCA	780	4.21	4.21	0.00	3.22	3.22	0.00	2.29	2.29	0.00
BUCCA	805	4.21	4.19	-0.02	3.22	3.21	-0.01	2.28	2.28	0.00
BUCCA	825	4.21	4.18	-0.03	3.22	3.20	-0.02	2.28	2.28	0.00
BUCCA	853	4.21	4.18	-0.03	3.22	3.20	-0.02	2.28	2.28	-0.01
BUCCA	883	4.21	4.17	-0.04	3.22	3.20	-0.02	2.28	2.28	-0.01
BUCCA	965	4.21	4.17	-0.04	3.22	3.19	-0.02	2.29	2.27	-0.02
BUCCA	1065	4.21	4.17	-0.04	3.22	3.19	-0.03	2.30	2.27	-0.02
BUCCA	1185	4.11	4.16	**0.05**	3.19	3.18	-0.01	2.28	2.26	-0.03
BUCCA	1310	12.66	12.84	**0.18**	9.90	9.99	**0.08**	7.54	7.61	**0.07**
BUCCA	1435	12.10	12.12	**0.02**	9.43	9.50	**0.07**	7.25	7.26	**0.01**
BUCCA	1660	11.52	11.52	0.00	9.07	9.11	**0.04**	7.02	7.02	0.00
CULVERT#7	1	4.21	4.21	0.00	3.22	3.22	0.00	2.29	2.29	0.00
BRIDGE#1	5	0.40	0.40	0.00	0.35	0.35	0.00	0.26	0.26	0.00
BRIDGE#1	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Peak Velocities (m/s)

Post-Development		1% AEP			5% AEP			20% AEP		
Branch	Chainage	Existing	Developed	Impact	Existing	Developed	Impact	Existing	Developed	Impact
MOONEE	10	0.77	0.77	0.00	0.66	0.66	0.00	0.51	0.51	0.00
MOONEE	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MOONEE	185	1.56	1.56	0.00	1.49	1.49	0.00	1.47	1.47	0.00
MOONEE	315	1.27	1.27	0.00	1.26	1.26	0.00	1.24	1.24	0.00
MOONEE	450	1.29	1.29	0.00	1.28	1.28	0.00	1.26	1.26	0.00
MOONEE	625	1.33	1.33	0.00	1.31	1.31	0.00	1.29	1.29	0.00
MOONEE	765	1.50	1.50	0.00	1.47	1.47	0.00	1.46	1.46	0.00
MOONEE	950	1.97	1.97	0.00	1.89	1.89	0.00	1.86	1.86	0.00
MOONEE	1235	1.65	1.65	0.00	1.61	1.61	0.00	1.55	1.55	0.00
MOONEE	1585	0.95	0.95	0.00	0.94	0.94	0.00	0.91	0.91	0.00
MOONEE	2115	1.33	1.33	0.00	1.31	1.31	0.00	1.23	1.23	0.00
MOONEE	2752.5	1.04	1.04	0.00	0.98	0.98	0.00	0.92	0.92	0.00
MOONEE	3297.5	0.76	0.76	0.00	0.75	0.75	0.00	0.70	0.70	0.00
MOONEE	4150	1.28	1.28	0.00	1.28	1.28	0.00	1.33	1.33	0.00
MOONEE	4300	1.03	1.03	0.00	0.98	0.98	0.00	0.83	0.83	0.00
MOONEE	4525	0.93	0.93	0.00	0.83	0.83	0.00	0.71	0.71	0.00
MOONEE	5125	0.79	0.79	0.00	0.68	0.68	0.00	0.54	0.54	0.00
MOONEE	5575	0.76	0.76	0.00	0.70	0.70	0.00	0.62	0.62	0.00
MOONEE	5775	0.64	0.64	0.00	0.61	0.61	0.00	0.56	0.56	0.00
MOONEE	6000	0.87	0.87	0.00	0.82	0.82	0.00	0.78	0.78	0.00
MOONEE	6115	0.44	0.44	0.00	0.42	0.42	0.00	0.40	0.40	0.00
MOONEE	6300	0.35	0.35	0.00	0.32	0.32	0.00	0.30	0.30	0.00
MOONEE	6500	0.66	0.66	0.00	0.60	0.60	0.00	0.52	0.52	0.00
MOONEE	6740	0.85	0.85	0.00	0.78	0.78	0.00	0.70	0.70	0.00
MOONEE	7050	0.78	0.78	0.00	0.72	0.72	0.00	0.65	0.65	0.00
MOONEE	7240	0.88	0.88	0.00	0.76	0.76	0.00	0.63	0.63	0.00
MOONEE	7340	0.85	0.85	0.00	0.75	0.75	0.00	0.64	0.64	0.00
MOONEE	7600	0.83	0.83	0.00	0.73	0.73	0.00	0.63	0.63	0.00
MOONEE	7975	1.03	1.03	0.00	0.90	0.90	0.00	0.78	0.78	0.00
MOONEE	8285	1.14	1.14	0.00	1.00	1.00	0.00	0.86	0.86	0.00
MOONEE	8590	0.89	0.89	0.00	0.79	0.79	0.00	0.72	0.72	0.00
MOONEE	8860	1.06	1.06	0.00	0.95	0.95	0.00	0.86	0.86	0.00
MOONEE	9080	1.33	1.34	0.01	1.13	1.13	0.00	0.94	0.94	0.00
MOONEE	9300	2.75	2.75	0.00	2.75	2.75	0.00	2.75	2.75	0.00
SKINNERS	90	2.90	2.90	0.00	2.69	2.69	0.00	2.44	2.44	0.00
SKINNERS	315	2.30	2.30	0.00	2.13	2.13	0.00	1.99	1.99	0.00
SKINNERS	525	2.62	2.62	0.00	2.26	2.26	0.00	2.10	2.10	0.00
SKINNERS	775	2.51	2.51	0.00	2.45	2.45	0.00	2.37	2.37	0.00
SKINNERS	1110	1.40	1.40	0.00	1.42	1.42	0.00	1.45	1.45	0.00
SKINNERS	1285	3.31	3.31	0.00	3.22	3.22	0.00	3.11	3.11	0.00
SKINNERS	1330	1.03	1.03	0.00	1.01	1.01	0.00	0.99	0.99	0.00
SKINNERS	1410	1.20	1.20	0.00	1.12	1.12	0.00	1.05	1.05	0.00
SKINNERS	1530	1.15	1.15	0.00	1.12	1.12	0.00	1.10	1.10	0.00
SKINNERS	1710	0.85	0.85	0.00	0.82	0.82	0.00	0.78	0.78	0.00
SKINNERS	1900	1.16	1.16	0.00	1.01	1.01	0.00	0.90	0.90	0.00
SKINNERS	2060	1.14	1.14	0.00	0.99	0.99	0.00	0.87	0.87	0.00
SKINNERS	2170	0.96	0.96	0.00	0.83	0.83	0.00	0.74	0.74	0.00
SKINNERS	2290	0.88	0.88	0.00	0.80	0.80	0.00	0.72	0.72	0.00
SKINNERS	2440	0.78	0.78	0.00	0.72	0.72	0.00	0.67	0.67	0.00
SKINNERS	2575	1.04	1.04	0.00	0.89	0.89	0.00	0.79	0.79	0.00
SKINNERS	2860	0.57	0.57	0.00	0.47	0.47	0.00	0.41	0.41	0.00
SKINNERS	2950	0.50	0.50	0.00	0.40	0.40	0.00	0.33	0.33	0.00

Peak Velocities (m/s)

Post-Development		1% AEP			5% AEP			20% AEP		
Branch	Chainage	Existing	Developed	Impact	Existing	Developed	Impact	Existing	Developed	Impact
BUCCA	150	0.47	0.47	0.00	0.37	0.37	0.00	0.36	0.36	0.00
BUCCA	400	0.73	0.73	0.00	0.61	0.61	0.00	0.51	0.51	0.00
BUCCA	590	0.20	0.20	0.00	0.16	0.16	0.00	0.13	0.13	0.00
BUCCA	700	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BUCCA	740	0.63	0.63	0.00	0.63	0.63	0.00	0.63	0.63	0.00
BUCCA	780	0.46	0.59	0.13	0.46	0.59	0.13	0.46	0.59	0.13
BUCCA	805	0.43	0.68	0.25	0.43	0.68	0.25	0.43	0.68	0.25
BUCCA	825	0.55	0.65	0.10	0.55	0.65	0.10	0.55	0.65	0.10
BUCCA	853	0.66	1.48	0.82	0.66	1.18	0.52	0.66	0.89	0.23
BUCCA	883	0.78	0.71	-0.07	0.78	0.71	-0.07	0.78	0.71	-0.07
BUCCA	965	0.63	0.53	-0.10	0.63	0.53	-0.10	0.63	0.53	-0.10
BUCCA	1065	0.86	0.67	-0.19	0.85	0.67	-0.18	0.82	0.66	-0.16
BUCCA	1185	0.50	0.38	-0.12	0.50	0.39	-0.11	0.51	0.39	-0.12
BUCCA	1310	0.47	0.40	-0.07	0.46	0.38	-0.08	0.45	0.38	-0.07
BUCCA	1435	0.53	0.42	-0.11	0.52	0.41	-0.11	0.51	0.39	-0.12
BUCCA	1660	1.52	1.52	0.00	1.47	1.47	0.00	1.41	1.41	0.00

Volume 3

Traffic Engineering Review

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Our Ref: B1000

Date: 30 October 2006

DESIGN NOTE

"THE GLADES" MOONEE BEACH
TRAFFIC ENGINEERING REVIEW

This design note has been prepared to address the traffic engineering matters relevant to the construction of a proposed residential development west of the Pacific Highway at Moonee Beach, north of Coffs Harbour.

Development Master Plan

The development master plan is depicted on Auspacific Engineers Drawing 04-1600-IC, a copy of which is attached. The development incorporates a total of approximately 550 allotments that will be developed over a number of stages. The first stage includes a total of 154 allotments.

Development Access Intersection and Form

Vehicular access to the subject development site will be achieved by way of a new temporary unsignalised intersection on the Pacific Highway. The proposed unsignalised intersection will be constructed by the Winten Property Group to enable access to be achieved and facilitate the initial stages of development. It is envisaged that this will be an interim access arrangement until such time as a collector route to Moonee Beach Road is constructed and upgrading of the Moonee Beach Road/Pacific Highway is undertaken to a standard that provides sufficient capacity to cater for the entire catchment.

The development access intersection to be constructed on the Pacific Highway will be a priority-controlled AUSTROADS Type C seagull intersection treatment. The form and operational aspects of this access intersection have been analysed to ensure consistency with Roads and Traffic Authority (RTA) standards.

The proposed access is a rural seagull intersection treatment with acceleration and deceleration lanes of sufficient length on both Pacific Highway approaches. The intersection has been designed to a 90km/h design speed on the Pacific Highway. A review of Coffs Harbour City Council meeting minutes indicates that a motion was moved on 2 September 2004 to reduce the speed limit between Double Crossing Creek, Woolgoolga to south of Moonee Beach from the existing 100 km/hr to an 80 km/hr posted speed, more consistent with the operation of the Pacific Highway at Moonee Beach. It is also understood that upgrading works for the Moonee Beach Road/Pacific Highway intersection are also being designed for a 90km/h design speed. The 90km/h design speed is therefore considered to be appropriate.

The intersection will be constructed within an existing overtaking section on the Pacific Highway where two southbound traffic lanes exist. The importance of the overtaking provision is recognised and therefore the overtaking lanes have been retained in the design. Intersection forms similar to this exist at other locations on the Pacific Highway north of Moonee Beach.

A copy of the proposed intersection plan is attached hereto prepared by Auspacific Engineers (refer Auspacific Drawings 04-1600-13 and 04-1600-14). It recognises the importance of through traffic movements and has been designed to match with other road works which have been recently completed at the Moonee Beach Road intersection identified in reporting prepared by TTM Consulting.

The design of the access intersection has been advanced with significant consultation with the RTA. A works authorisation deed (WAD) has been formulated to cover the infrastructure works.

Existing Approvals

An access in the form proposed by this application has been formally approved by both the RTA and Coffs Harbour City Council in 1994. Importantly, the RTA correspondence dated 21 February 1994 identifies that an AUSTROADS Type A form would be required for Stage 1 being a ten lot subdivision with upgrading to a Type C form (possible seagull) required prior to residential development being constructed (Stage 2).

As discussed above, the intersection proposed complies with the Stage 2 requirements documented by the RTA as this is considered to represent the minimum safe form for access to the site. Further approvals have now been issued by the RTA which are covered by the WAD.

Road Network Planning Consideration

Road network planning matters associated with the area including the subject land have been separated into two components which are generally described as a) regional planning matters and b) local planning matters.

With respect to regional planning matters, the RTA has recently resolved to upgrade the Pacific Highway between Sapphire and Woolgoolga as part of the Coffs Harbour Highway Planning Strategy. It is proposed that the Pacific Highway be upgraded to four lanes whilst maintaining the majority of the existing corridor alignment.

This upgrading of the Pacific Highway will occur north of Moonee Beach. These decisions reinforce the importance of maintaining the operational integrity of the Pacific Highway corridor so that its traffic carrying performance is not jeopardised in the longer term.

With respect to local planning, the Moonee Beach catchment is currently only serviced by one major access from the Pacific Highway which is provided at Moonee Beach Road. Moonee Beach Road intersects with the highway south of the subject site and is controlled by an at-grade unsignalised intersection. This intersection currently comprises a form which can be generally described as a rural seagull intersection form albeit that acceleration and deceleration lanes are substandard for the posted speed of the Pacific Highway in this section.

A single at grade access intersection from the Pacific Highway servicing the Moonee Beach catchment is clearly not sustainable in the longer term for a number of reasons including that it:

- does not allow for local connectivity between suburbs or villages east of the Pacific Highway resulting in a reliance on the Pacific Highway for local trip making;
- results in inefficient public transport serviceability whereby services have extensive dead running and forced to utilise the highway as part of any route corridors;
- results in greater external traffic demands and therefore more significant upgrading requirements for any connections to the highway.

Moonee Beach Development Control Plan (DCP)

The recently completed DCP for Moonee Beach starts to recognise the existing transport planning deficiencies by identifying a series of collector roads north and south of Moonee Beach Road. The northern collector identified in the DCP however does not provide a through connection north to Tiki Road which would provide an inter-suburban connection. Discussions with RTA officers have identified a longer term desire for a road link extending from Tiki Road north of the development to Moonee Beach Road. This would facilitate a strong local connection and then enable grade separated connections to the Pacific Highway at Moonee Beach Road and another somewhere in the vicinity of Tiki Road. Considering the existing limitations on operation of the Moonee Beach Road intersection, this connection would provide increased levels of operational capacity for access to the catchment.

A complete north-south collector route would enable public transport (bus) services to be implemented at some future time to service the demands generated any future development of the subject site and future neighbouring residential developments. The collector route would also result in more efficient local routes for vehicular traffic to and from neighbourhood centres located north and south.

Coffs Harbour City Council has, it is understood, initiated discussions with local stakeholders regarding the necessary land acquisitions for the section of the collector route between the subject site and Moonee Beach Road, however the timing of its completion is unclear as a result of the dependence on adjacent land owners and allocation of necessary funding.

Moonee Beach Road/Pacific Highway Intersection

Background

Upgrading of the Pacific Highway/Moonee Beach intersection has been recently undertaken to facilitate development of the proposed Moonee Beach shopping centre and an estimated catchment of approximately 500 residential allotments. Council officers have suggested that planning applications have, or will soon be lodged, for the majority of this development yield.

The operation of the proposed upgraded intersection has been analysed to determine the available spare capacity. A review of the TTM traffic report titled "*Proposed Shopping Centre Moonee Beach Road, Moonee Beach*" was also undertaken which provides an assessment of traffic implications of a proposed shopping centre development on the Moonee Beach Road/Pacific Highway intersection.

The TTM report presents base year Pacific Highway volumes derived from recent traffic counts. It also presents an estimate of traffic volumes generated by the proposed commercial development and future residential development within the catchment.

The TTM report indicates that a previous traffic assessment was undertaken for the proposed commercial site which assumed a traffic generation of 75% of the rates described in the RTA *Guide to Traffic Generating Developments*, resulting in a total generation of 590 trips per hour. The latest report states that an ultimate development traffic generation of 100% of the rates outlined by the RTA has been considered, resulting in a total development traffic generation of approximately 787 trips per hour.

A discrepancy exists between the total development generation described above (*787 trips*) and the number of peak hour trips detailed in Table 4.1 of the report (*590 trips*). It appears as though the incorrect development generation total (75% instead of the newly revised 100%) has been used for the intersection analysis contained in that report.

The operational analysis contained in the TTM report suggests that the upgraded intersection will operate acceptably until 2010. Based upon the above matters relevant to the traffic forecast methodology and limitations in the merge analysis adopted by TTM, it is considered that the upgrade would at best provide 5 years of operating life. Beyond that time, construction of a grade separated facility or alternative access arrangements will be required to allow continued safe access to the Moonee Beach catchment.

A detailed assessment has been completed to determine the capacity of the subject intersection to accommodate the proposed Glades development envisaged by the Winten Property Group, and this is documented in following sections.

Background Traffic Volumes

This assessment has been based upon information contained in the 2004 TTM traffic report. This report details the traffic impacts that both the shopping centre and a nominated amount of residential development, has on the current configuration of the Pacific Highway/Moonee Beach seagull intersection. Figures 1 and 2 show the recorded intersection counts at this location and expected shopping centre development traffic respectively.

To establish future traffic volumes expected at this intersection, the traffic volumes recorded in 2004 have been factored by a linear growth of three percent per year. The background volumes at this location represent the addition of the shopping centre trip estimates to the factored existing volumes for years 2006, 2011 and 2021. These volumes are detailed in Figures 3, 4 and 5 respectively.

Catchment Traffic Volumes

The catchment traffic that utilises this intersection has been determined by estimating the quantum of developable land east of the highway, that in future will utilise the Moonee Beach Road. A development take up rate of 50 lots/dwellings per year has been assumed which is considered to be conservative. The traffic movements that will occur at this intersection were then calculated using a traffic generation rate of 0.8 vehicles per hour per dwelling and a distribution of 25% of vehicles travelling north and 75% vehicles to the south. The expected traffic movements by the catchment at this intersection is summarised on Figure 6.

Operational Analysis

The computer based modelling tool aaSIDRA has been used to determine the overall performance of the Pacific Highway/Moonee Beach Road intersection. Table 1 shows the output results in terms of capacity, average delay of vehicles and the length of queues expected at this intersection.

Table 1 ***Pacific Highway/Moonee Beach Road Intersection Performance Characteristics***

Analysis Scenario	Degree of Saturation (DOS)	Average Movement Delay (seconds)	Critical Queue Length (metres)
2004 Surveyed Traffic Demands	0.27	4.1	5
2006 Background (Other residential and shopping centre)	0.97	24.3	148
2011 Background (Other residential and shopping centre)	< 1.0	82.0	478
2021 Background (Other residential and shopping centre)	n/a	n/a	n/a
2006 Background plus Glades Development	n/a	n/a	n/a
2011 Background plus Glades Development	n/a	n/a	n/a
2021 Background plus Glades Development	n/a	n/a	n/a

NOTE: n/a dictates this analysis has not been completed due to earlier scenarios being above capacity levels.

As shown in the table above, the Pacific Highway/Moonee Beach Road intersection has reached a level of saturation at the current year incorporating factored existing volumes and shopping centre trips. The critical movement for this intersection configuration is the right turn from Moonee Beach Road onto Pacific Highway. It is noted that this intersection performance does not include the traffic demand generated by the Glades residential land.

Connections to an interim intersection form north of Moonee Beach (proposed Glades development access intersection) should be encourage as the intersection will provide sufficient relief for the Moonee Beach Road to allow the catchment to develop prior to the grade separation planning being resolved.

Proposed Glades Access/Pacific Highway Intersection Operation

The subject proposed Type C seagull intersection on the Pacific Highway has been analysed using the aaSIDRA modelling suite to test the operating life of the proposed intersection form.

Traffic demands at the intersection have been estimated for the purposes of assessment amounting to a total of approximately 500 peak hour traffic movements. This represents a reasonable estimate of the maximum demands likely to be generated based upon the current master plan. The distribution of development traffic to/from the subject development has been adopted for this assessment consistent with that adopted by TTM in the assessment of the Moonee Beach Road intersection which is as follows:

- north via Pacific Highway – 25%;
- south via Pacific Highway – 75%.

Background traffic volumes are based upon surveys of the Pacific Highway and surrounding intersections, which were undertaken by TTM on Thursday 12th July 2004.

A future year design horizon of 2015 has been adopted for the purposes of assessment. A traffic growth rate of 3% (compound) per annum (as detailed in the TTM traffic report and used here for consistency) was applied to the traffic survey results to determine the background design volumes for assessment at the 2015 design horizon scenario. Operating results for the proposed access intersection are presented in Table 2.

Table 2 ***Pacific Highway/Development Site Access Intersection Operating Performance***

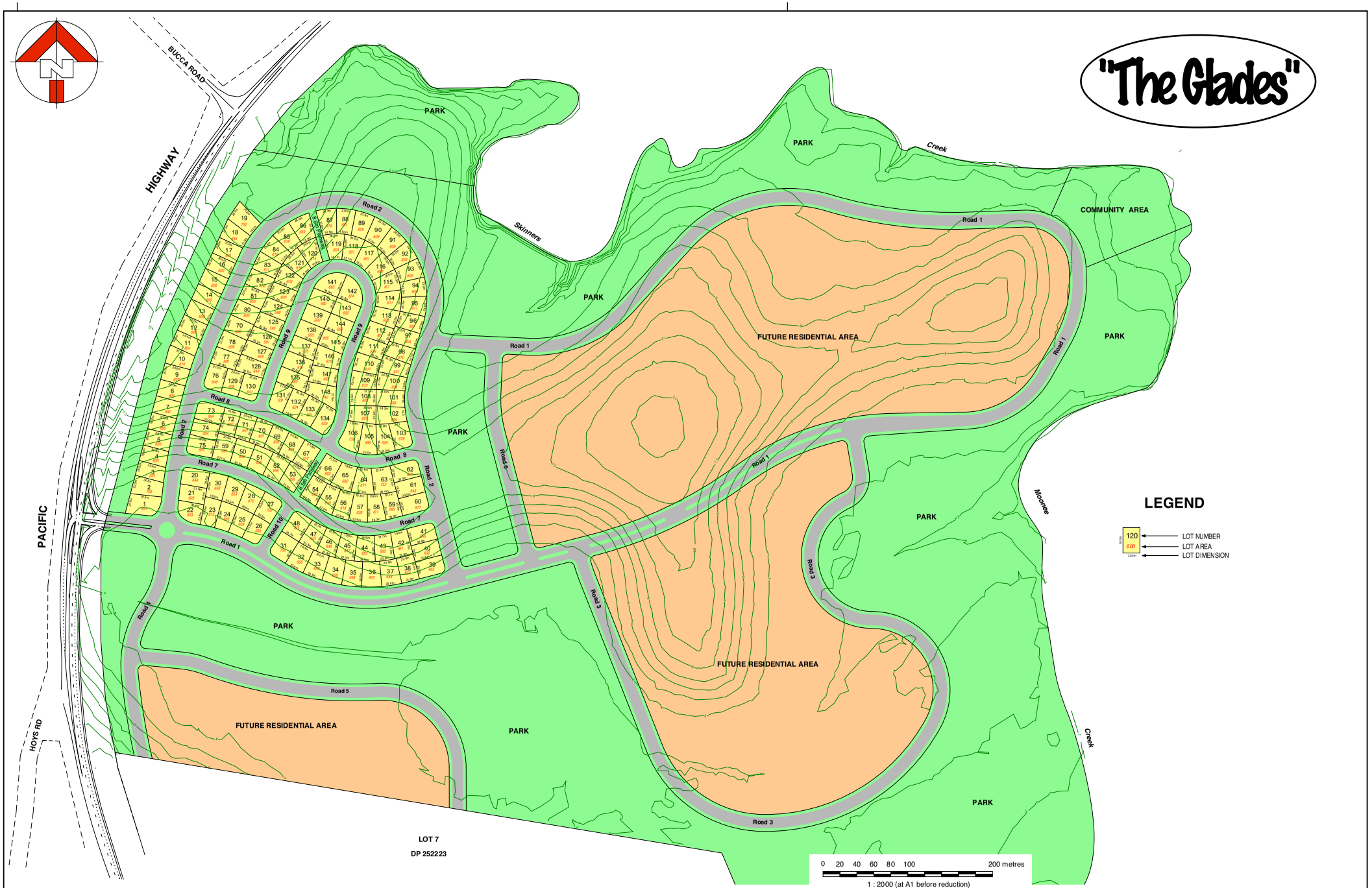
Design Year	AM Peak			PM Peak		
	Degree of Saturation	Critical Delay (s)	Critical Queue (m)	Degree of Saturation	Critical Delay (s)	Critical Queue (m)
2005	57%	8	33	27%	6	11
2015	71%	9	45	32%	6	14

The results in Table 2 indicate that the access as proposed would operate well within normal operating thresholds for a ten year design horizon based upon assumed trip demands of 500 peak hour movements. Should additional demands be generated, there is some spare capacity in this form to allow some diversion from the Moonee Beach Road intersection should that occur following construction of internal linkages.

Conclusions

This design note documents the assessment of the relevant traffic and transport aspects of the proposed residential development access to be located on the Pacific Highway between Moonee Beach Road and Hoys Road, Moonee Beach. The conclusions drawn from this assessment are summarised as follows:

- the development will contain approximately 550 residential allotments when fully completed;
- the proposed access intersection on the Pacific Highway has been designed in accordance with existing RTA and Council approvals and provides a form consistent with current design standards;
- the existing overtaking provision will be retained albeit at a reduced speed consistent with that envisaged at the Moonee Beach Road intersection;
- the proposed access will provide sufficient capacity to enable satisfactory operation for the ten year horizon;
- the access may provide future relief to the catchment should the collector routes be constructed by grade separation be delayed.



amdt no.	date	amendment
C	OCT 07	SUBMISSION C
B	OCT 06	SUBMISSION B
A	DEC 05	SUBMISSION A

DISCLAIMER: This is a preliminary concept plan prepared by Auspacific Engineers Pty Ltd ("the consultant")
The concept plan has been prepared by the Consultant for the benefit of the entity to which it is address ("the Client") and is in response to certain instructions and requests given by the Client. The concept plan therefore may only be relied upon by the Client for the purpose for which it has been prepared and for no other purpose. The concept plan does not represent the Consultant's professional advice, but is merely an overview of potential development outcome and as stated is "preliminary" in nature.
No third party is entitled to rely upon the information contained in the preliminary report and any definitive advice as to budgets, yields, etc., should be sought directly from the consultant.

STAGE 1 PROJECT PLAN
(148 LOTS)

AUSPACIFIC ENGINEERS

AUSPACIFIC ENGINEERS PTY LTD
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scales		
AS SHOWN		
design	drawn	
RKH	JM	
date	signed	
NOV 2006		

client: THE ROTHWELL BOYS PTY LTD

project: PROPOSED RESIDENTIAL SUBDIVISION
MOONEE BEACH COFFS HARBOUR

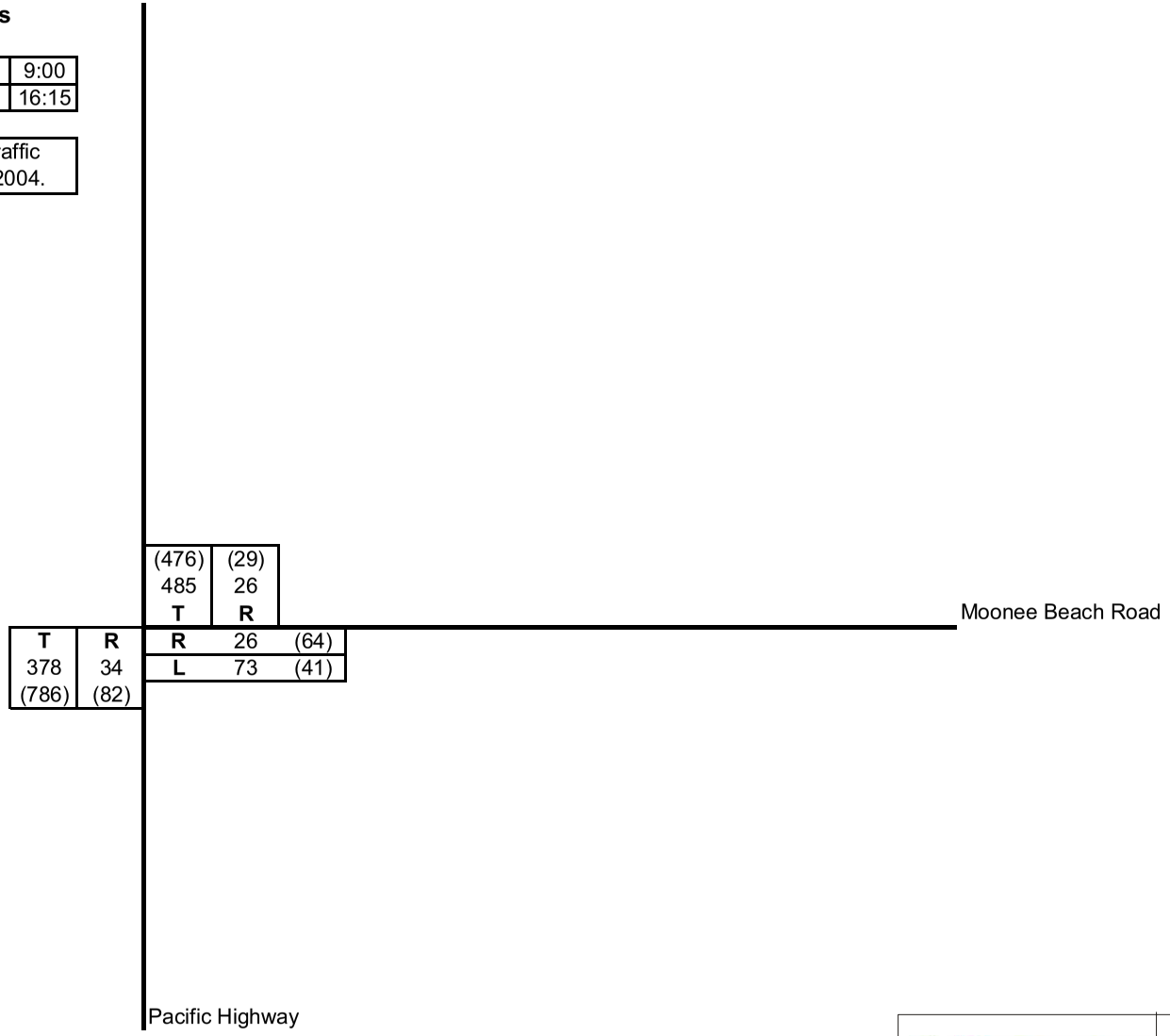
dwg no.	amendment
1	C

04-1600

Moonee Cardno Project
2004 Existing Traffic Volumes

AM Peak Hour Ending	9:00
PM Peak Hour Ending	16:15

Data taken from TTM traffic surveys, on 12 August 2004.



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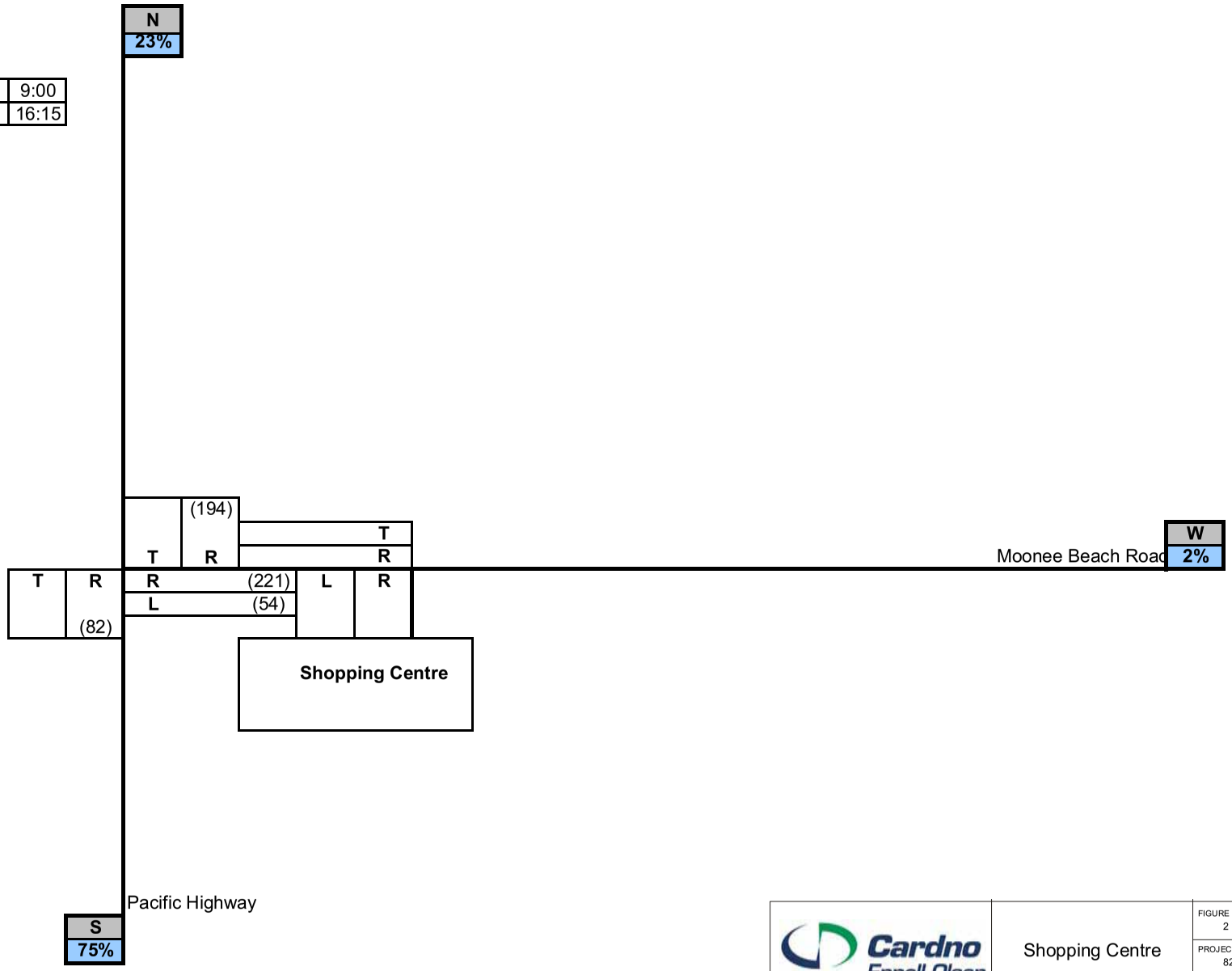
2004
Existing Traffic
Volumes

FIGURE No: 1
PROJECT No: 8294
DAT 2006.10.02

Moonee Cardno Project
Shopping Centre Dev Traffic

AM Peak Hour Ending	9:00
PM Peak Hour Ending	16:15



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Shopping Centre

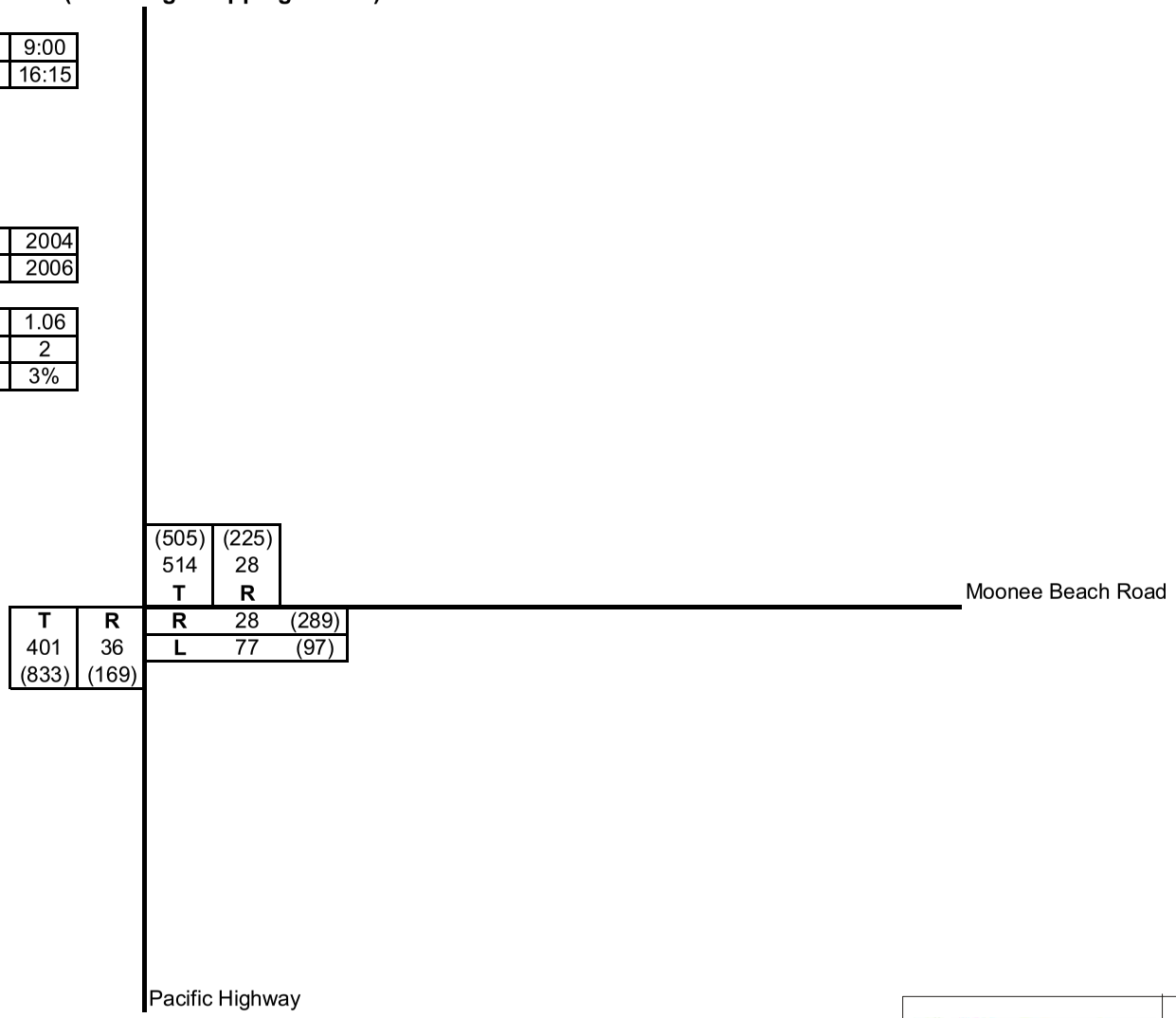
FIGURE No: 2
PROJECT No: 8294
DAT 2006.10.02

Moonee Cardno Project
2006 Background Traffic Volumes (including Shopping Centre)

AM Peak Hour Ending	9:00
PM Peak Hour Ending	16:15

Traffic Survey Year	2004
Development Year	2006

Growth Factor	1.06
Growth Years	2
Growth Rate	3%



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2006 Background Traffic Volumes

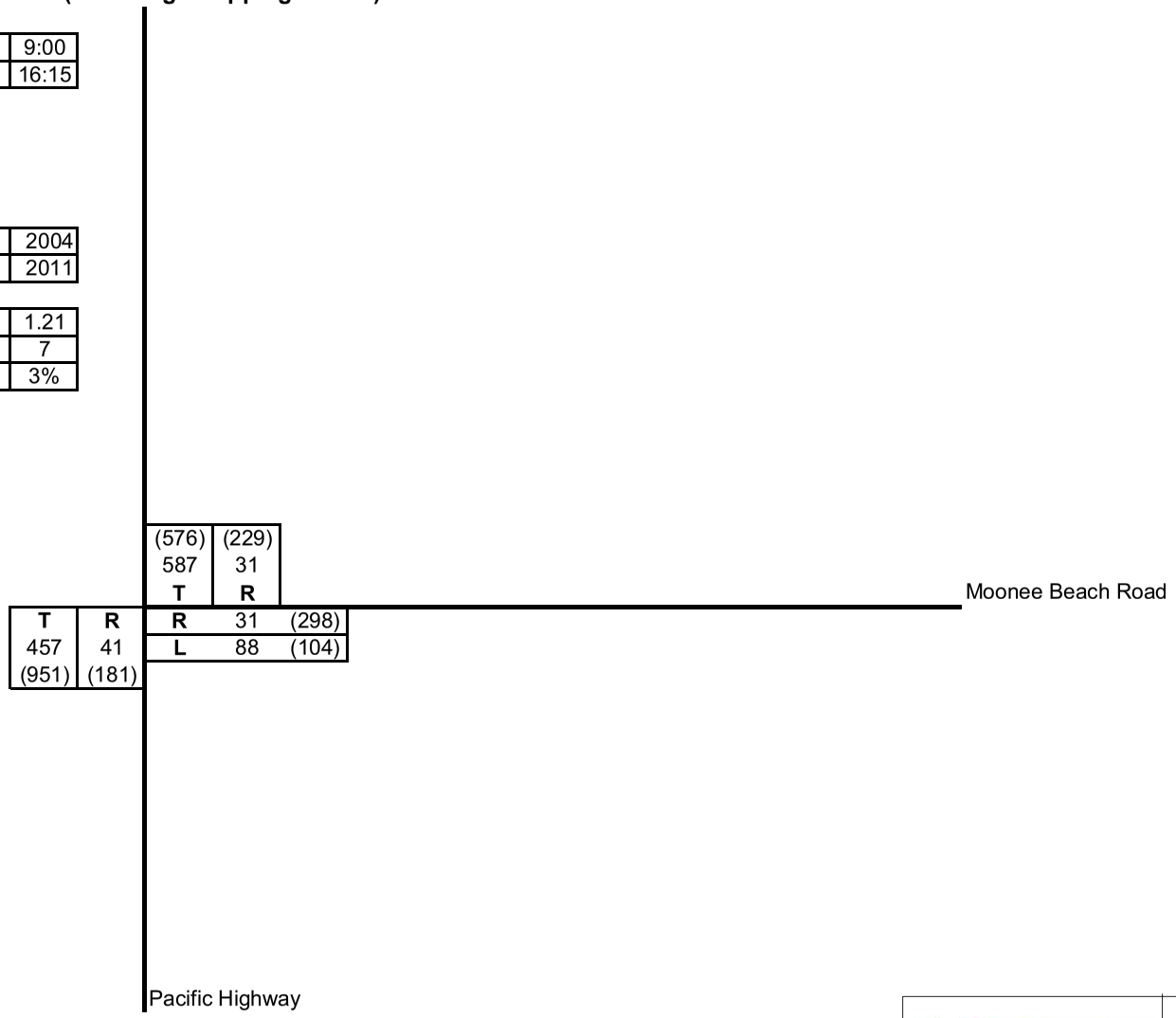
FIGURE No: 3
PROJECT No: 8453
DAT 2006.10.02

Moonee Cardno Project
2011 Background Traffic Volumes (including Shopping Centre)

AM Peak Hour Ending	9:00
PM Peak Hour Ending	16:15

Traffic Survey Year	2004
Development Year	2011

Growth Factor	1.21
Growth Years	7
Growth Rate	3%



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2011 Background Traffic Volumes

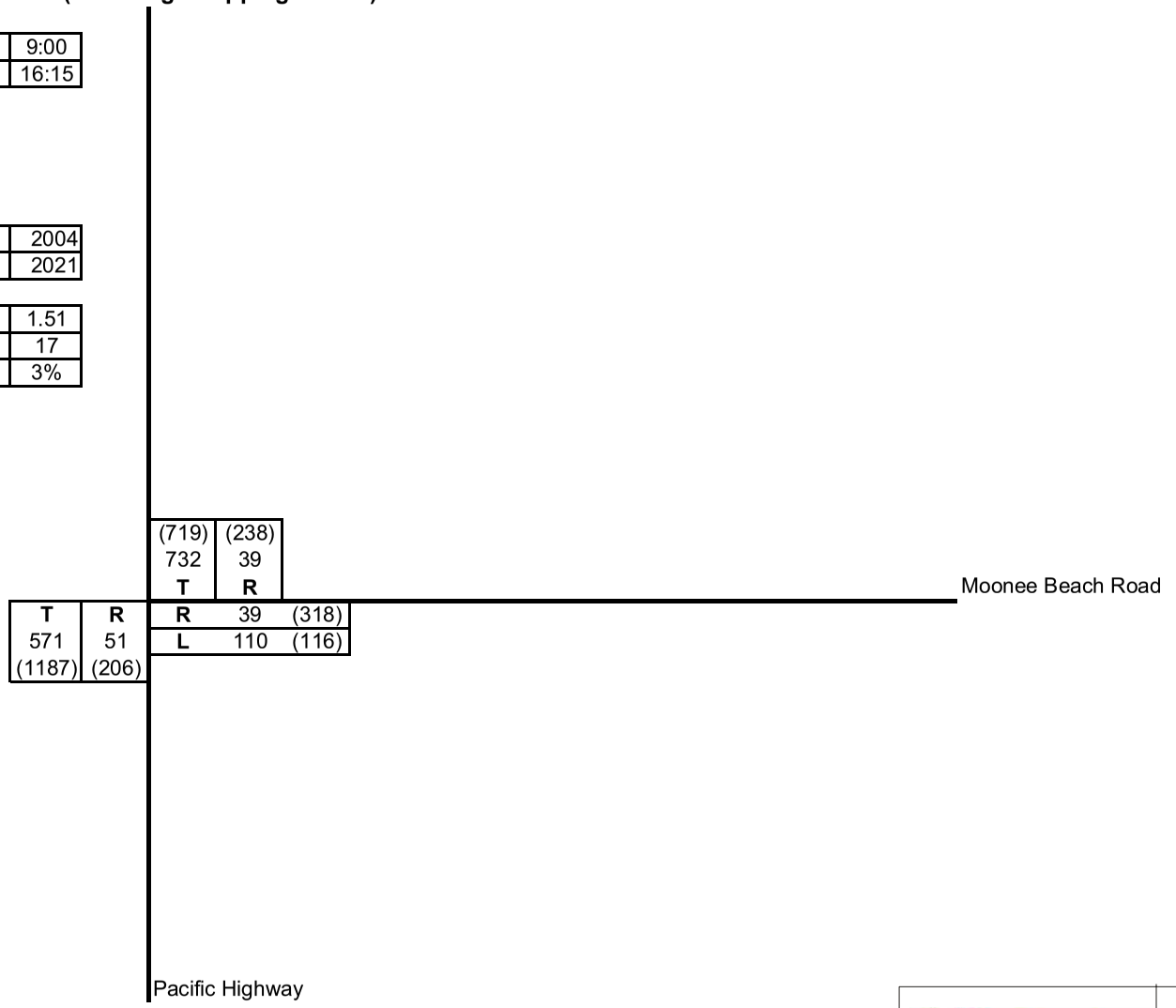
FIGURE No: 4
PROJECT No: 8453
DAT 2006.10.02

Moonee Cardno Project
2021 Background Traffic Volumes (including Shopping Centre)

AM Peak Hour Ending	9:00
PM Peak Hour Ending	16:15

Traffic Survey Year	2004
Development Year	2021

Growth Factor	1.51
Growth Years	17
Growth Rate	3%



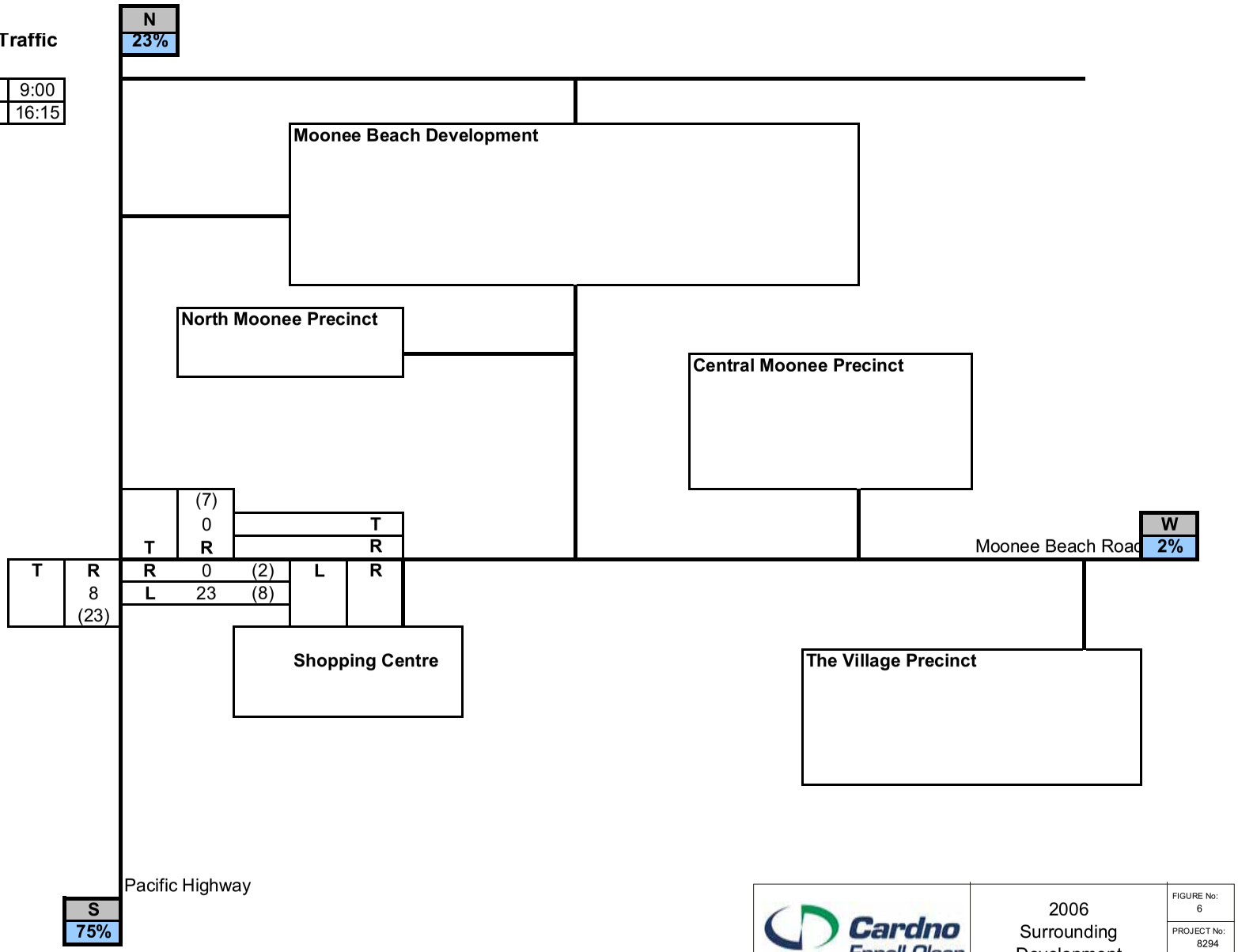
Cardno Eppell Olsen

2021 Background Traffic Volumes

FIGURE No: 5
PROJECT No: 8453
DAT 2006.10.02

Moonee Cardno Project
2006 Total Surrounding Dev Traffic

AM Peak Hour Ending	9:00
PM Peak Hour Ending	16:15



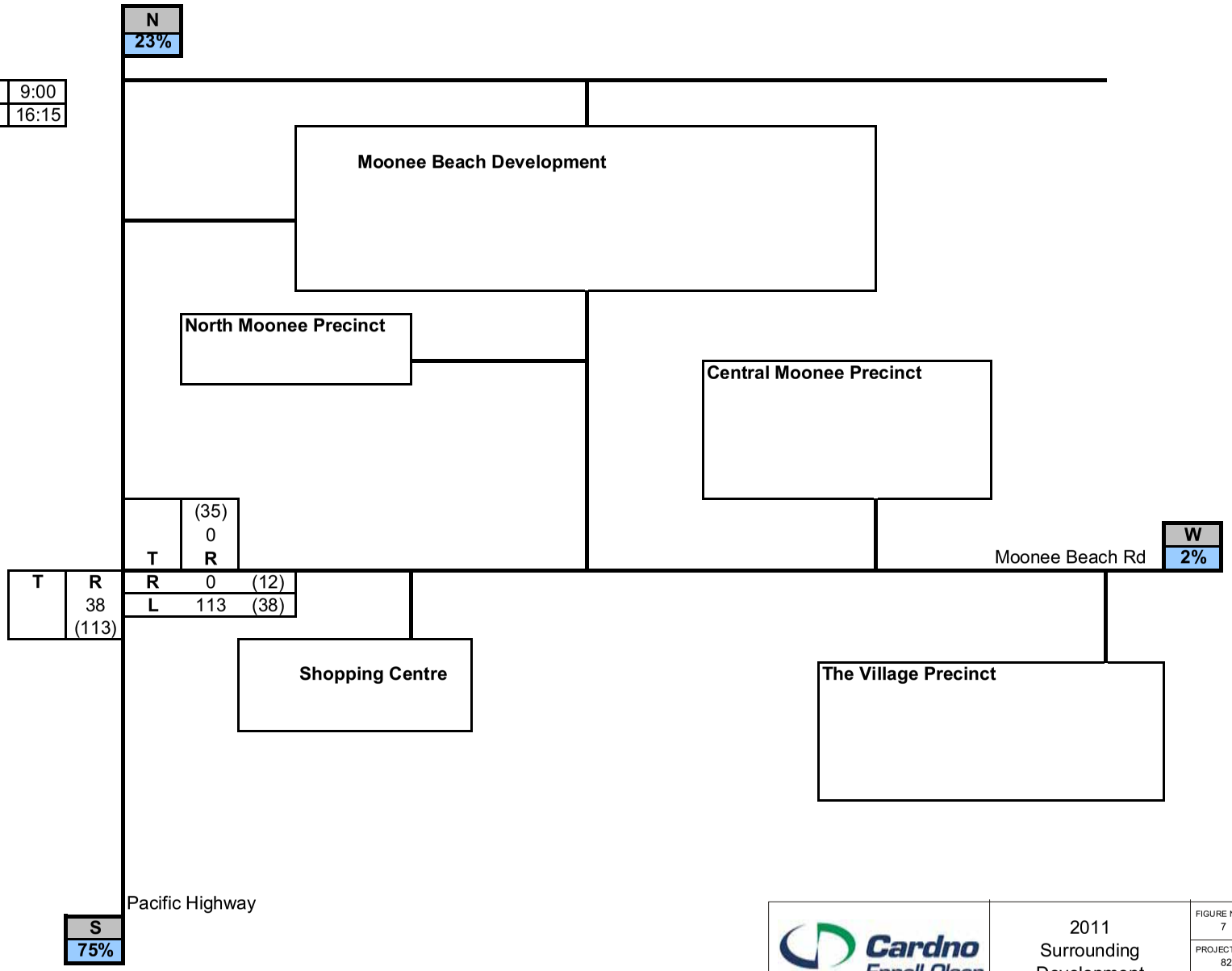
Cardno Eppell Olsen

2006 Surrounding Development

FIGURE No: 6
PROJECT No: 8294
DAT 2006.10.02

Moonee Cardno Project
2011 Development Loading

AM Peak Hour Ending	9:00
PM Peak Hour Ending	16:15



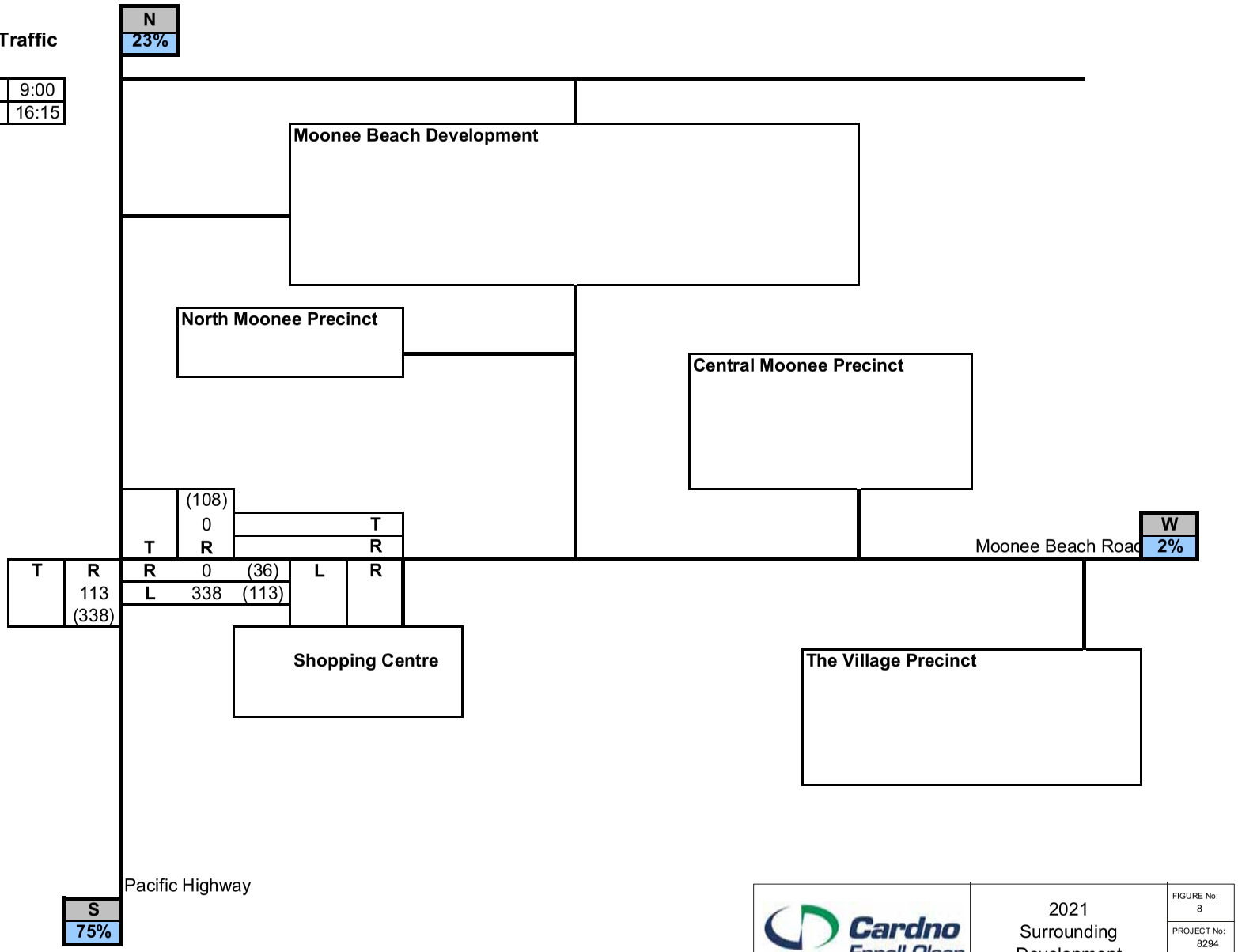
Cardno Eppell Olsen

2011 Surrounding Development

FIGURE No: 7
PROJECT No: 8294
DAT 2006.10.02

Moonee Cardno Project
2021 Total Surrounding Dev Traffic

AM Peak Hour Ending	9:00
PM Peak Hour Ending	16:15



Cardno Eppell Olsen

2021 Surrounding Development

FIGURE No: 8
PROJECT No: 8294
DAT 2006.10.02