

Appendix A

Crash history

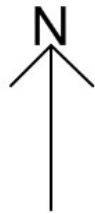
First Street	D Second street I or landmark Distance R	Crash Number	Date DD/MM/YYYY	Day Time DDD HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F S M A E I T R N
BEALEY AVENUE	10E COLOMBO ST	2870223	04/02/2008	Mon 0907	CAR1 EBD on BEALEY AVENUE hit rear end of CAR2 stop/slow for queue	CAR1 following too closely CAR2 following too closely	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal	
BEALEY AVENUE	20E COLOMBO ST	201171438	04/06/2011	Sat 1048	CAR1 WBD on BEALEY AVENUE hit rear end of CAR2 stop/slow for queue	CAR1 following too closely	Dry	Overcast	Fine	Unknown	N/A	
BEALEY AVENUE	10W COLOMBO ST	2921001	01/01/2009	Thu 0940	CAR1 EBD on BEALEY AVENUE lost control; went off road to left	CAR1 alcohol test above limit or test refused	Dry	Bright	Fine	X Type Junction	Traffic Signal	1
BEALEY AVENUE	I COLOMBO ST	2570994	26/04/2005	Tue 1240	CAR1 WBD on BEALEY AVENUE hit CAR2 turning right onto BEALEY AVENUE from the left	CAR1 did not stop at steady red light	Wet	Overcast	Light Rain	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2670233	11/02/2006	Sat 0850	CAR1 WBD on BEALEY AVENUE lost control; went off road to left, CAR1 hit Phone Box Etc., Kerb	CAR1 illness with no warning (eg heart attack)	Dry	Bright	Fine	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2672766	09/08/2006	Wed 1840	CAR1 WBD on BEALEY AVENUE lost control; went off road to left	CAR1 suddenly swerved to avoid vehicle VAN3 overseas/migrant driver failed to adjust to NZ road rules and road conditions	Dry	Dark	Fine	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2672771	11/08/2006	Fri 2034	CAR2 turning right hit by oncoming CAR1 WBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Dark	Fine	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2721435	03/03/2007	Sat 2344	CAR2 turning right hit by oncoming CAR1 EBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction, new driver showed inexperience	Dry	Dark	Fine	X Type Junction	Traffic Signal	1
BEALEY AVENUE	I COLOMBO ST	2723005	24/08/2007	Fri 1650	CAR2 turning right hit by oncoming CAR1 EBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, inattentive, new driver showed inexperience	Dry	Bright	Fine	X Type Junction	Traffic Signal	4
BEALEY AVENUE	I COLOMBO ST	2723478	09/10/2007	Tue 1120	CAR2 turning right hit by oncoming CAR1 EBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when visibility obstructed by other vehicles	Dry	Bright	Fine	X Type Junction	Traffic Signal	1
BEALEY AVENUE	I COLOMBO ST	2872072	10/06/2008	Tue 0058	CAR1 WBD on BEALEY AVENUE lost control; went off road to left, CAR1 hit Traffic Sign	CAR1 drugs suspected, fatigue (drowsy, tired, fell asleep)	Dry	Dark	Fine	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2873155	15/09/2008	Mon 1620	CAR2 turning right hit by oncoming SUV1 WBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2972255	30/06/2009	Tue 1750	CAR1 EBD on BEALEY AVENUE hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, new driver showed inexperience CAR2 suddenly braked	Wet	Dark	Fine	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2974031	19/11/2009	Thu 1110	CAR1 EBD on BEALEY AVENUE hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, failed to notice traffic lights	Dry	Bright	Fine	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	201023324	26/11/2010	Fri 0704	CAR1 SBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, failed to notice traffic lights, fatigue (drowsy, tired, fell asleep)	Dry	Bright	Fine	X Type Junction	Traffic Signal	1
BEALEY AVENUE	I COLOMBO ST	201070526	28/02/2010	Sun 1300	CAR1 EBD on BEALEY AVENUE hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	Dry	Bright	Fine	X Type Junction	Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	201071804	25/05/2010	Tue 1808	CAR2 turning right hit by oncoming CAR1 WBD on BEALEY AVENUE	CAR1 didn't signal in time incorrect signal CAR2 failed to give way when turning to non-turning traffic, misjudged intentions of another party	Wet	Dark	Light Rain	X Type Junction	Traffic Signal	

First Street	D Second street I or landmark Distance R	Crash Number	Date DD/MM/YYYY	Day Time DDD HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road Natural Light	Weather	Junction	Cntrl	Tot Inj F S M A E I T R N
BEALEY AVENUE	I COLOMBO ST	201073685	20/10/2010	Wed 0825	CAR2 turning right hit by oncoming CAR1 WBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	201170208	06/02/2011	Sun 0621	CAR1 SBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady amber light, attention diverted by passengers	Dry	Twilight	Fine	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	201173852	24/12/2011	Sat 1151	CAR1 WBD on BEALEY AVENUE hit rear end of CAR2 stop/slow for signals	CAR1 following too closely	Dry	Bright	Fine	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	201173892	24/12/2011	Sat 1720	CAR2 turning right hit by oncoming CAR1 WBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	201222587	25/08/2012	Sat 1431	CAR1 EBD on BEALEY AVENUE hit rear end of CAR2 stop/slow for queue	CAR1 following too closely CAR2 following too closely	Dry	Bright	Fine	X Type Junction Traffic Signal	1
BEALEY AVENUE	I COLOMBO ST	201321710	09/05/2013	Thu 1308	SUV1 EBD on BEALEY AVENUE hit obstruction, SUV1 hit Obj thrown/dropped	ENV: road surface under construction or maintenance	Dry	Bright	Fine	X Type Junction Traffic Signal	1
BEALEY AVENUE	I COLOMBO ST	201324136	16/11/2013	Sat 1153	CAR1 WBD on BEALEY AVENUE lost control; went off road to left	CAR1 too far left/right	Dry	Bright	Fine	X Type Junction Traffic Signal	1
BEALEY AVENUE	I COLOMBO ST	201445977	13/10/2014	Mon 0730	SUV1 SBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light, failed to notice traffic lights	Dry	Bright	Fine	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	201447757	21/10/2014	Tue 2150	SUV1 WBD on BEALEY AVENUE changing lanes/overtaking to right hit VAN2	SUV1 didnt see/look behind when changing lanes, position or direction	Dry	Dark	Fine	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	201449774	25/12/2014	Thu 0845	CAR2 turning right hit by oncoming CAR1 WBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Overcast	Fine	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2871681	08/05/2008	Thu 2000	CAR1 WBD on BEALEY AVENUE hit rear end of CAR2 stop/slow for signals	CAR1 following too closely	Dry	Dark	Light Rain	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2522319	11/07/2005	Mon 1900	CAR1 WBD on BEALEY AVENUE hit PEDESTRIAN2 (Age 65) crossing road from right side	CAR1 didnt see/look when required to give way to ped	Dry	Dark	Fine	X Type Junction Traffic Signal	2
BEALEY AVENUE	I COLOMBO ST	2572021	10/07/2005	Sun 1030	CAR2 turning right hit by oncoming CAR1 EBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Wet	Bright	Fine	X Type Junction Traffic Signal	
BEALEY AVENUE	I COLOMBO ST	2521584	08/04/2005	Fri 0010	CAR1 EBD on BEALEY AVENUE hit rear end of CAR2 stop/slow for signals	CAR1 alcohol test above limit or test refused, failed to notice car slowing	Wet	Dark	Light Rain	X Type Junction Traffic Signal	1
BEALEY AVENUE	I COLOMBO ST	2521739	03/05/2005	Tue 0850	CAR2 turning right hit by oncoming CAR1 EBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when visibility obstructed by other vehicles	Wet	Overcast	Light Rain	X Type Junction Traffic Signal	1
CANON ST	I COLOMBO ST	2772116	16/06/2007	Sat 1540	CAR1 NBD on COLOMBO ST swinging wide hit CAR2 head on	CAR1 too far left/right, inattentive	Dry	Bright	Fine	X Type Junction Stop Sign	
COLOMBO ST	50N BEALEY AVENUE	201443784	11/09/2014	Thu 1357	CAR1 NBD on COLOMBO ST lost control but did not leave the road, CAR1 hit Parked Vehicle, CAR2 hit Parked Vehicle	CAR1 too fast on straight, lost control, new driver showed inexperience	Dry	Bright	Fine	Unknown N/A	
COLOMBO ST	50N BEALEY AVENUE	2770777	06/04/2007	Fri 0415	CAR1 NBD on COLOMBO ST lost control; went off road to left, CAR1 hit Fence, Parked Vehicle	CAR1 too far left/right, attention diverted by cell phone	Dry	Dark	Fine	Unknown N/A	

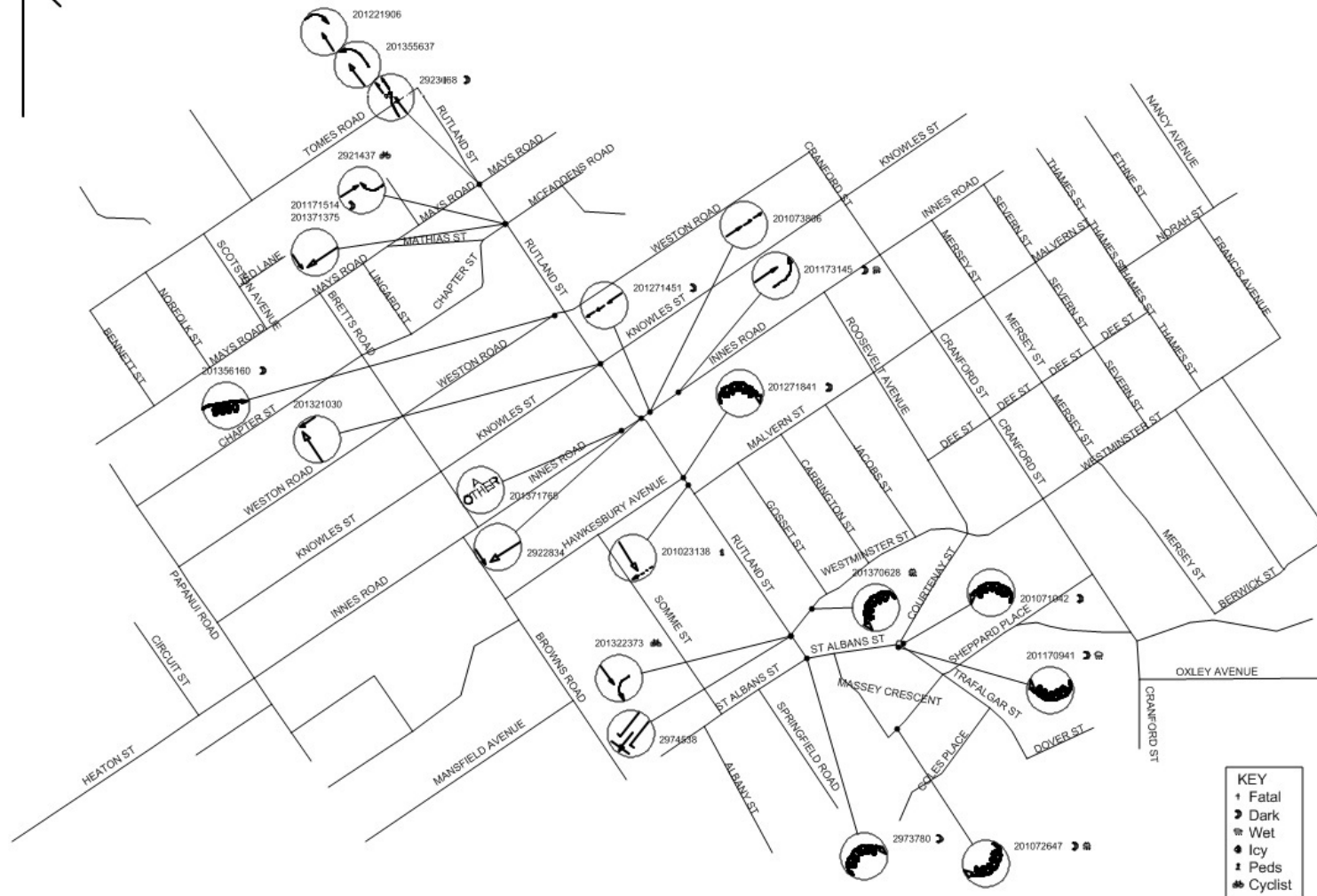
First Street	D Second street	Crash	Date	Day Time	Description of Events	Crash Factors	Road	Natural	Weather	Junction	Cntrl	Tot Inj
	I or landmark	Number						Light				F S M
	Distance R		DD/MM/YYYY	DDD HHMM		(ENV = Environmental factors)						A E I T R N
COLOMBO ST	60N BEALEY AVENUE	201270134	29/01/2012	Sun 0800	CAR1 NBD on COLOMBO ST lost control turning right on right hand bend	CAR1 alcohol suspected, too fast entering corner, lost control when turning ENV: entering or leaving private house / farm	Wet	Dark	Light Rain	Driveway	Nil	
COLOMBO ST	I BEALEY AVENUE	2822066	23/05/2008	Fri 2344	CAR2 turning right hit by oncoming CAR1 WBD on BEALEY AVENUE	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction, new driver showed inexperience	Wet	Dark	Heavy Rain	X Type Junction	Traffic Signal	1
COLOMBO ST	I BEALEY AVENUE	2674600	13/12/2006	Wed	CAR1 NBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 did not stop at steady red light	Dry	Overcast	Fine	X Type Junction	Traffic Signal	
COLOMBO ST	I BEALEY AVENUE	2774712	22/12/2007	Sat 0945	CAR1 SBD on COLOMBO ST hit rear end of CAR2 stop/slow for signals	CAR1 following too closely, failed to notice car slowing CAR2 following too closely	Dry	Overcast	Fine	X Type Junction	Traffic Signal	
COLOMBO ST	I BEALEY AVENUE	2821270	05/02/2008	Tue 1820	CAR2 turning right hit by oncoming CYCLIST1 (Age 32) NBD on COLOMBO ST	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	X Type Junction	Traffic Signal	1
COLOMBO ST	I BEALEY AVENUE	2770972	09/03/2007	Fri 2300	CAR2 turning right hit by oncoming CAR1 NBD on COLOMBO ST	CAR2 failed to give way when turning to non-turning traffic, didnt see/look when required to give way to traffic from another direction	Dry	Dark	Fine	X Type Junction	Traffic Signal	
COLOMBO ST	I BEALEY AVENUE	201021583	16/04/2010	Fri 1515	CAR1 NBD on COLOMBO ST turning right hit PEDESTRIAN2 (Age 35) crossing BEALEY AVENUE from right	CAR1 failed to give way when turning at signals to ped	Dry	Bright	Fine	X Type Junction	Traffic Signal	1
COLOMBO ST	I BEALEY AVENUE	2922646	19/08/2009	Wed 1531	CAR1 SBD on COLOMBO ST hit rear end of TAXI2 stop/slow for signals	CAR1 following too closely, failed to notice car slowing	Dry	Bright	Fine	X Type Junction	Traffic Signal	1
COLOMBO ST	50N CANON ST	201073165	08/09/2010	Wed 1558	CAR1 SBD on COLOMBO ST hit parked veh, CAR1 hit Parked Vehicle	CAR1 inattentive	Dry	Overcast	Fine	Unknown	N/A	
COLOMBO ST	120N CANON ST	201020022	05/05/2010	Wed 1912	CAR1 NBD on COLOMBO ST hit parked veh, CAR1 hit Fence, House Or Bldg, Parked Vehicle	CAR1 too far left/right	Dry	Dark	Fine	Unknown	N/A	1
COLOMBO ST	40S CANON ST	2523171	17/11/2005	Thu 1345	CAR1 NBD on COLOMBO ST sideswiped by CAR2 turning left, CAR1 hit Parked Vehicle	CAR1 overtaking on left, failed to notice indication of vehicle in front ENV: entering or leaving private house / farm	Dry	Overcast	Fine	Driveway	N/A	1
COLOMBO ST	I CANON ST	201413131	01/05/2014	Thu 1642	CAR1 EBD on CANON ST hit VAN2 crossing at right angle from right	CAR1 did not stop at stop sign	Dry	Bright	Fine	X Type Junction	Stop Sign	1
COLOMBO ST	I CANON ST	201415718	31/08/2014	Sun 0855	CYCLIST1 (Age 49) SBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	Dry	Overcast	Fine	X Type Junction	Stop Sign	1
COLOMBO ST	I CANON ST	201325293	28/11/2013	Thu 1842	MOPED1 NBD on COLOMBO ST lost control; went off road to left, MOPED1 hit Kerb	MOPED1 lost control avoiding another vehicle, suddenly swerved to avoid vehicle	Dry	Overcast	Fine	X Type Junction	Stop Sign	1
COLOMBO ST	30S EDGEWARE ROAD	201072528	27/05/2010	Thu 0530	CAR1 SBD on COLOMBO ST hit parked veh, CAR1 hit Parked Vehicle	CAR1 too far left/right	Dry	Dark	Light Rain	Unknown	N/A	
COLOMBO ST	50S EDGEWARE ROAD	2822372	21/06/2008	Sat 1955	CAR1 SBD on COLOMBO ST hit PEDESTRIAN2 (Age 23) crossing road from left side	PEDESTRIAN2 crossing road, running heedless of traffic	Dry	Dark	Fine	Unknown	N/A	1
COLOMBO ST	70S EDGEWARE ROAD	2621424	18/03/2006	Sat 2255	CAR1 NBD on COLOMBO ST hit PEDESTRIAN2 (Age 16) crossing road from left side	PEDESTRIAN2 Intoxicated non-driver, crossing road, running heedless of traffic	Dry	Dark	Fine	Unknown	N/A	1
COLOMBO ST	90S EDGEWARE ROAD	201223089	18/10/2012	Thu 1758	SUV1 SBD on COLOMBO ST hit rear of CAR2 turning right from left side	CAR2 turned right from left side of road ENV: entering or leaving other commercial	Dry	Bright	Fine	Driveway	Nil	1

First Street	D Second street I or landmark Distance R	Crash Number	Date DD/MM/YYYY	Day Time DDD HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road	Natural Light	Weather	Junction	Cntrl	Tot Inj F S M A E I T R N
COLOMBO ST	I EDGEWARE ROAD	201270433	18/02/2012	Sat 1905	CAR1 NBD on COLOMBO ST hit parked veh, CAR1 hit Parked Vehicle	CAR1 too fast on straight, too far left/right	Dry	Overcast	Fine	T Type	Give Way Sign	
COLOMBO ST	30S PURCHAS ST	2873832	12/08/2008	Tue 1634	CAR1 SBD on COLOMBO ST hit CAR2 headon on straight, CAR1 hit Parked Vehicle, CAR2 hit Parked Vehicle	CAR1 alcohol test above limit or test refused, too far left/right, new driver showed inexperience	Dry	Bright	Fine	Unknown	N/A	
COLOMBO ST	100S PURCHAS ST	201172754	26/08/2011	Fri 1600	CAR1 SBD on COLOMBO ST hit Parked Vehicle while manoeuvring	CAR1 misjudged speed of own vehicle	Dry	Bright	Fine	Unknown	N/A	
COLOMBO ST	I PURCHAS ST	201356171	11/11/2013	Mon 0850	CAR1 NBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign	Dry	Overcast	Fine	X Type	Stop Sign	
COLOMBO ST	I PURCHAS ST	201272080	17/07/2012	Tue 1529	CAR1 SBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	Dry	Bright	Fine	X Type	Stop Sign	
COLOMBO ST	I PURCHAS ST	201271951	03/07/2012	Tue 1704	CAR1 SBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, inattentive: failed to notice intersection or its stop/give way control	Wet	Dark	Heavy Rain	X Type	Stop Sign	
COLOMBO ST	I PURCHAS ST	201222642	15/06/2012	Fri 1713	CAR1 SBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	Wet	Dark	Heavy Rain	X Type	Stop Sign	1
COLOMBO ST	I PURCHAS ST	201222155	06/06/2012	Wed 1435	CAR1 SBD on COLOMBO ST hit CAR2 crossing at right angle from right, CAR1 hit Fence	CAR2 too fast to give way at intersection, did not stop at stop sign, new driver showed inexperience ENV: road slippery (snow or hail), snow	Ice/Snow	Overcast	Snow	X Type	Stop Sign	1
COLOMBO ST	I PURCHAS ST	201122590	20/09/2011	Tue 0715	CAR1 EBD on PURCHAS ST hit BUS2 crossing at right angle from right	CAR1 did not stop at stop sign, inattentive: failed to notice intersection or its stop/give way control	Wet	Bright	Fine	X Type	Stop Sign	1
COLOMBO ST	I PURCHAS ST	2622372	28/06/2006	Wed 1554	CAR1 NBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, inattentive: failed to notice intersection or its stop/give way control ENV: dazzling sun	Dry	Bright	Fine	X Type	Stop Sign	1
COLOMBO ST	I PURCHAS ST	2673762	27/10/2006	Fri 1550	CAR1 NBD on COLOMBO ST hit CAR2 merging from the left	CAR2 failed to give way at stop sign	Dry	Bright	Fine	X Type	Stop Sign	
COLOMBO ST	I PURCHAS ST	2674732	20/12/2006	Wed 1945	CAR1 SBD on COLOMBO ST lost control turning right on right hand bend	CAR1 alcohol suspected, too fast entering corner, lost control when turning ENV: road slippery (rain)	Wet	Twilight	Light Rain	X Type	Stop Sign	
COLOMBO ST	I PURCHAS ST	2872355	09/07/2008	Wed 2219	CAR1 WBD on PURCHAS ST missed inters or end of road, CAR1 hit Fence	CAR1 alcohol suspected, too fast on straight, new driver showed inexperience, evading enforcement	Dry	Dark	Fine	X Type	Stop Sign	
COLOMBO ST	I PURCHAS ST	2822350	21/06/2008	Sat 0054	CAR1 NBD on COLOMBO ST hit CAR2 merging from the left	CAR2 did not stop at stop sign, didnt see/look when required to give way to traffic from another direction	Dry	Dark	Fine	X Type	Stop Sign	2
COLOMBO ST	I PURCHAS ST	2871281	23/04/2008	Wed 1330	CAR1 WBD on PURCHAS ST hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign, inattentive: failed to notice intersection or its stop/give way control	Dry	Bright	Fine	X Type	Stop Sign	
COURTENAY ST	15N TRAFALGAR ST	201411164	04/01/2014	Sat 2235	MOTOR CYCLE1 SBD on COURTENAY ST lost control but did not leave the road	MOTOR CYCLE1 alcohol test below limit, too fast on straight, lost control under heavy braking, evading enforcement	Dry	Dark	Fine	Unknown	N/A	1
DOVER ST	I TRAFALGAR ST	201370651	30/03/2013	Sat 1950	CAR1 SBD on TRAFALGAR ST lost control turning right, CAR1 hit Parked Vehicle on right hand bend	CAR1 alcohol test above limit or test refused, attention diverted by passengers	Dry	Dark	Fine	T Type	Nil Junction	

First Street	D Second street I or landmark Distance R	Crash Number	Date DD/MM/YYYY	Day Time DDD HHMM	Description of Events	Crash Factors (ENV = Environmental factors)	Road 	Natural Light	Weather	Junction	Cntrl	Tot Inj F S M A E I T R N
EDGEWARE ROAD	15E COLOMBO ST	2921470	12/03/2009	Thu 1224	CAR1 EBD on EDGEWARE ROAD hit rear end of CAR2 stop/slow for PEDESTRIAN	CAR1 following too closely, failed to notice car slowing	Dry	Bright	Fine	Unknown	N/A	1
EDGEWARE ROAD	15E COLOMBO ST	2921961	10/01/2009	Sat 1057	CAR1 EBD on EDGEWARE ROAD hit PEDESTRIAN2 (Age 53) crossing road from right side	CAR1 failed to give way to ped on a xing	Dry	Overcast	Fine	Unknown	N/A	1
EDGEWARE ROAD	I COLOMBO ST	201418838	21/11/2014	Fri 1922	MOTOR CYCLE1 EBD on EDGEWARE ROAD hit CAR2 U-turning from same direction of travel	CAR2 alcohol test below limit, didnt see/look behind when changing lanes, position or direction	Dry	Bright	Fine	T Type Junction	Stop Sign	1
EDGEWARE ROAD	I COLOMBO ST	2872245	06/07/2008	Sun 0010	CAR1 NBD on COLOMBO ST lost control turning right, CAR1 hit Kerb on right hand bend	CAR1 alcohol test above limit or test refused, suddenly braked ENV: road slippery (rain)	Wet	Dark	Light Rain	T Type Junction	Give Way Sign	
EDGEWARE ROAD	I COLOMBO ST	201221590	23/03/2012	Fri 0820	CYCLIST1 (Age 28) WBD on EDGEWARE ROAD hit CAR2 turning right onto EDGEWARE ROAD from the left	CAR2 failed to give way at give way sign, didnt see/look when required to give way to traffic from another direction	Dry	Overcast	Fine	T Type Junction	Give Way Sign	1
PURCHAS ST	I COLOMBO ST	201221209	14/02/2012	Tue 1752	CAR1 NBD on COLOMBO ST hit CAR2 crossing at right angle from right	CAR2 did not stop at stop sign, inattentive: failed to notice intersection or its stop/give way control	Wet	Overcast	Mist	X Type Junction	Stop Sign	1
ST ALBANS ST	I COURTENAY ST	2770962	25/03/2007	Sun 0312	CAR1 SBD on COURTENAY ST lost control turning right, CAR1 hit Tree on right hand bend	CAR1 alcohol test above limit or test refused, too fast entering corner, cutting corner at intersection, lost control when turning	Dry	Dark	Fine	T Type Junction	Give Way Sign	
ST ALBANS ST	I TRAFALGAR ST	201170941	17/04/2011	Sun 1948	CAR1 WBD on TRAFALGAR ST lost control turning right, CAR1 hit Parked Vehicle on right hand bend	CAR1 alcohol test below limit, lost control when turning, new driver showed inexperience	Wet	Dark	Light Rain	Roundabo	Give Way Sign	
TRAFALGAR ST	20S COLES PLACE	2821004	06/01/2008	Sun 1330	CAR1 SBD on TRAFALGAR ST lost control turning right, CAR1 hit Parked Vehicle, CAR2 hit Post Or Pole on right hand bend	CAR1 too far left/right, attention diverted by passengers	Dry	Bright	Fine	Unknown	N/A	1
TRAFALGAR ST	I COURTENAY ST	201071042	09/04/2010	Fri 2340	CAR1 WBD on COURTENAY ST lost control turning left, CAR1 hit Parked Vehicle	CAR1 alcohol test above limit or test refused, lost control when turning, new driver showed inexperience	Dry	Dark	Fine	T Type Junction	Nil	
TRAFALGAR ST	20S DOVER ST	201273089	04/11/2012	Sun 1900	CAR1 SBD on TRAFALGAR ST lost control turning left	CAR1 alcohol test above limit or test refused, lost control when turning	Dry	Bright	Fine	Unknown	N/A	
TRAFALGAR ST	70S DOVER ST	201448902	21/11/2014	Fri 1640	SUV1 NBD on TRAFALGAR ST lost control turning left, SUV1 hit Kerb, Parked Vehicle, Tree	SUV1 illness with no warning (eg heart attack)	Dry	Overcast	Fine	Unknown	N/A	
TRAFALGAR ST	I MASSEY CRESCENT	2771958	06/06/2007	Wed 0148	CAR1 NBD on TRAFALGAR ST lost control: went off road to left, CAR1 hit Kerb, Traffic Sign	CAR1 too fast on straight, lost control, new driver showed inexperience	Dry	Dark	Fine	X Type Junction	Give Way Sign	



Collision Diagram
Trafalgar to Toms



CRASH ROAD	CRASH DIS	CRASH DIR	SIDE ROAD	CRASH ID	CRASH DATE	CRASH DO	CRASH TIME	MVMT DESCR	CAUSES	ROAD WET	LIGHT	WTHRa	JUNC TYPE	TRAF CTRL	CRASH FATAL CNT	CRASH SEV CNT	CRASH MIN CNT
RUTLAND ST		I	CHAPTER ST	2921437	10/03/2009	Tue	1519	SUV2 turning right hit by oncoming CYCLIST1 (Age 12)EBD on CHAPTER ST	SUV2 failed to give way at stop sign, didnt see/look when required to give way to traffic from another direction	Dry	Bright Sun	Fine	X Type Junction	Stop Sign	0	0	1
TRAFALGAR ST		I	COURTENAY ST	201071042	9/04/2010	Fri	2340	CAR1 WBD on COURTENAY ST lost control turning left, CAR1 hit Parked Vehicle	CAR1 alcohol test above limit or test refused, lost control when turning, new driver showed inexperience	Dry	Dark	Fine	T Type Junction	Nil	0	0	0
RUTLAND ST		I	HAWKESBURY AVENUE	201271841	20/04/2012	Fri	144	CAR1 EBD on HAWKESBURY AVENUE lost control turning right, CAR1 hit Post Or Pole on right hand bend	CAR1 alcohol suspected, too fast entering corner, lost control when turning	Dry	Dark	Fine	T Type Junction	Nil	0	0	0
RUTLAND ST		I	KNOWLES ST	201321030	4/01/2013	Fri	1418	CAR1 NBD on RUTLAND ST hit VAN2 crossing at right angle from right	VAN2 did not stop at stop sign	Dry	Bright Sun	Fine	X Type Junction	Stop Sign	0	0	1
RUTLAND ST	20 N		MALVERN ST	201023138	3/11/2010	Wed	1646	SUV1 SBD on RUTLAND ST hit PEDESTRIAN crossing road from left side	PEDESTRIAN2 crossing road, running heedless of traffic, pedestrian unsupervised child	Dry	Bright Sun	Fine	Unknown	N/A	0	0	1
RUTLAND ST		I	MAYS ROAD	2923668	14/12/2009	Mon	315	CAR1 NBD on RUTLAND ST changing lanes/overtaking to right hit MQPED2	CAR1 intentional collision	Dry	Dark	Fine	X Type Junction	Give Way Sign	0	0	1
RUTLAND ST		I	MAYS ROAD	201355637	18/10/2013	Fri	1630	CAR1 NBD on RUTLAND ST sideswiped by SUV2 turning left	SUV2 turned left from incorrect lane, didnt see/look behind when changing lanes, position or direction	Dry	Overcast	Fine	X Type Junction	Stop Sign	0	0	0
RUTLAND ST		I	MCFADDENS ROAD	201171514	8/06/2011	Wed	2040	CAR1 WBD on MCFADDENS ROAD hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign, inattentive: failed to notice intersection or its stop/give way control	Dry	Dark	Fine	X Type Junction	Stop Sign	0	0	0
INNES ROAD	20 E		RUTLAND ST	201271451	24/05/2012	Thu	1750	CAR1 WBD on INNES ROAD hit rear end of CAR2 stop/slow for queue	CAR1 following too closely, failed to notice car slowing CAR2 following too closely	Dry	Twilight	Fine	Unknown	N/A	0	0	0
INNES ROAD	20 E		RUTLAND ST	201073806	15/11/2010	Mon	1350	TRUCK1 EBD on INNES ROAD hit rear end of CAR2 stop/slow for queue	TRUCK1 following too closely	Dry	Bright Sun	Fine	Unknown	N/A	0	0	0
INNES ROAD	80 E		RUTLAND ST	201173145	19/09/2011	Mon	1937	CAR1 EBD on INNES ROAD sideswiped by CAR2 turning left	CAR1 overtaking on left, misjudged intentions of another party ENV: entering or leaving private house / farm	Wet	Dark	Light Rain	Driveway	Nil	0	0	0
INNES ROAD	40 W		RUTLAND ST	201371765	25/06/2013	Tue	840	CAR1 EBD on INNES ROAD overtaking SUV2	CAR1 misjudged speed of own vehicle	Dry	Bright Sun	Fine	Unknown	N/A	0	0	0
INNES ROAD		I	RUTLAND ST	2922834	23/08/2009	Sun	1310	CAR1 WBD on INNES ROAD hit CAR2 crossing at right angle from right	CAR1 did not stop at steady red light, failed to notice traffic lights	Dry	Overcast	Fine	X Type Junction	Traffic Signal	0	0	1
MAYS ROAD		I	RUTLAND ST	201221906	28/05/2012	Mon	817	CAR1 NBD on RUTLAND ST hit CAR2 turning right onto RUTLAND ST from the left	CAR2 failed to give way at stop sign	Dry	Bright Sun	Fine	X Type Junction	Stop Sign	0	0	1
MCFADDENS ROAD		I	RUTLAND ST	201371375	9/05/2013	Thu	1210	CAR1 WBD on MCFADDENS ROAD hit CAR2 crossing at right angle from right	CAR1 failed to give way at stop sign	Dry	Bright Sun	Fine	X Type Junction	Stop Sign	0	0	0
ST ALBANS ST		I	RUTLAND ST	2973780	10/09/2009	Thu	2300	CAR1 EBD on ST ALBANS ST lost control turning right, CAR1 hit Fence on right hand bend	CAR1 alcohol test above limit or test refused, lost control when turning, new driver showed inexperience	Dry	Dark	Fine	Roundabout	Give Way Sign	0	0	0
WESTMINSTER ST	60 E		RUTLAND ST	201370628	19/03/2013	Tue	807	CAR1 WBD on WESTMINSTER ST lost control turning left, CAR1 hit Post Or Pole	CAR1 too far left/right, attention diverted by cigarette etc	Wet	Overcast	Light Rain	Unknown	N/A	0	0	0
WESTON ROAD	20 W		RUTLAND ST	201356160	12/11/2013	Tue	0	CAR1 EBD on WESTON ROAD lost control; went off road to right, CAR1 hit Parked Vehicle	CAR1 lost control under heavy braking	Dry	Twilight	Fine	X Type Junction	Give Way Sign	0	0	0
MASSEY CRESCENT	200 S		ST ALBANS ST	201072647	14/08/2010	Sat	2231	CAR1 SBD on MASSEY CRESCENT lost control turning right, CAR1 hit Post Or Pole on right hand bend	CAR1 too fast entering corner, lost control under heavy braking, inexperience ENV: road slippery (rain)	Wet	Dark	Light Rain	Unknown	N/A	0	0	0
ST ALBANS ST		I	TRAFALGAR ST	201170941	17/04/2011	Sun	1948	CAR1 WBD on TRAFALGAR ST lost control turning right, CAR1 hit Parked Vehicle on right hand bend	CAR1 alcohol test below limit, lost control when turning, new driver showed inexperience	Wet	Dark	Light Rain	Roundabout	Give Way Sign	0	0	0
RUTLAND ST		I	WESTMINSTER ST	2974538	28/12/2009	Mon	1608	CAR1 WBD on WESTMINSTER ST missed inters or end of road, CAR1 hit Tree	CAR1 illness with no warning (eg heart attack)	Dry	Overcast	Fine	T Type Junction	Nil	0	0	0
RUTLAND ST		I	WESTMINSTER ST	201322373	20/08/2013	Tue	803	CYCLIST1 (Age 74)SBD on RUTLAND ST hit CAR2 merging from the left	CAR2 failed to give way at give way sign	Dry	Bright Sun	Fine	T Type Junction	Give Way Sign	0	0	1



Appendix B

Engagement notes

Minutes of Meeting

St. Alban School Meeting Minutes

Held 5 June 2014 at 9:30am

at St. Alban School

Present: Hayden Trumper (Beca) HT
Ginnie Warren (St Alban School Principal) GW

Apologies:

Distribution: Hayden Trumper
Ginnie Warren

Item	Action
<p>1 Key Points</p> <ul style="list-style-type: none">HT outlined to GW that Beca has been commissioned by CCC to conduct an initial investigation of a cycleway which run along Trafalgar Street as part of the Major Cycleway Project.GW raised the following concerns with a cycleway on Trafalgar Street:<ul style="list-style-type: none">Any cycleway on Trafalgar Street should be able to be ridden by young children as there are some children who ride to school.The road width is narrow so when traffic wants to pass parked cars they are required to wait for oncoming traffic to clear before proceeding.The current speed humps are ineffective and drivers are speeding on Trafalgar Street. Trafalgar tends to be used as a thoroughfare for other traffic.There is a visibility issue with vehicles exiting Sheppard Place on to Trafalgar Street.Parents tend to drop off their children on Sheppard Place and attempt to park on Sheppard Place. This is due to difficulty accessing Cranford Street from Westminster St.Poor driver behaviour exacerbates problems around parking and access to Sheppard Place. Around 90 parking tickets issued in one week during enforcement on Sheppard Place. The school has attempted to educate parents through the school newsletters. This school has a growing immigrant community making communication regarding driving behaviour difficult.The narrowing around Sheppard Place causes confusion around the give way rules.Parents are encouraged to use the English Park car park on Cranford Street. It is not used as much as hoped as is difficult for parents to get in and out of the car park.The school view the kea crossing as a key point to get children across Trafalgar Street so they run a school crossing before and after school with a person employed to supervise. The kea crossing is currently effective at providing a safe crossing point for students.Children crossing Cranford Street is problematic so they have employed someone to escort children across the road before and after school.	


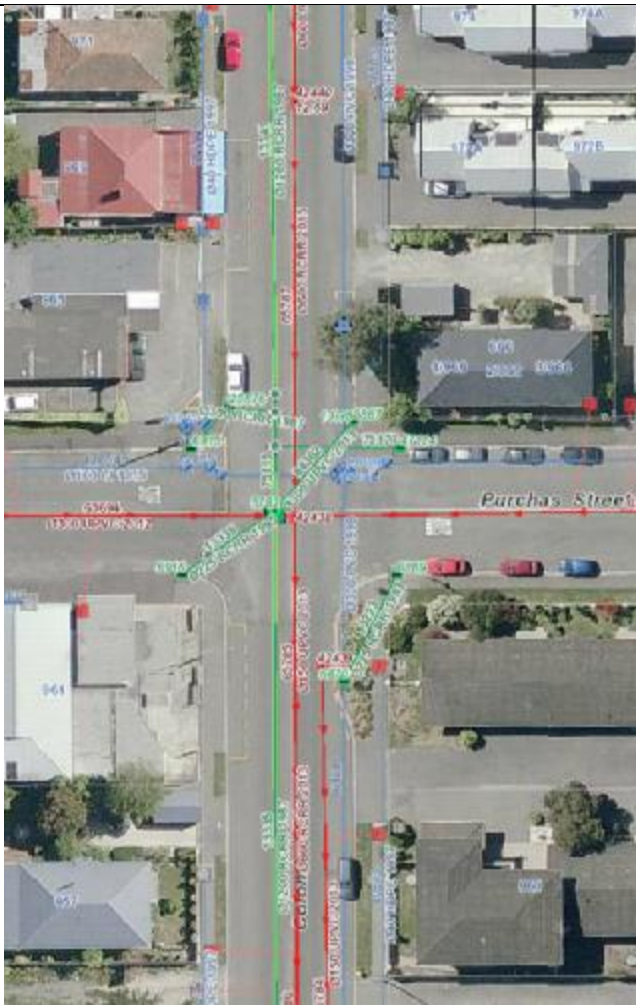
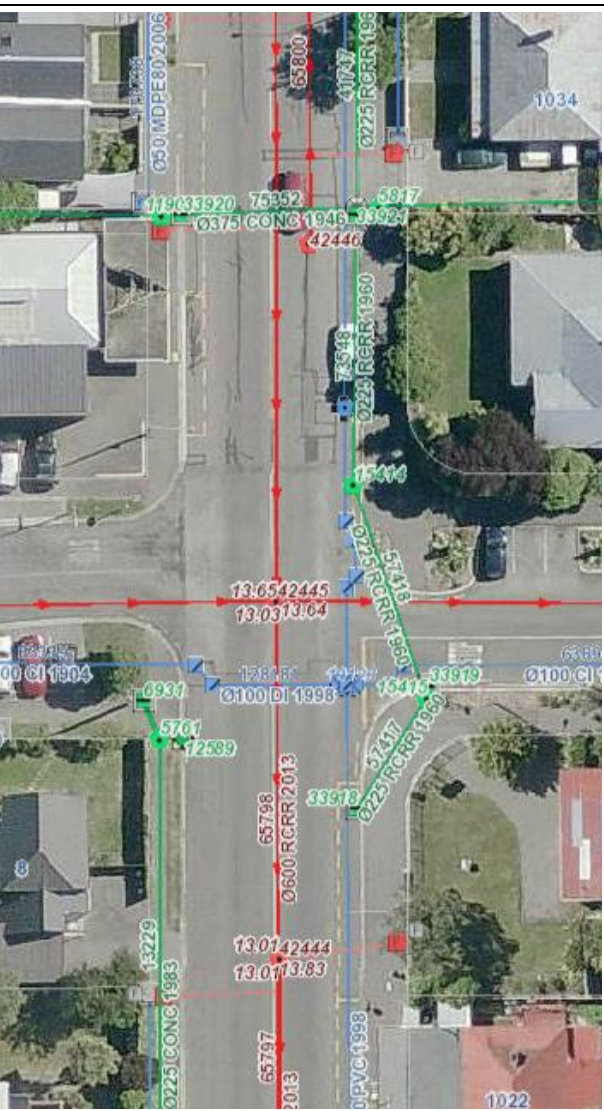
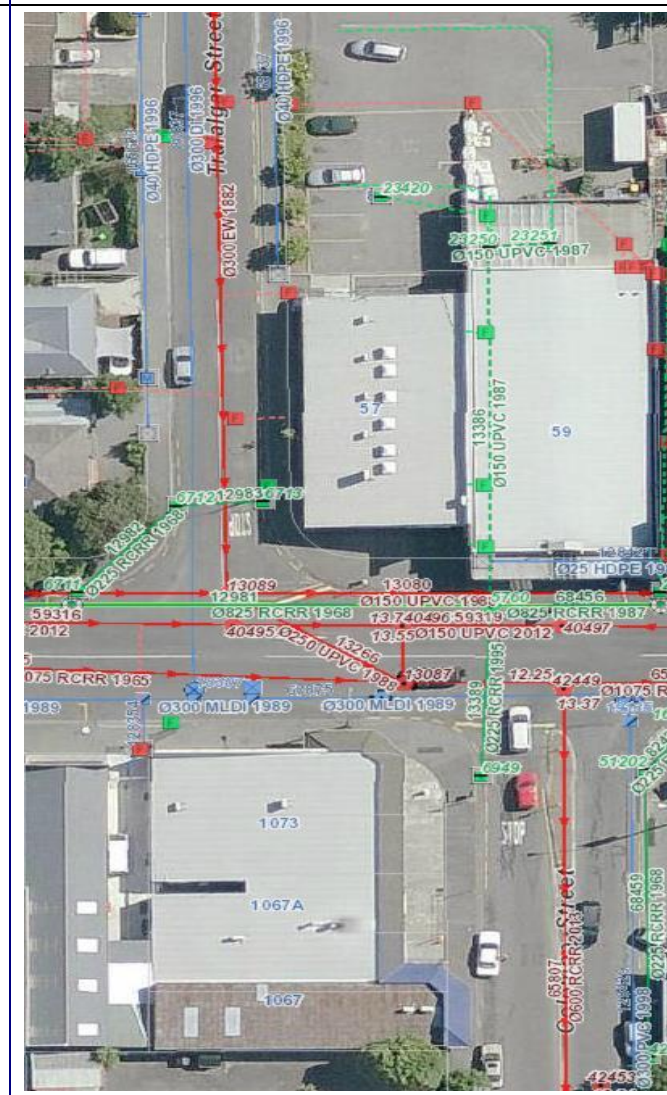
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- | | |
|--|-----------|
| <ul style="list-style-type: none">– The preschool gets staff to park on Trafalgar Street while parents use the on-site parking to pick up and drop off their children.– St. Albans school has made a submission to CCC about the safety of the Roosevelt Ave/Westminster St intersection.■ The on-site parking for the school is usually full with some use of the small English Park car park on Sheppard Place. The tries to keep this car park as free as possible to allow parents to use it.■ GW indicated they feel the footpath on the eastern side of Trafalgar Street is currently wide enough for school children.■ GW indicated some parents do currently park on Massey Crescent and escort their children to school from there.■ GW will relay any concern the Board of Trustees may have to HT so they can be incorporated in the design considerations for the cycleway. | GW |
|--|-----------|
-

Minuted by: Hayden Trumper

Appendix C

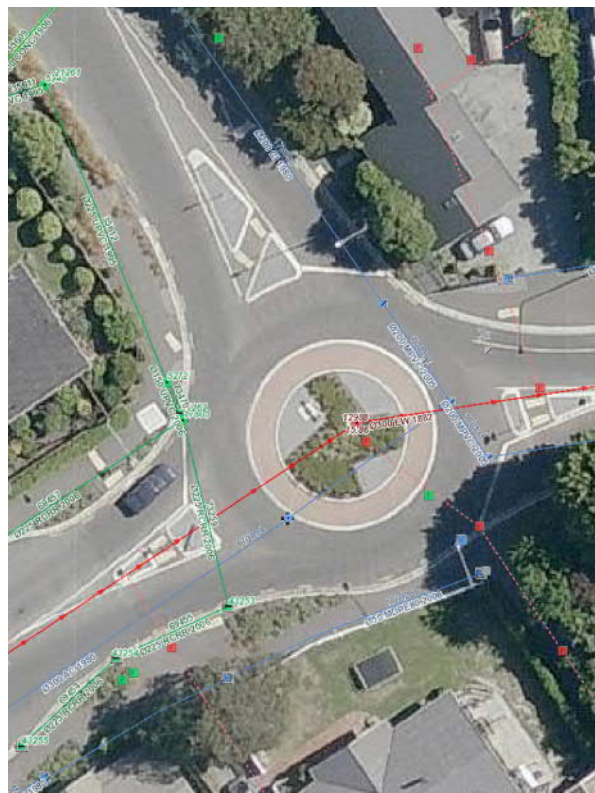
Services and utilities

5.0 Services & Utilities

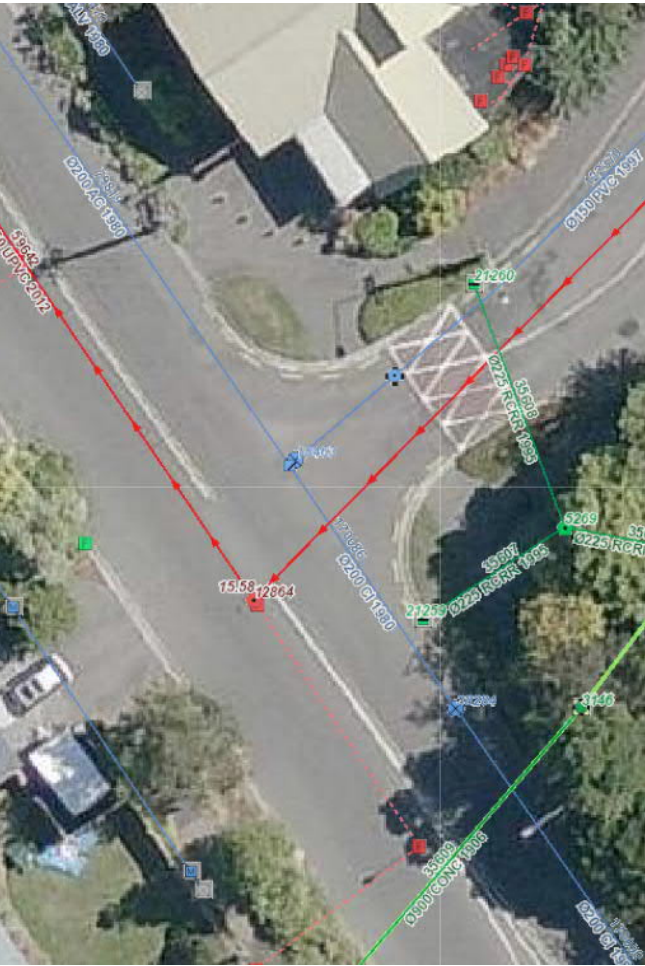
	Bealey Ave - Colombo St Intersection	Colombo - Purchas Street Intersection	Colombo St - Canon St Intersection	Colombo Edgeware Trafalgar Intersection
5.1	 <ul style="list-style-type: none"> • Wastewater gravity mains and laterals (shown in red) • Water Supply mains and sub-mains and laterals (shown in blue) • Stormwater gravity mains and manholes/chamber including connections from sumps (shown in green) 			

Services

St Albans St - Rutland St Intersection



Rutland St - Westminster St Intersection



Rutland St - Malvern St Intersection



Rutland St - Hawkesbury Ave Intersection

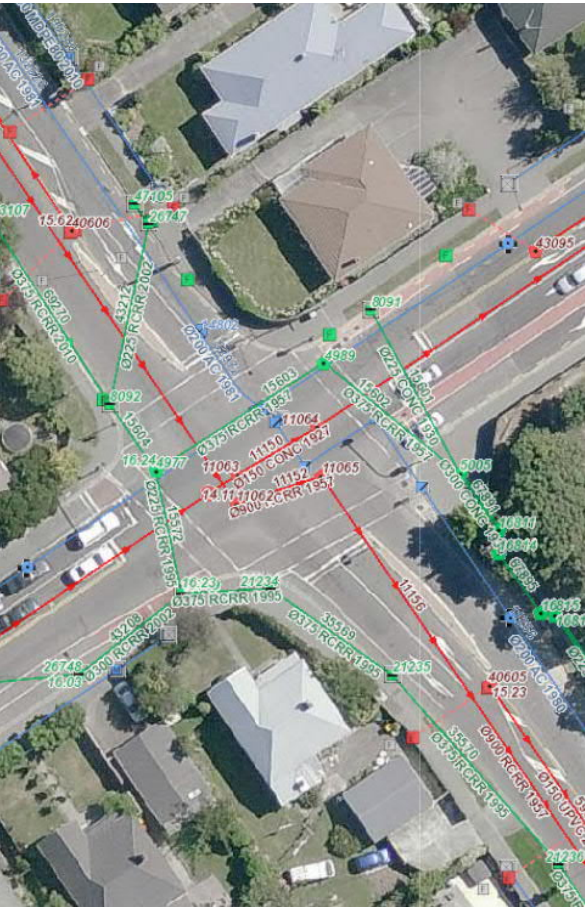


5.1
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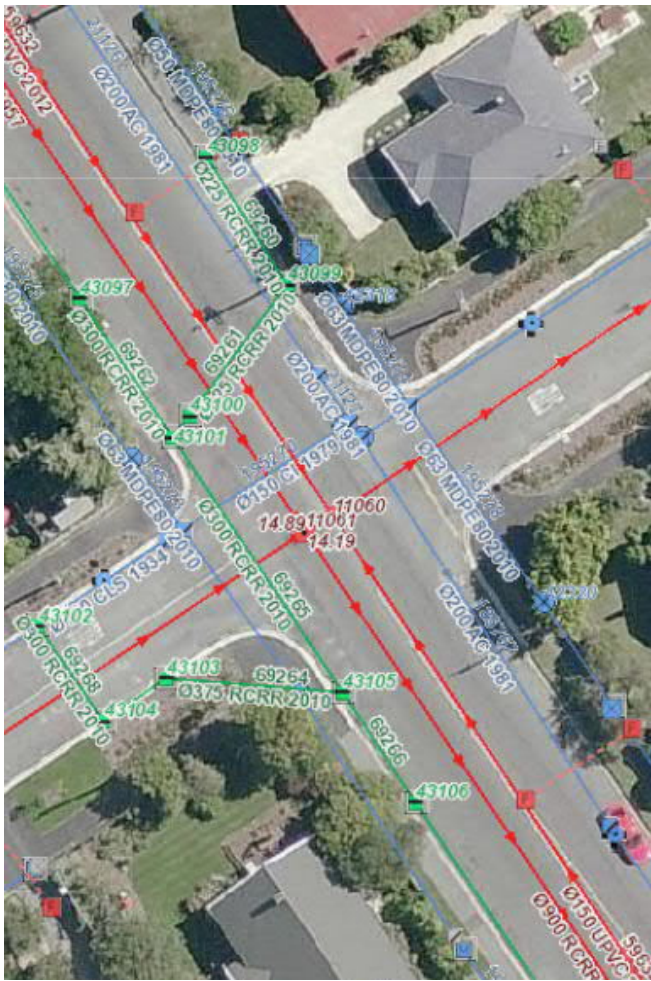
- Wastewater gravity mains and laterals (shown in red)
- Water Supply mains and sub-mains and laterals (shown in blue)
- Stormwater gravity mains and manholes/chamber including connections from sumps (shown in green)

Services

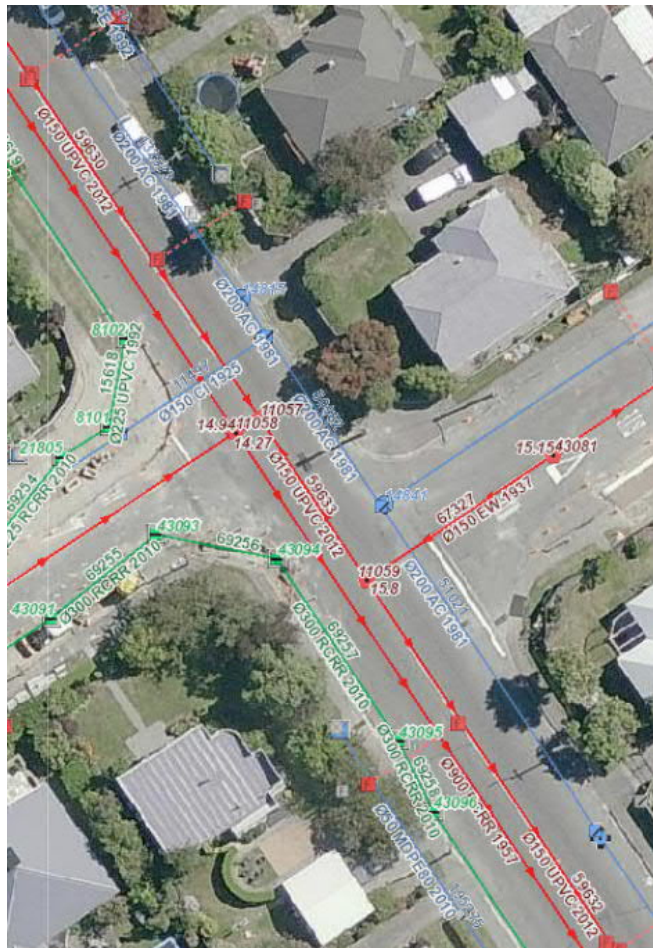
Rutland St - Innes Rd Intersection



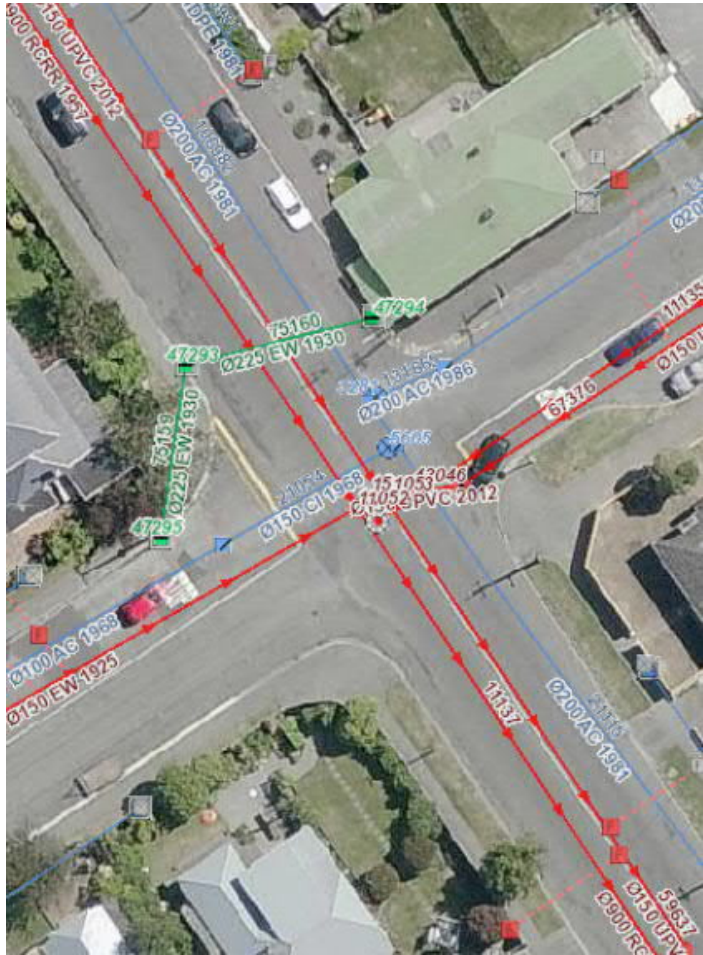
Rutland St - Knowles St Intersection



Rutland St - Weston Rd Intersection

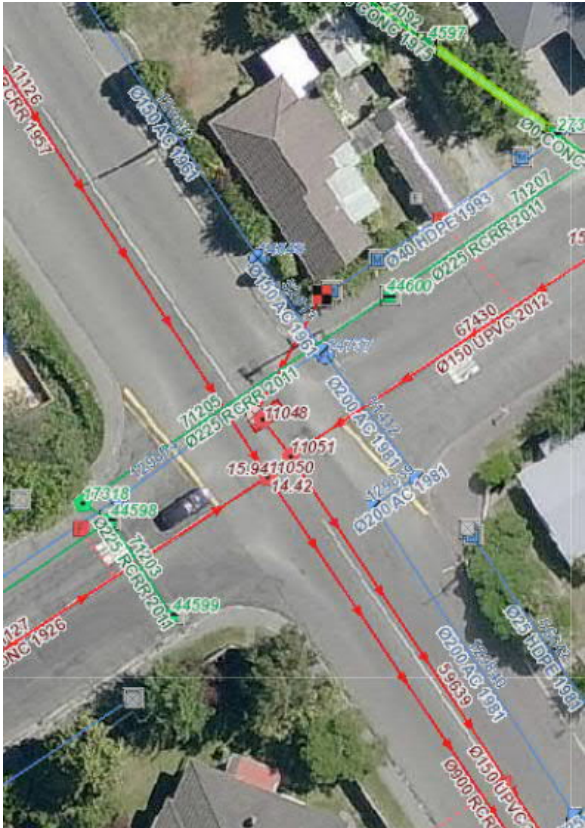
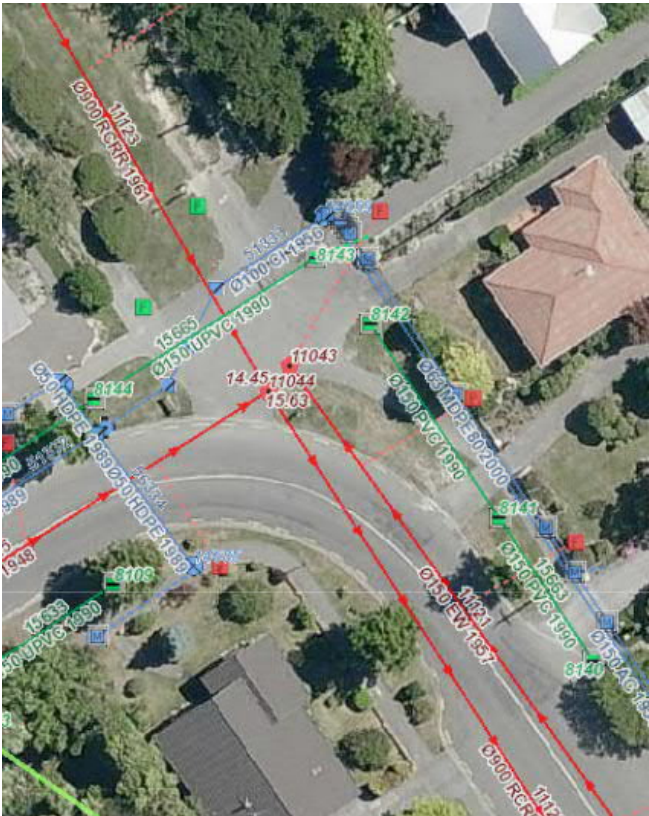






Rutland St - McFaddens/Chapter Intersection




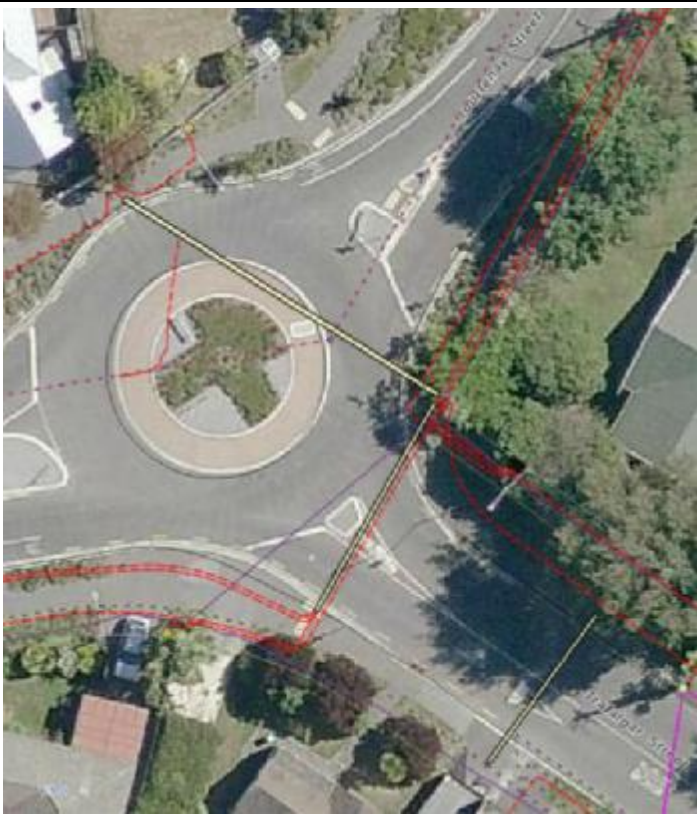


5.1
cont...

- Wastewater gravity mains and laterals (shown in red)
- Water Supply mains and sub-mains and laterals (shown in blue)
- Stormwater gravity mains and manholes/chamber including connections from sumps (shown in green)

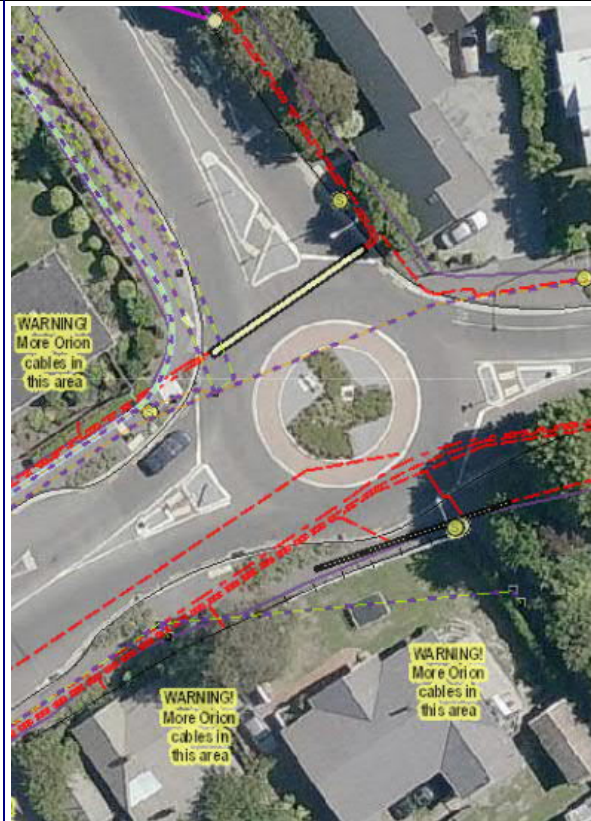
Services				
	Rutland St - Mays Rd Intersection	Rutland St - Tomes Rd Corner		
5.1 cont...	<div></div> <ul style="list-style-type: none">• Wastewater gravity mains and laterals (shown in red)• Water Supply mains and sub-mains and laterals (shown in blue)• Stormwater gravity mains and manholes/chamber including connections from sumps (shown in green)	<div></div> <p>Route finishes at this point</p>		

Utilities				
	Bealey – Colombo St	Colombo Purchas Street	Colombo Canon St	Colombo Edgeware Trafalgar
5.2		<div><ul style="list-style-type: none">• Orion overhead power cables and infrastructure above (shown in purple)• Orion underground power cables (shown in red)• Orion ducts (shown in yellow in black)• Chorus Telecommunication Cables (shown in mauve/yellow stripes)• Enable fibre optic cables or ducts (shown mauve)• Overhead Lighting</div>		

Utilities				
	Trafalgar St- Dover St Intersection	Trafalgar St- Coles PI Intersection	Trafalgar St Massey Cr – Shepard PI Intersection	Trafalgar St – St Albans – Courtenay St Intersection
5.2 cont..		 <ul style="list-style-type: none">• Orion overhead power cables and infrastructure above (shown in purple)• Orion underground power cables (shown in red)• Orion ducts (shown in yellow in black)• Chorus Telecommunication Cables (shown in mauve/yellow stripes)• Enable fibre optic cables or ducts (shown mauve)• Lighting on Existing Power Poles		

Utilities

St Albans St - Rutland St Intersection

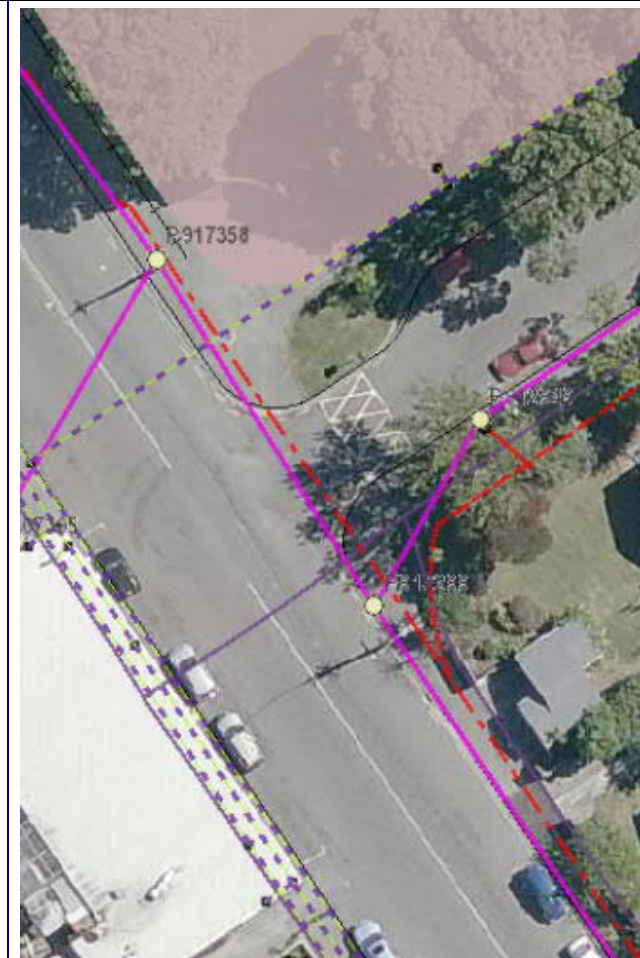


- Orion overhead power cables and infrastructure above (shown in purple)
- Orion underground power cables (shown in red)
- Orion ducts (shown in yellow in black)
- Chorus Telecommunication Cables (shown in mauve/yellow stripes)
- Enable fibre optic cables or ducts (shown mauve)
- Overhead Lighting

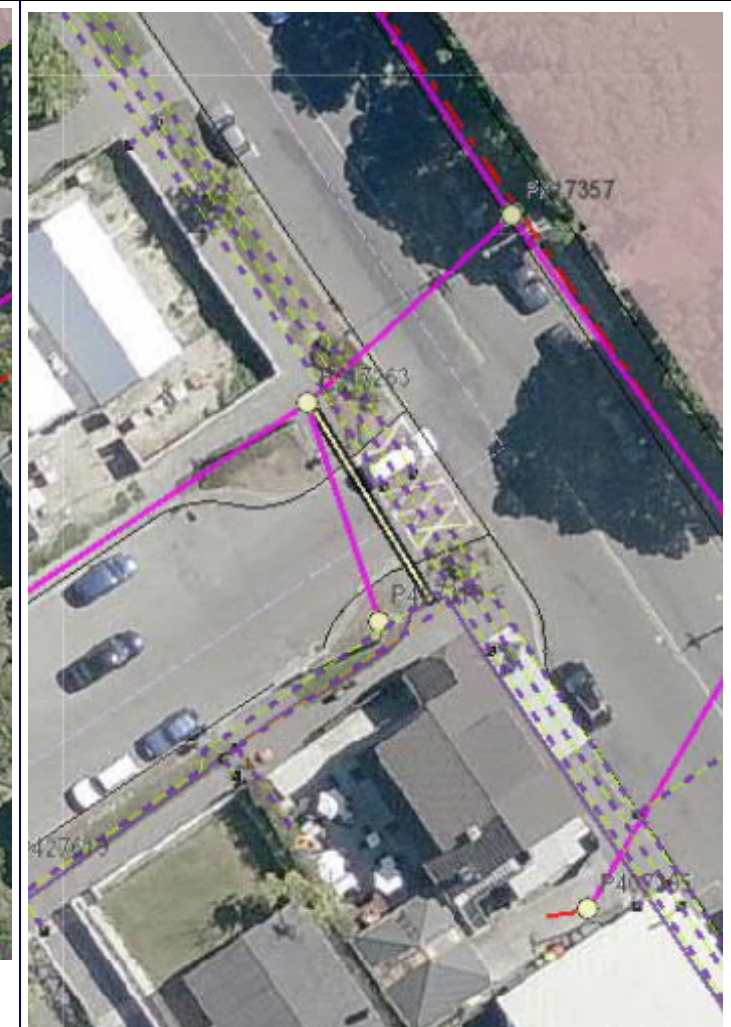
Rutland St - Westminster St Intersection



Rutland St - Malvern St Intersection



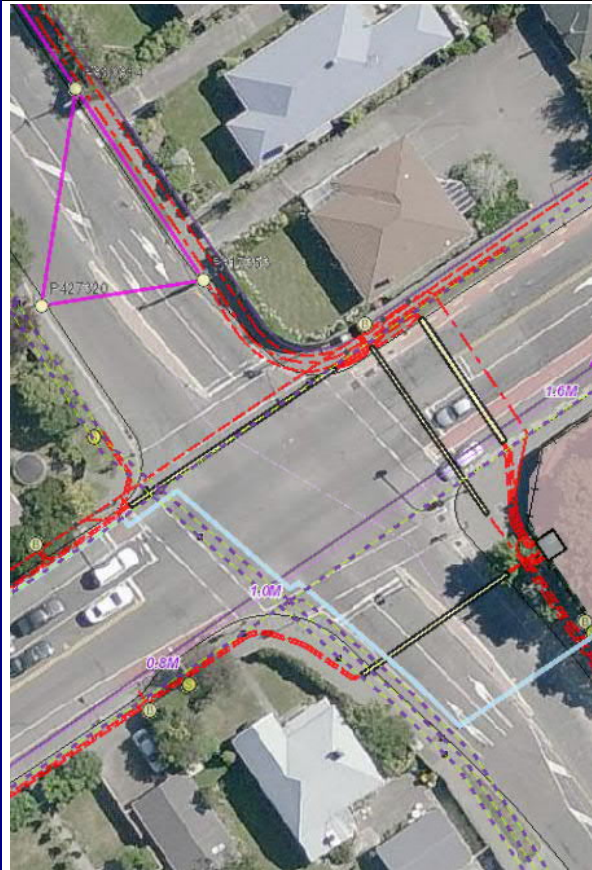
Rutland St - Hawkesbury Ave Intersection



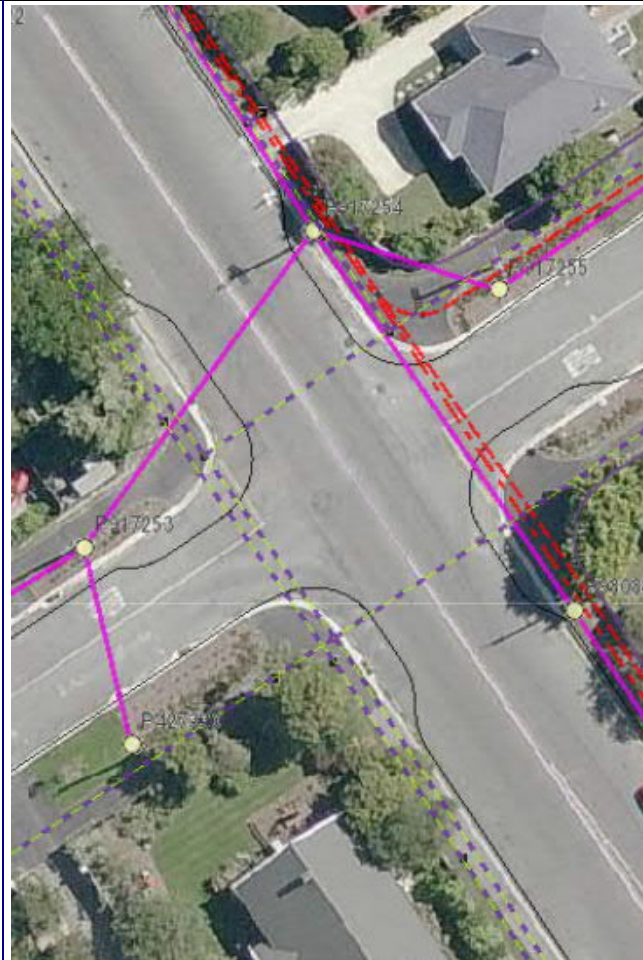
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Utilities

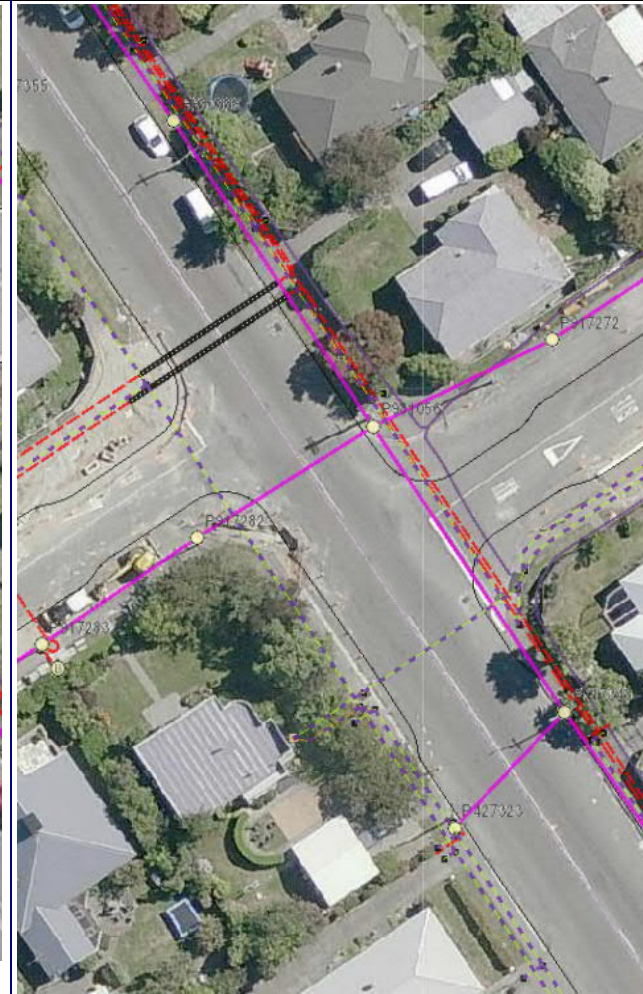
Rutland St - Innes Rd Intersection



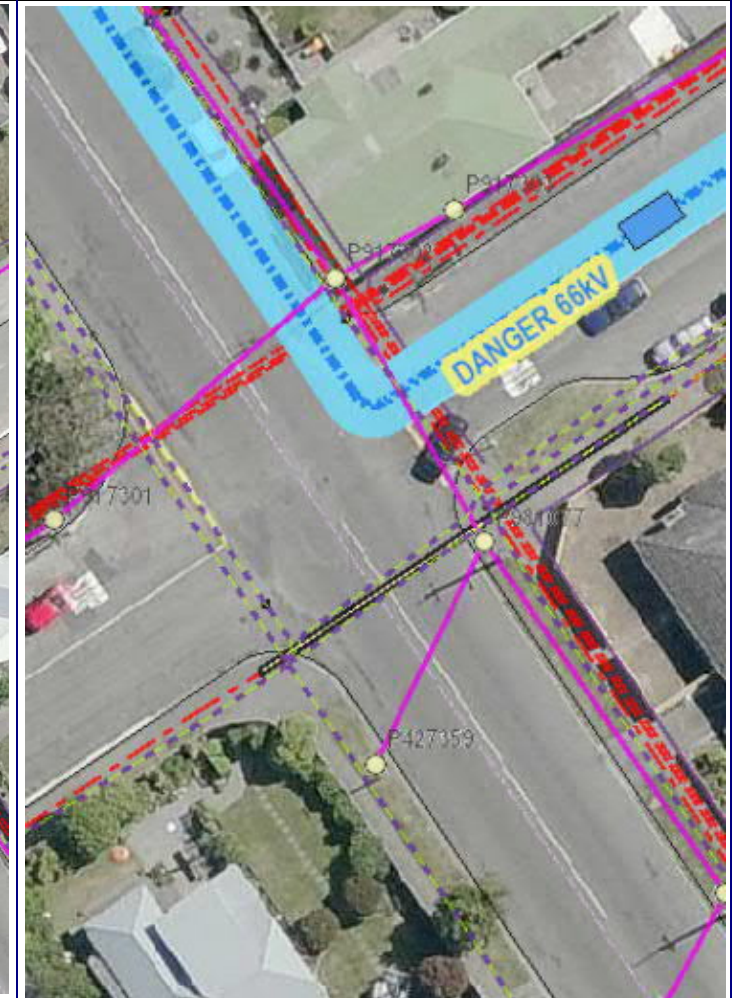
Rutland St - Knowles St Intersection



Rutland St - Weston Rd Intersection

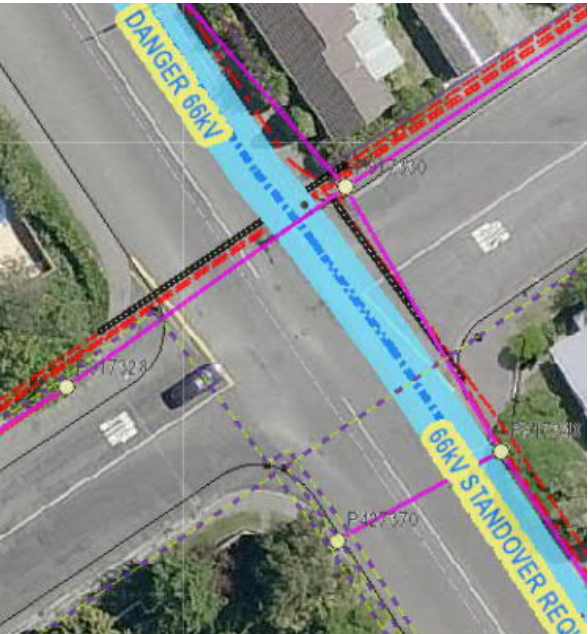
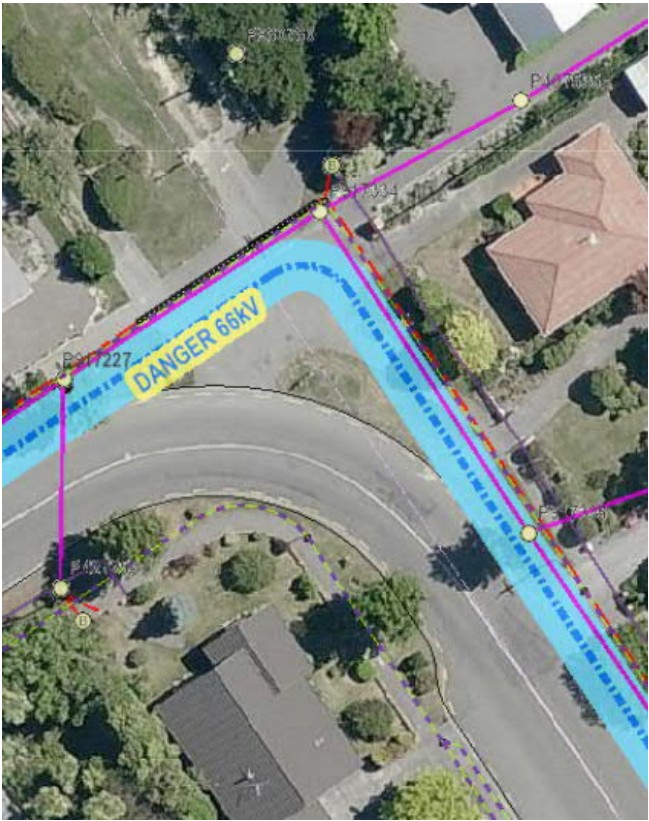


Rutland St - McFaddens/Chapter Intersection



5.2
cont...

- Orion overhead power cables and infrastructure above (shown in purple)
- Orion underground power cables (shown in red)
- Orion ducts (shown in yellow in black)
- Chorus Telecommunication Cables (shown in mauve/yellow stripes)
- Enable fibre optic cables or ducts (shown mauve)
- Overhead Lighting

Utilities				
	Rutland St - Mays Rd Intersection	Rutland St - Tomes Rd Corner		
5.2 cont...	 <ul style="list-style-type: none">• Orion overhead power cables and infrastructure above (shown in purple)• Orion underground power cables (shown in red)• Orion ducts (shown in yellow in black)• Chorus Telecommunication Cables (shown in mauve/yellow stripes)• Enable fibre optic cables or ducts (shown mauve)• Overhead Lighting	 <p>Route finishes at this point</p>		

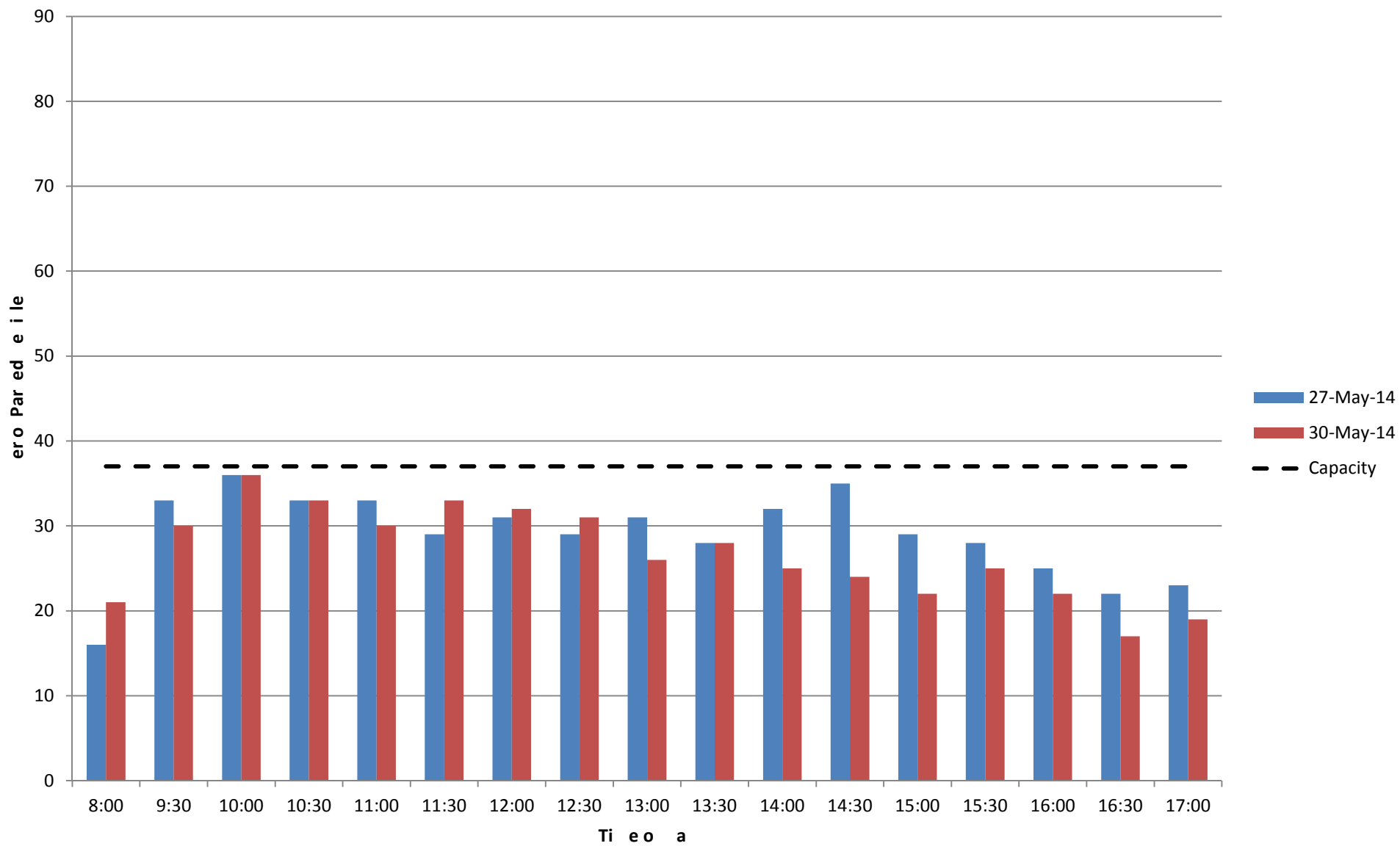
6.0 Potential Tie-in to Northern Papanui Parallel Cycleway

Option	Description	Description and Outcome	Pros	Cons
Option 1	Tie into existing MWH design	<p>The section of the Papanui Parallel north of the Trafalgar Street / St. Albans Street intersection is currently being designed by MWH. This requires a shared path to be present on the Eastern side of Trafalgar Street.</p> <p>This option a shared path on the eastern side of Trafalgar Street starting to the south of Sheppard Place. The crossing location is south of Sheppard Place as the traffic volumes north of Sheppard Place are likely to be higher than the 1,500 vpd threshold for a greenway. The shared path will have priority over Sheppard Place.</p> <p>OUTCOME: Take option forward take option forward to MCA</p>	<ul style="list-style-type: none"> Does not require a redesign of the MWH scheme Shared path provides separation from traffic north of Sheppard Place where traffic volume are expected to exceed 1,500vpd 	<ul style="list-style-type: none"> Not intuitive for northbound cyclist as they are required to go away from the more direct line of travel as they are required to cross the Trafalgar Street for a second time High turning volumes at Sheppard Place due to the presence of St. Albans School. Potential for conflict with school children waiting at crossing located north of Sheppard Place
Option 2	Alternative Design	<p>This option consists of constructing a shared path on the western side of Trafalgar Street starting south of Sheppard Place. The crossing location is south of Sheppard Place as the traffic volumes north of Sheppard Place are likely to be higher than the 1,500 vpd threshold for a greenway . The shared path will have priority over Massey Crescent.</p> <p>OUTCOME: Take option forward to MCA</p>	<ul style="list-style-type: none"> Avoids high turning traffic volumes at Sheppard Place Intuitive for northbound cyclist as this is more direct line of travel as they are not required to cross the Trafalgar Street for a second time Shared path provides separation from traffic north of Sheppard Place where traffic volume are expected to exceed 1,500vpd 	<ul style="list-style-type: none"> Requires a minor redesign of the MWH scheme Potential for conflict with school children waiting at crossing located north of Sheppard Place Similar cost to Option 1
Option 3	Using Massey Crescent	<p>Greenway</p> <p>OUTCOME: Option to not go forward</p>	<ul style="list-style-type: none"> Can retain parking between Avoids high turning traffic volumes at Sheppard Place Avoids conflict with school crossing located on Northern side of Sheppard Place 	<ul style="list-style-type: none"> Requires a major redesign of the MWH scheme This option is likely to be difficult to get cyclists to use Massey Crescent. The most intuitive route is continuing to use Trafalgar Street.

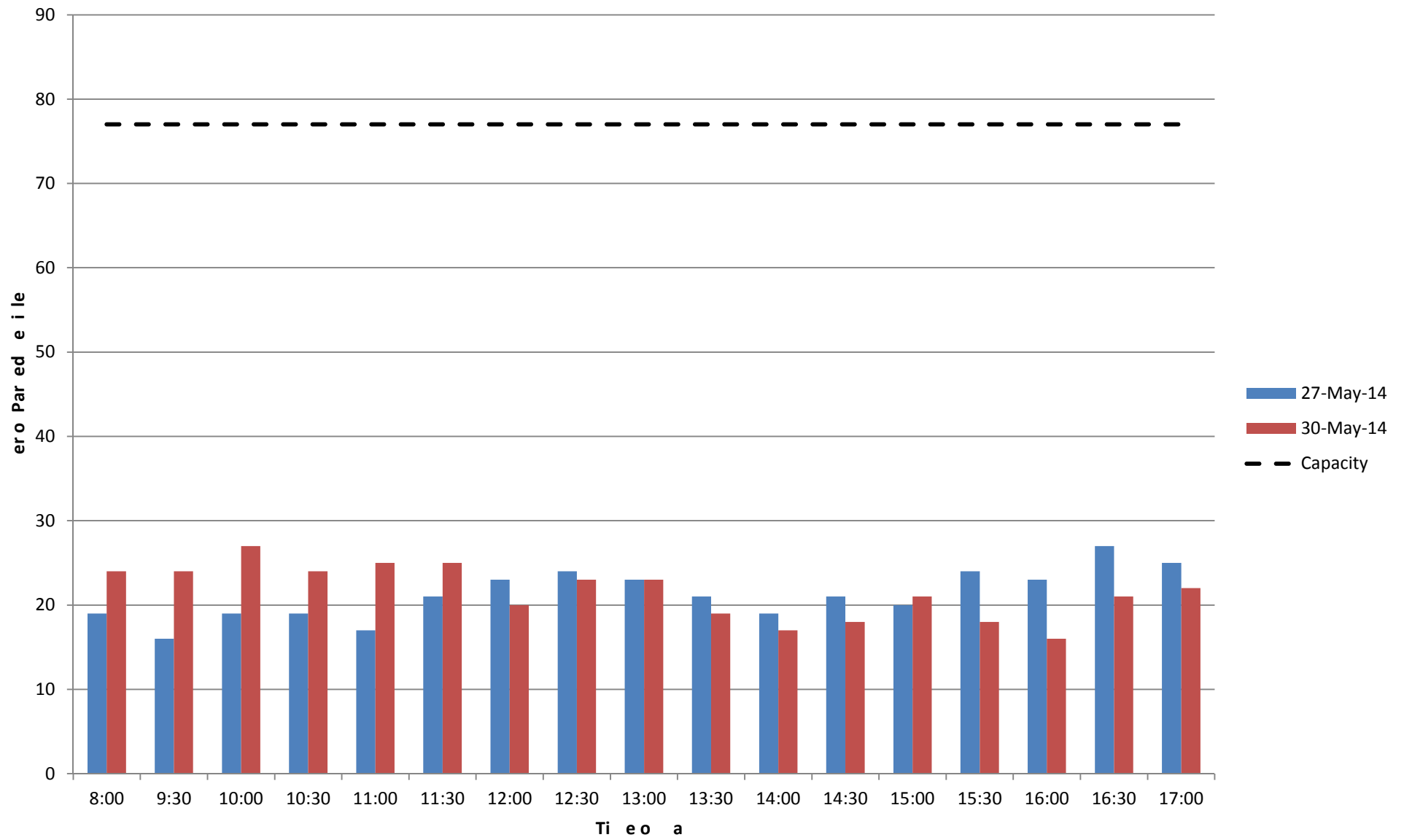
Appendix D

Parking and demand

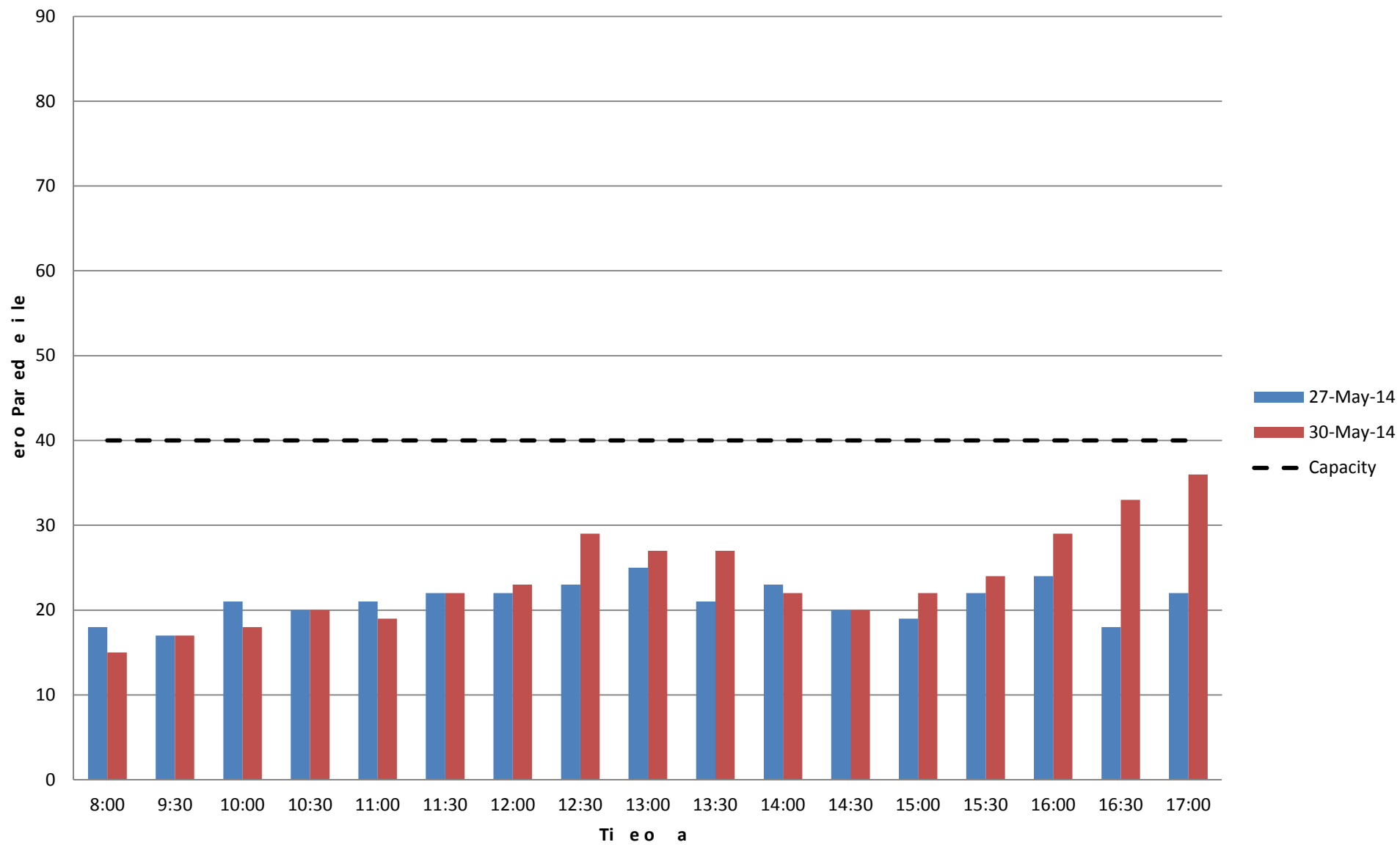
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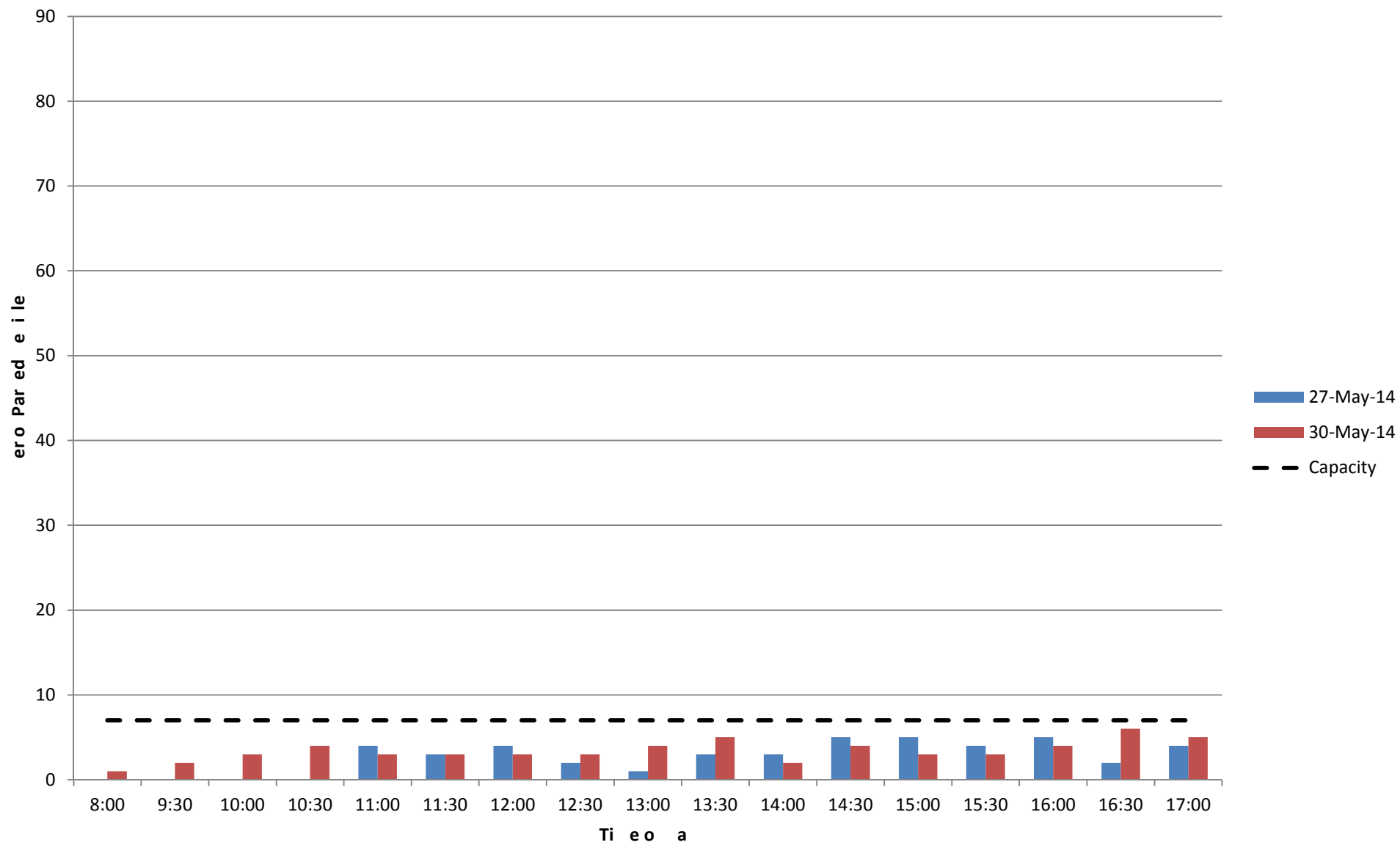
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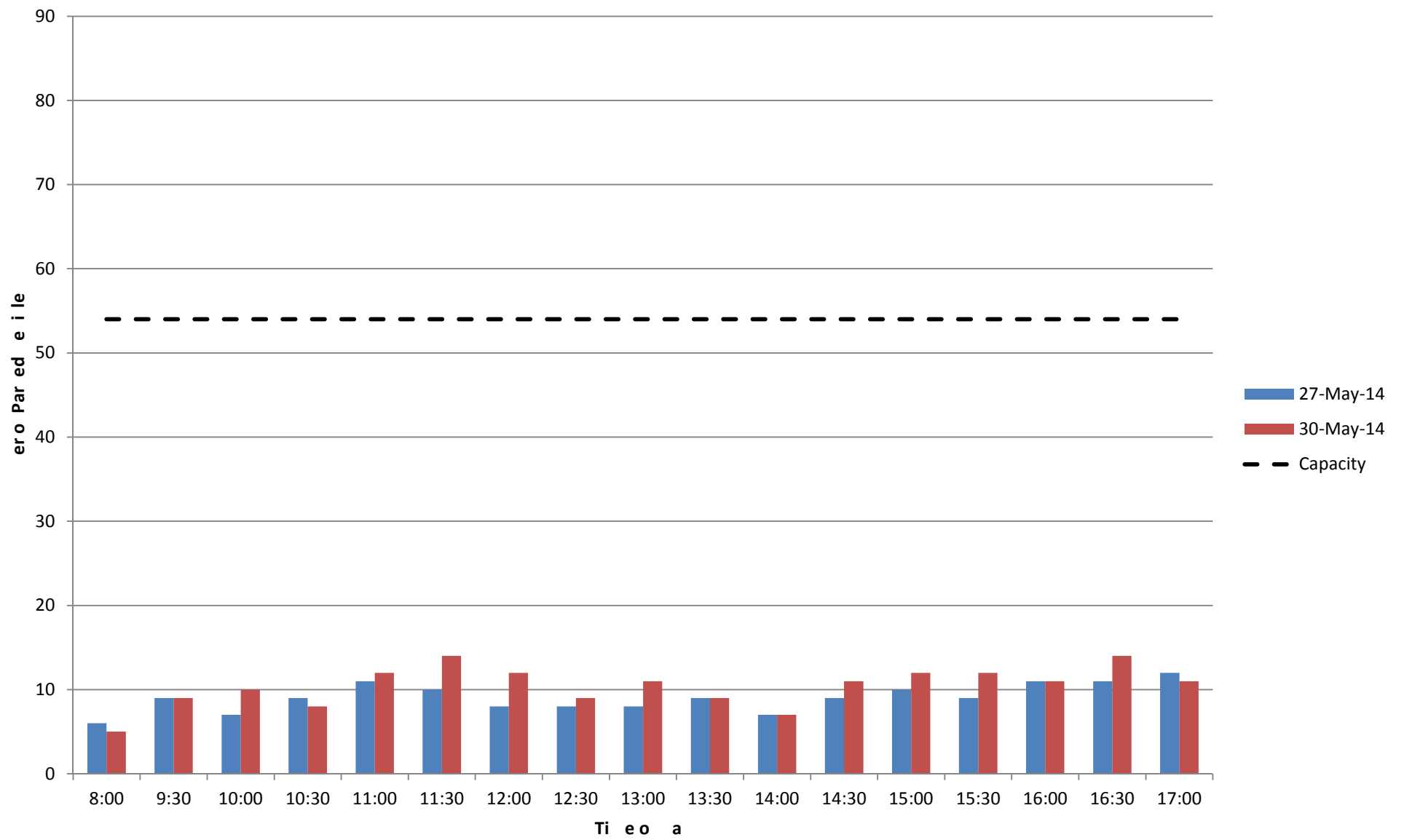
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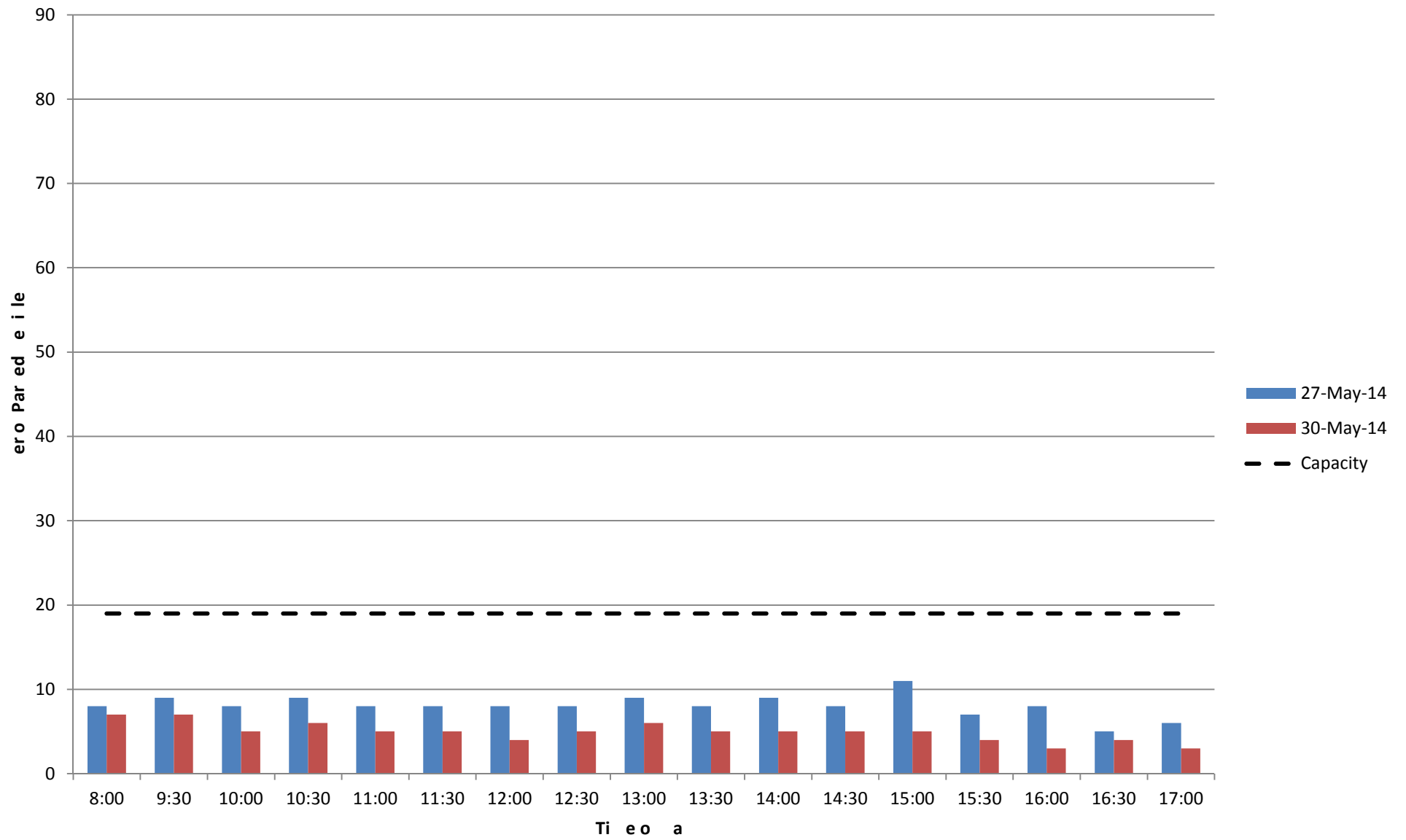
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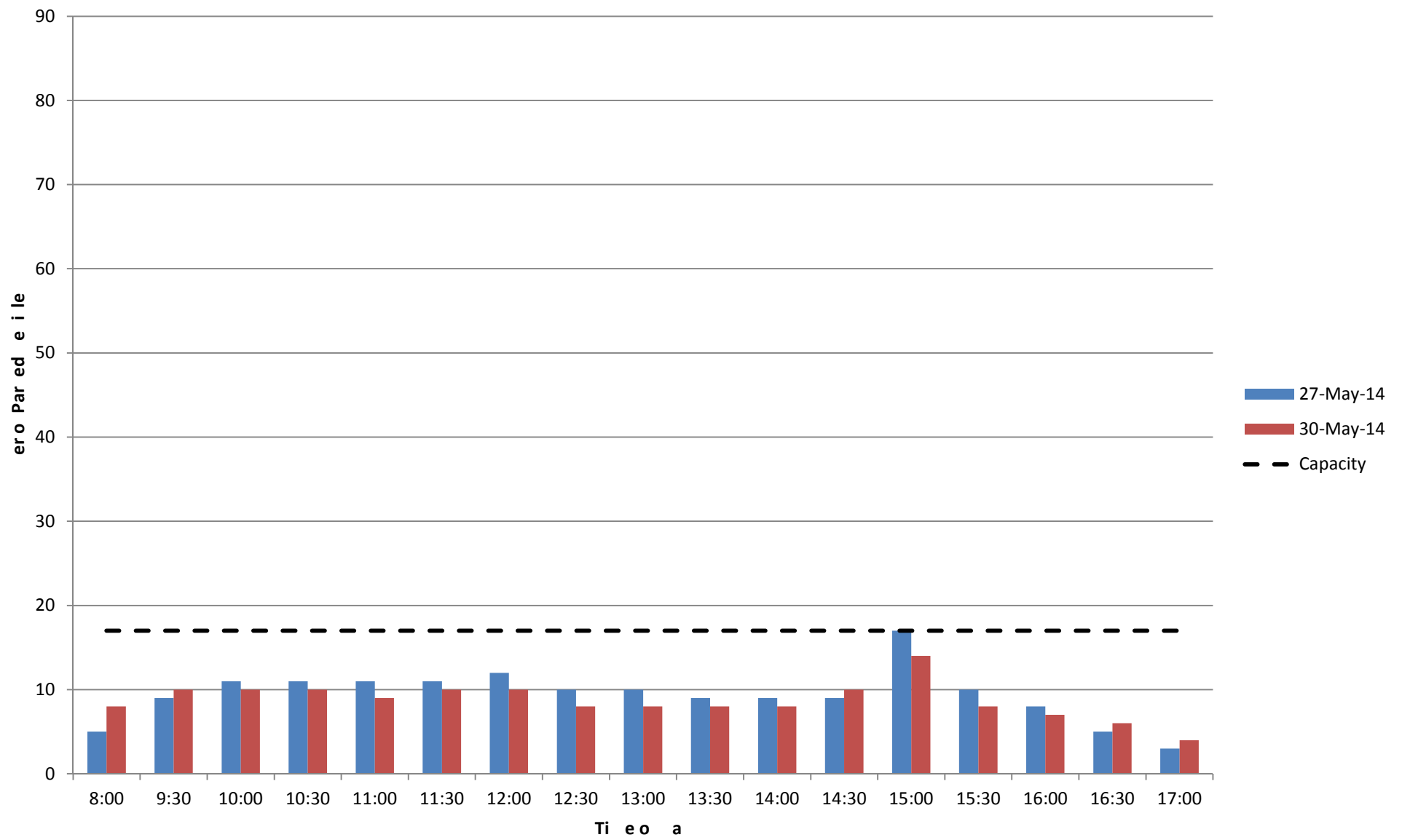
Tra al ar t Par i e a d d e are d o er t



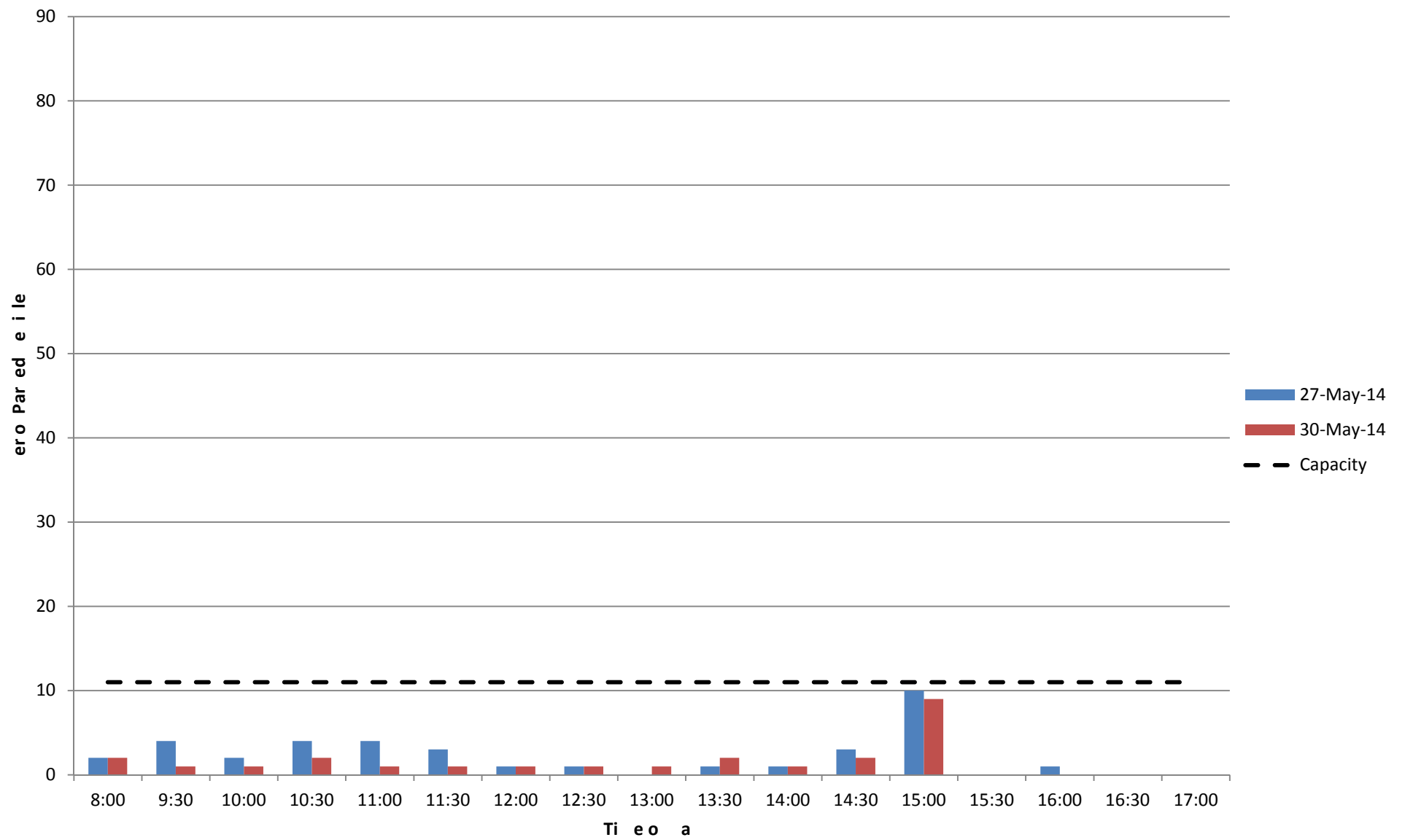
Tra al ar t Par i e a d o er t ole PI



Tra al ar t Par i e a d ole PI e ard PI



Tra al ar t Par i e a d e ard Pl t l a t



Par i o a r e

2014

		Wednesday 24th Sep 12:30pm		
tla d treet	a a it	West side	East side	Total
Tomes - Mays	32	6	10	16
Mays - Mcfaddens	15	1	2	3
Mcfaddens - Weston	31	0	3	3
Weston - Knowles	16	1	1	2
Knowles - nnes	11	1	1	2
nnes - aw esbury	25	2	5	7
aw esbury - Sth end of shops	9	6	0	6
Sth end of shops - St Albans	49	9	11	20

t l a treet		North side	South side	Total
Courtenay - Rutland	12	1	2	3

Tra al ar treet		North side	South side	Total
Sheppard - Courtenay	9	2	2	4

a e r e		Fully par ed out
al er treet		Fully par ed out

Wednesday 24th Sep 9 15pm		
West side	East side	Total
2	5	7
1	3	4
1	9	10
0	1	1
0	0	0
0	1	1
0	0	0
2	0	2

North side	South side	Total
3	2	5

North side	South side	Total
1	0	1

2
2

Thursday 25th Sep 8 30am		
West side	East side	Total
12	7	19
0	1	1
2	3	5
0	0	0
0	1	1
2	3	5
1	2	3
11	6	17

North side	South side	Total
4	2	6

North side	South side	Total
3	3	6

2
2

Saturday 27th Sep 1 30pm		
West side	East side	Total
7	2	9
0	2	2
2	7	9
1	4	5
1	1	2
2	6	8
6	2	8
6	2	8

North side	South side	Total
5	1	6

North/west side	South/east s	Total
1	0	1

3	3
6	6

Sunday 28th Sep 10 15am		
West side	East side	Total
4	5	9
1	1	2
13	15	28
3	0	3
0	1	1
0	4	4
6	2	8
19	20	39

North side	South side	Total
2	1	3

North/west side	South/east s	Total
1	0	1

6	6
3	1

o e t

2015

		Monday 31st August 9:30pm		
tla d treet	a a it	West side	East side	Total
Tomes - Mays	32	4	2	6
Mays - Mcfaddens	15	2	0	2
Mcfaddens - Weston	31	6	6	12
Weston - Knowles	16	0	4	4
Knowles - nnes	11	0	0	0
nnes - aw esbury	25	1	0	1
aw esbury - Sth end of shops	9	2	0	2
Sth end of shops - St Albans	49	9	4	13

t l a treet		North side	South side	Total
Courtenay - Rutland	12	2	3	5

o e t

Tuesday 1st September 8:30am		
West side	East side	Total
12	12	24
0	2	2
2	5	7
1	2	3
1	0	1
4	7	11
8	1	9
16	4	20

North side	South side	Total
		0

o e t

Tuesday 1st September 12:00pm		
West side	East side	Total
6	2	8
2	2	4
2	4	6
0	1	1
1	1	2
4	9	13
9	3	12
16	10	26

North side	South side	Total
1	1	2

o e t

Friday 4th September		
West side	East side	Total
5	3	8
0	4	4
6	8	14
1	0	1
3	0	3
4	8	12
9	2	11
12	17	29

North side	South side	Total
1	2	3

o e t

West side	East side	Total
		0
		0
		0
		0
		0
		0
		0
		0

North side	South side	Total
		0

Appendix E

Pedestrian and cycle counts

Edgeware Village Pedestrian Counts

27/05/2014

Time	Count																			
	Colombo St				Trafalgar St				Edgeware Zebra				East of Edgeware Zebra				West of Edgeware Zebra			
	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total
8:30-8:45	17	2	2	21	6	2		8	17	5		22	7		3	10	9	2		11
8:45-9:00				0				0				0				0				0
9:00-9:15	9			9	3	3		6	9			9	9			9	3			3
9:15-9:30	4		2	6				0	9		4	13	3	1		4				0
Period Total	30	2	4	36	9	5	0	14	35	5	4	44	19	1	3	23	12	2	0	14
11:00-11:15	13		3	16	2		2	4	6		4	10	4			4	4			4
11:15-11:30	14	1	11	26	2	2	1	5	10		4	14	3			3	6		1	7
11:30-11:45	17			17	4	1	1	6	12	3	3	18	11		1	12	4			4
11:45-12:00	18		2	20	3	1	3	7	20	1	4	25	5		2	7	2			2
12:00-12:15	16		1	17	1		1	2	14		6	20	6	2		8	2		1	3
12:15-12:30	15		5	20			1	1	14	2	5	21	1			1	3	1	1	5
12:30-12:45	18	1	3	22	6		1	7	16	2	7	25	8			8	2			2
12:45-1:00	21	1	1	23	4	3	2	9	14	1	5	20	2		1	3	5			5
Period Total	132	3	26	161	22	7	12	41	106	9	38	153	40	2	4	46	28	1	3	32
4:30-4:45	15		1	16	4			4	31		2	33	10			10	14	2		16
4:45-5:00	14	1	3	18	7		1	8	33	1	3	37	6			6	6			6
5:00-5:15	25	1	3	29	12			12	21	1	3	25	2			2	8			8
5:15-5:30	34	4	3	41	6		2	8	44	2	1	47	1			1	7			7
Period Total	88	6	10	104	29	0	3	32	129	4	9	142	19	0	0	19	35	2	0	37

Edgeware Village Pedestrian Counts

30/05/2014

Time	Count																			
	Colombo St				Trafalgar St				Edgeware Zebra				East of Edgeware Zebra				West of Edgeware Zebra			
	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total
8:30-8:45	4	1	1	6				0	9	5	1	15	8			8	2	1		3
8:45-9:00	12	4		16	3			3	8	7	3	18	2			2	7	2		9
9:00-9:15	14			14	2			2	14	1	2	17	6		1	7	6	1	1	8
9:15-9:30	6		1	7	4	1	1	6	8	2	4	14	4	1	1	6	3		1	4
Period Total	36	5	2	43	9	1	1	11	39	15	10	64	20	1	2	23	18	4	2	24
11:00-11:15	2	1	2	5	1		2	3	9	3	1	13	6			6	1			1
11:15-11:30	7	1	3	11	2	1		3	23	1	4	28	9			9	5			5
11:30-11:45	14	3	7	24	4	1	5	10	14	2	1	17	2			2	2		2	4
11:45-12:00	8		2	10	4		2	6	7		5	12	13			13	2		1	3
12:00-12:15	14		5	19	1		1	2	23	2	4	29	3		1	4	5			5
12:15-12:30	21	2	1	24	2			2	14		5	19	17		1	18	5			5
12:30-12:45	29	2	9	40	4		1	5	13	2	5	20	10		3	13	3		1	4
12:45-1:00	18		8	26	2			2	10		5	15	16		7	23	3			3
Period Total	113	9	37	159	20	2	11	33	113	10	30	153	76	0	12	88	26	0	4	30
4:30-4:45	32		7	39	1	3		4	40	7	6	53	10			10	5			5
4:45-5:00	26		2	28	4			4	32	2	4	38	10		2	12	11	2	1	14
5:00-5:15	23	3	1	27	4			4	44	5	3	52	10		1	11	7		2	9
5:15-5:30	17	4	2	23	2			2	27	3	2	32	4			4	8			8
Period Total	98	7	12	117	11	3	0	14	143	17	15	175	34	0	3	37	31	2	3	36

Edgware Village Cyclist Directionality

30/05/2014

Time	Count																				
	From	Colombo St					Trafalgar St					East of Edgware Zebra					West of Edgware Zebra				
	To	E	W	T	S	Total	E	W	C	S	Total	W	T	C	S	Total	E	T	C	S	Total
8:30-8:45				1		1			1		1					0	1				1
8:45-9:00						0			2		2	5				5					0
9:00-9:15					1	1			1		1					0					0
9:15-9:30						0	1		1		2			2		2					0
Period Total		0	0	1	1	2	1	0	5	0	6	5	0	2	0	7	1	0	0	0	1
11:00-11:15		1	1			2			1		1		1			1	1		1		2
11:15-11:30			1			1					0					0					0
11:30-11:45						0					0	2				2	1				1
11:45-12:00		1		1		2			3		3	2				2					0
12:00-12:15					1	1				1	1		1			1	1				1
12:15-12:30		1				1					0					0		1			1
12:30-12:45		1				1					0					0					0
12:45-1:00					1	1			1		1	3				3					0
Period Total		4	2	1	2	9	0	0	5	1	6	7	2	0	0	9	3	1	1	0	5
4:30-4:45						0	1				1	3				3	1	1		1	3
4:45-5:00		2				2					0		1			1	5				5
5:00-5:15						0			1		1	3				3	1				1
5:15-5:30		2	2	1		5					0	2			2	4	6	1	1		8
Period Total		4	2	1	0	7	1	0	1	0	2	8	1	0	2	11	13	2	1	1	17

E Eastbound on Edgware
 W Westbound on Edgware
 T Trafalgar Street
 S Edgware Shops
 C Colombo Street

Sheppard Place Pedestrian Counts

27/05/2014

Time	Count																			
	Sheppard Place				South of Kea				At Kea				North of Kea				At Roundabout			
	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total
8:15-8:30	2	3		5	2	1		3	6	15		21				0				0
8:30-8:45	5	4		9	1			1	16	31		47				0				0
8:45-9:00	7	6		13	4	4		8	20	34		54				0				0
9:00-9:15	7	1		8	1			1	7	4		11				0				0
Period Total	19	11	0	30	6	4	0	10	43	69	0	112	0	0	0	0	0	0	0	0
14:30-14:45				0				0	2	1	1	4			3	3				0
14:45-15:00	16	4		20	6	1		7	15	7		22	1	1		2				0
15:00-15:15	5	7	1	13				0	42	68		110				0				0
15:15-15:30	6	8		14	2	2		4	5	15		20				0				0
Period Total	27	19	1	47	8	3	0	11	64	91	1	156	1	1	3	5	0	0	0	0

30/05/2014

Time	Count																			
	Sheppard Place				South of Kea				At Kea				North of Kea				At Roundabout			
	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total	Adults	Young	Elderly	Total
8:15-8:30	2	3		5				0	9	24		33				0				0
8:30-8:45	3	5		8				0	24	32		56				0				0
8:45-9:00	5			5	3			3	17	17		34				0	2	3		5
9:00-9:15	1			1				0	3	1		4				0				0
Period Total	9	5	0	14	3	0	0	3	44	50	0	94	0	0	0	0	2	3	0	5
14:30-14:45	2			2				0	1			1				0				0
14:45-15:00	7	1		8	6			6	21	6	1	28				0				0
15:00-15:15	11	16	2	29				0	45	85	1	131				0				0
15:15-15:30	3	8		11		1		1	18	8		26				0				0
Period Total	23	25	2	50	6	1	0	7	85	99	2	186	0	0	0	0	0	0	0	0

Sheppard Place Cyclist Counts

30/05/2014

Time	From To	Count															
		Shepard Place				Massey Cres				North Trafalgar Street				South Trafalgar Street			
		N	S	M	Total	N	S	SP	Total	S	SP	M	Total	N	SP	M	Total
8:15-8:30		1		1	2				0	1			1	3			3
8:30-8:45		1	1		2				0		1		1	1			1
8:45-9:00			1		1				0	2			2				0
9:00-9:15					0				0	1			1				0
Period Total		2	2	1	5	0	0	0	0	4	1	0	5	4	0	0	4
14:30-14:45					0				0				0	1		1	2
14:45-15:00					0				0	1			1		1		1
15:00-15:15					0				0				0	1			1
15:15-15:30		1			1				0	3	2		5	2	2		4
Period Total		1	0	0	1	0	0	0	0	4	2	0	6	4	3	1	8

N North on Trafalgar St
S South on Trafalgar St
M Massey Crescent
SP Sheppard Place

Major Cycle Routes: Model Projections of Average Term-time Weekday Cyclist Volumes on each Route/Section

Route No	Route Name	Section No	Section Name	By Section				By Route			
				Total Length (km)	2021 Cyclists/Day/km	2031 Cyclists/Day/km	2041 Cyclists/Day/km	Total Length (km)	2021 Cyclists/Day/km	2031 Cyclists/Day/km	2041 Cyclists/Day/km
1	Uni_Cycle	Section 1	Matai St East	0.4	950	1,140	1,270	5.6	1,230	1,370	1,490
		Section 2	Hagley Park to Riccarton Bush	2.4	1,110	1,280	1,450				
		Section 3	Ngahere St to Dovedale Ave	2.8	1,370	1,480	1,540				
2	Papanui Parallel	Section 1	Grassmere to Tomes	0.8	1,660	2,120	2,400	4.9	1,560	1,860	2,170
		Section 2	Bealey Ave to Trafalgar	0.8	2,220	2,880	3,450				
		Section 3	Trafalgar to Tomes	1.7	1,650	2,110	2,490				
		Section 4	Grassmere to Sawyers Arms Road	1.5	1,010	820	930				
3	Little River	Section 1	Moorhouse Ave to Barrington Street	1.5	870	1,080	1,220	3.0	510	630	710
		Section 2	Halswell Junction to Prebbleton	1.5	140	170	180				
4	Northern Line Cycleway	Section 1	Kilmarnock to Blenheim	1.1	1,310	1,460	1,580	5.6	840	780	830
		Section 2	Tuckers to Main North	1.4	1,360	1,210	1,290				
		Section 3	Main North to Belfast	3.2	480	370	390				
5	Avon-Ōtākaro Route	Section 1	Fitzgerald Avenue to Swanns Road Bridge	1.9	1,090	1,200	1,360	10.4	860	950	1,060
		Section 2	Swanns Road Bridge to ANZAC Drive Bridge	5.8	1,140	1,240	1,390				
		Section 3	ANZAC Drive Bridge to New Brighton	2.7	120	130	150				
6	Rapanui-Shag Rock Cycleway	Section 1	Worcester Street to Aldwins Road	2.2	250	310	360	8.9	360	440	490
		Section 2	Aldwins Road to Dyers Road	4.1	330	390	430				
		Section 3	Dyers Road to Ferry Road Bridge	2.6	510	620	680				
7	Nor'West Arc	Section 1	Cashmere Road To Annex	3.6	480	560	620	10.5	1,370	1,520	1,610
		Section 2	Annex to University	4.0	1,730	1,870	1,950				
		Section 3	University to Harewood Road	2.9	1,970	2,210	2,380				
8	South Express	Section 1	Templeton to Main South Road	8.5	1,180	1,340	1,450	13.3	1,370	1,590	1,760
		Section 2	Main South Road to Annex Road	2.1	1,880	2,250	2,520				
		Section 3	Annex Road to South Hagley Park	2.7	1,580	1,900	2,140				
9	Quarrymans Trail	Section 1	Moorhouse Ave to Frankleigh Street	2.5	1,400	1,900	2,050	8.6	930	1,330	1,460
		Section 2	Hoon Hay Road to Halswell	6.1	730	1,100	1,220				
10	Ōpāwaho River Route	Section 1	Princess Margaret Hospital to Corson Street	3.2	190	220	250	10.8	280	320	350
		Section 2	Ferrymead Bridge to Waltham Road	6.3	300	340	360				
		Section 3	Corson Street to Waltham Road	1.4	410	440	500				
11	Southern Lights		Strickland Street to Tennyson St	0.9	840	900	1,130	0.9	840	900	1,130
12	Heathcote Expressway	Section 1	City to Curries Road	3.7	1,030	1,340	1,510	7.1	670	860	960
		Section 2	Curries Road to Martindales Road	3.4	290	330	360				
13	Wheels to Wings	Section 1	Harewood Road to Greers Road	1.2	1,090	1,210	1,280	4.6	1,010	1,170	1,260
		Section 2	Greers Road to Wooldridge Road	2.3	1,060	1,220	1,330				
		Section 3	Wooldridge Road to Orchard Road	1.1	820	1,020	1,100				
14	Coastal Pathway		Ferrymead Bridge-Sumner	6.6	300	360	400	6.6	300	360	400
15	Central City (CCRP)		Central City (CCRP)	15.5	1,500	1,860	2,230	15.5	1,500	1,860	2,230

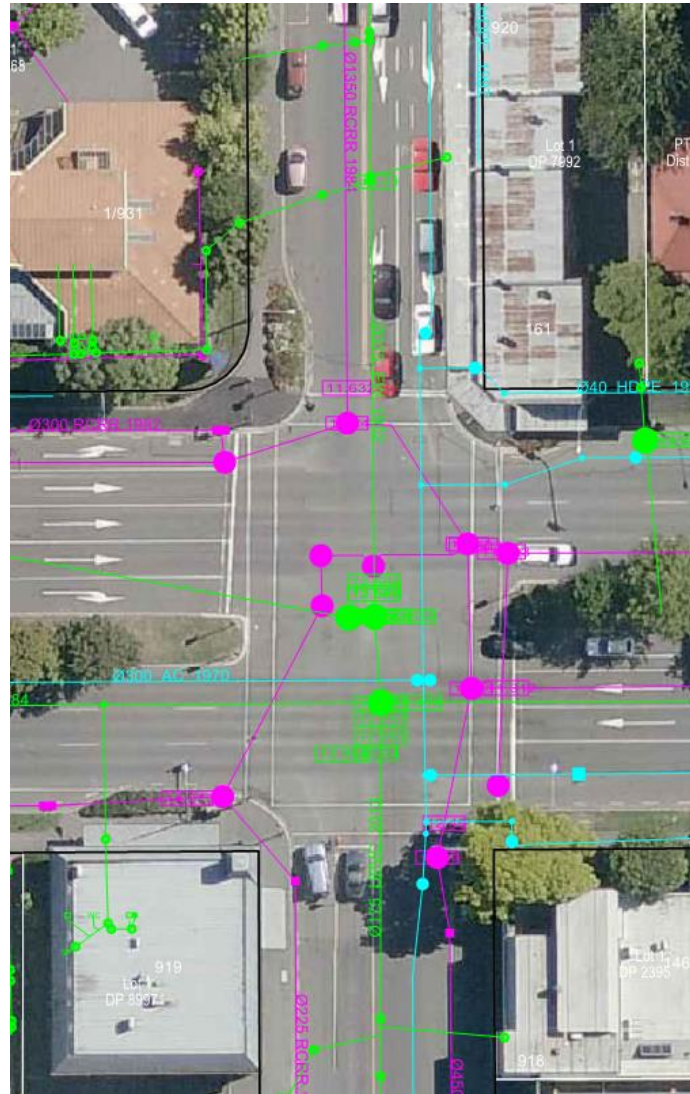
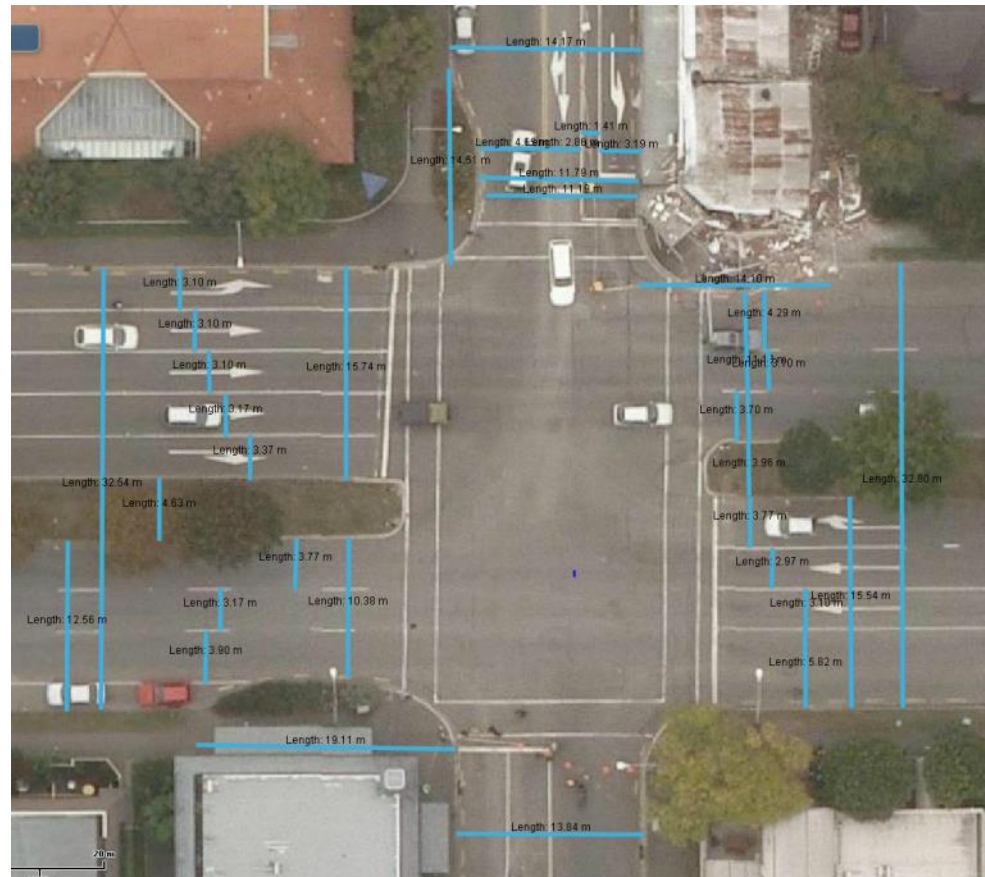
Notes:

Demands shown in *blue italics* are lower than those forecast for 2021, because of the forecast potential influence of the Northern Arterial and Northern Arterial Extension cycle projects, which cater better for *some* of the movements: In the generic future year transport model networks, the UDS partners agreed that both the Northern Arterial roading projects should be omitted from the network (modelling) for 2021, being assumed to be introduced some time between 2021 and 2031 (ie after 2021). The same approach has been adopted for modelling the associated (non-MCR) cycle projects. In practice both projects may now be implemented by (or before) 2021: The overall influence on the MCR project is negligible however, as 'reductions' on some MCR sections further north are (more than) compensated for by increases elsewhere (eg further South on the Papanui Parallel)

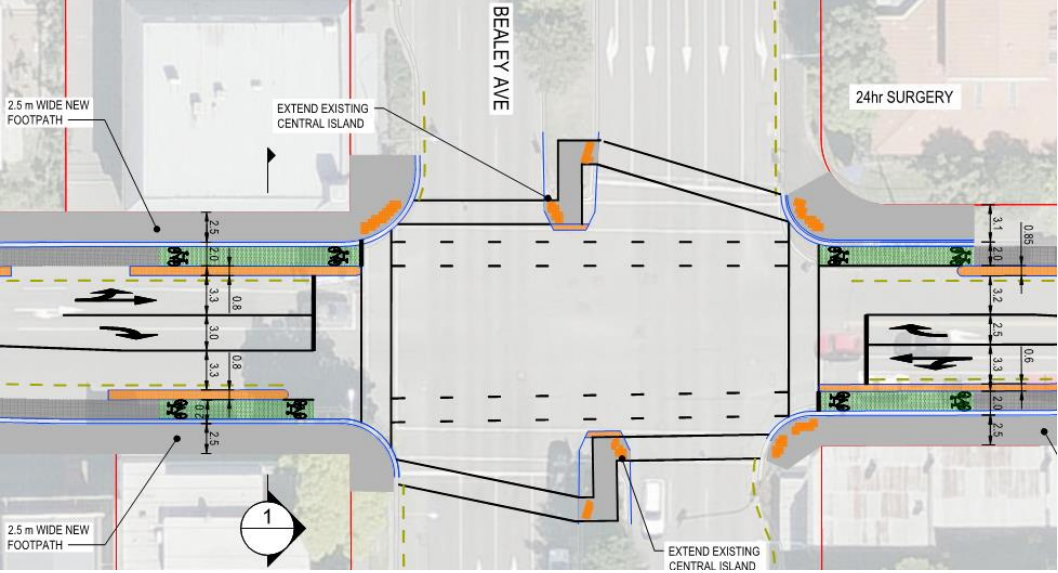
Appendix F

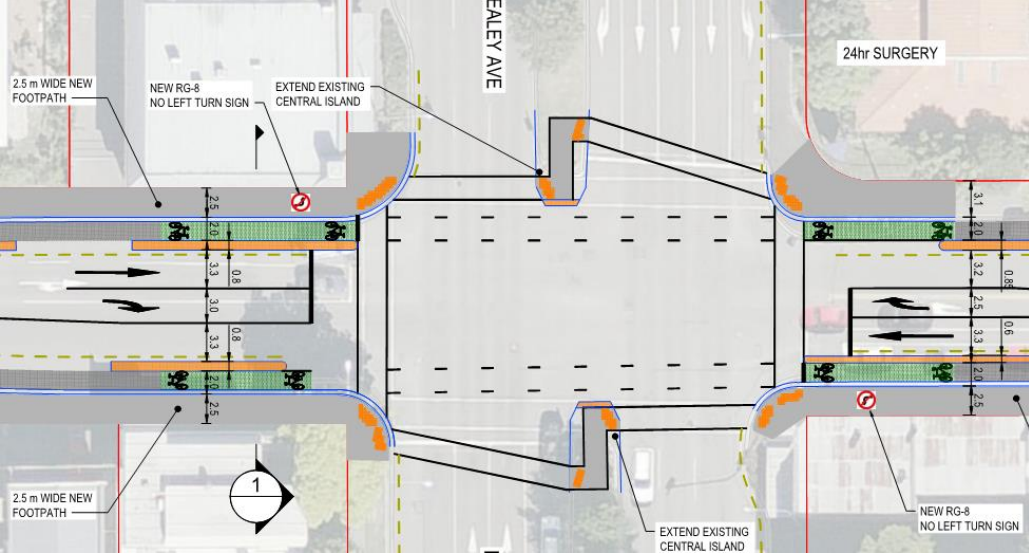
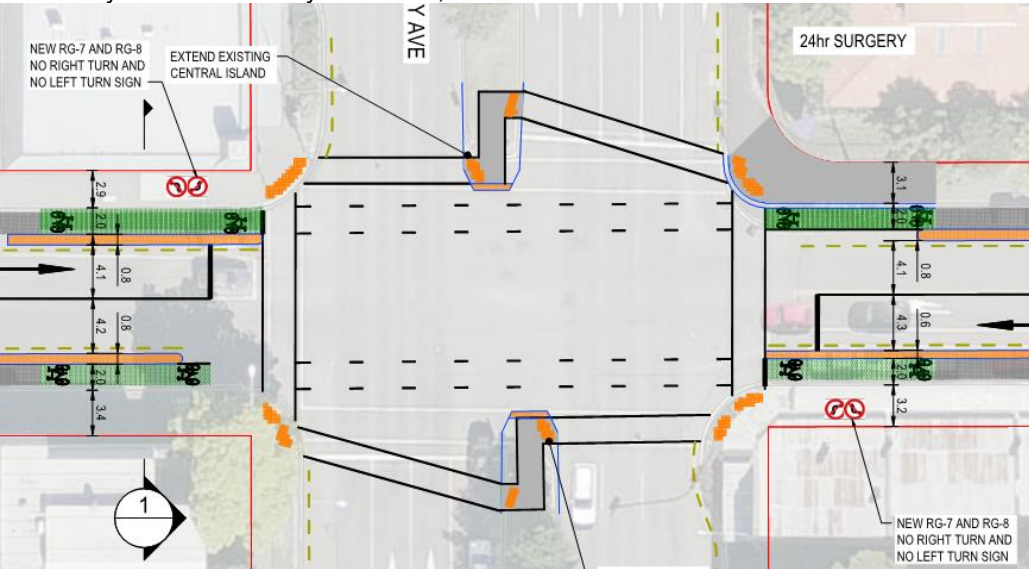
Options consideration

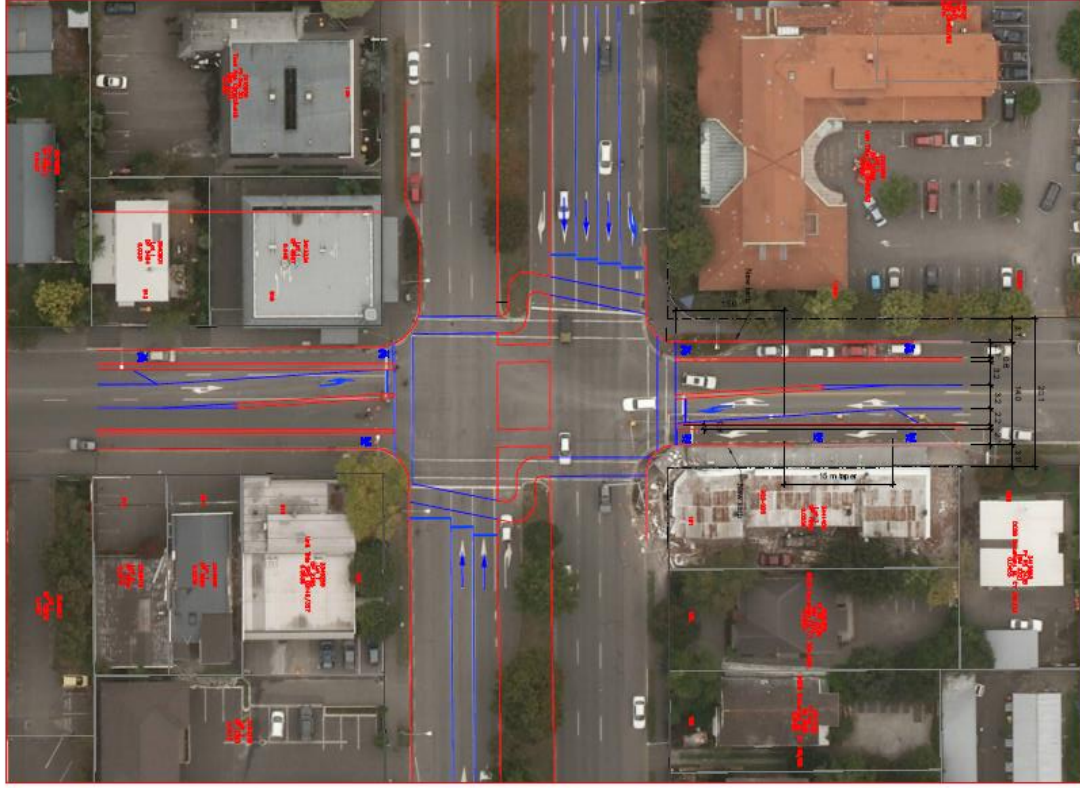
1.0 Bealey Ave Colombo Street Intersection – Existing Layout

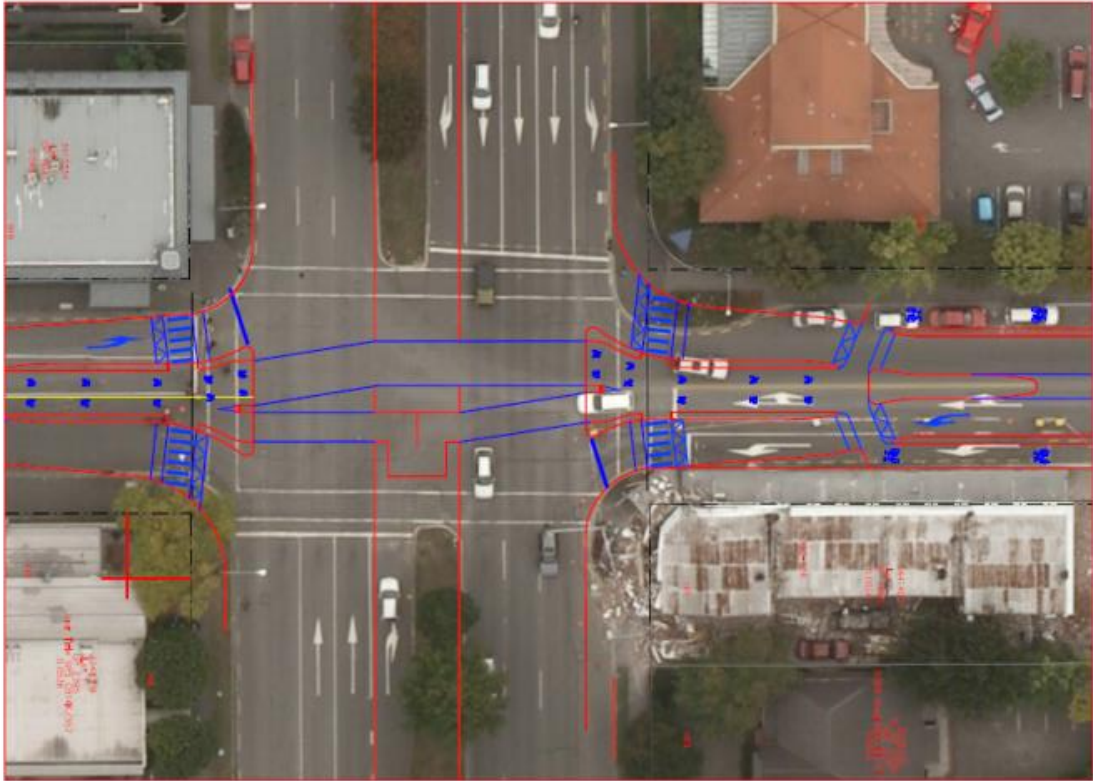
Description	Services and Utilities	Additional Considerations
<p>Colombo St, and Bealey Ave</p>  <ul style="list-style-type: none"> Existing services within the Colombo Street include water supply, wastewater and stormwater. A 600mm ww main is located close to the Colombo St Centreline. A 300mm ws main in the eastern shoulder 	<ul style="list-style-type: none"> Utilities within the corridor include Telecom, Orion, Chorus underground and overhead cables. Lighting includes. Lighting is located along the boundary line on both sides of Colombo Street Refer Utilities section later in this report  <ul style="list-style-type: none"> South of Bealey Colombo Cross section is 13.7m between kerb lines North of Bealey Colombo Cross section is 14.0m between kerb lines 	<ul style="list-style-type: none"> Traffic Volumes: <ul style="list-style-type: none"> Colombo St (N of Bealey Ave on 29/2/2012) is approximately 4,200 veh/day. Bealey Ave (W of Manchester St on 24/3/2011) is approximately 39,200 veh/day. Local Businesses along route – these will have to be accommodated to ensure their viability. Footpath width at shops desirable minimum is 2.5m as stated in the CCC Infrastructure Design Standards

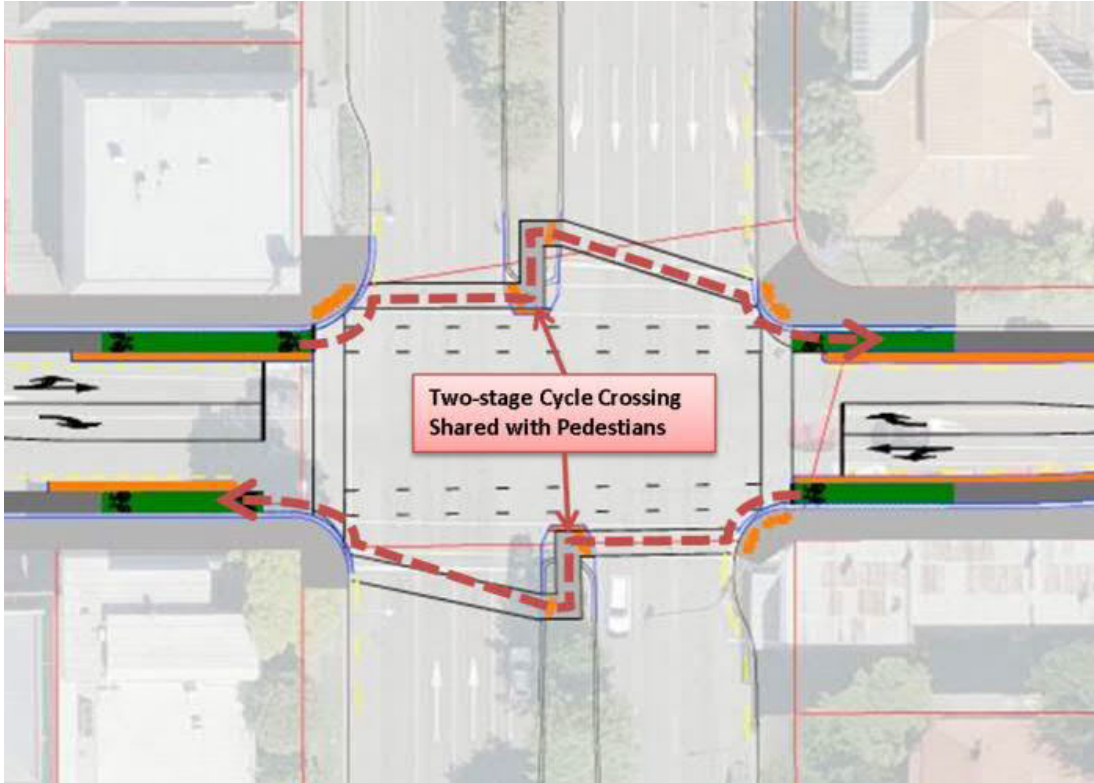
1.1 Bealey Ave Colombo Street Intersection – Option Development

Option	Description	Description	Pros	Cons / Issues to be Addressed
Option 1	One Way Cycle Crossings (One-stage crossing movements)	<p>This option consists of the separator present up to the limit line for cyclists and an on-road one-stage crossing across Bealey Avenue. The cyclists can be fully protected from conflicting traffic via signal phasing. An example of the layout is shown below.</p> <p>OUTCOME: Option taken forward to for MCA assessment. Three Sub-options (1A, 1B and 1C) for analysis in the MCA tool are described below.</p>	<ul style="list-style-type: none"> Minimises the potential delay for cyclists. Is intuitive for cyclists as path required is simple. Retains connectivity for through and right turning movements. Retains connectivity for existing bus route on Colombo Street. Retains continuity with cycleways to the north and south of Bealey Avenue. Signal phasing will provide protection to crossing cyclists Direct crossing without complicated manoeuvres 	<ul style="list-style-type: none"> Difficult to enforce turn bans on Colombo Street as physical work to restrict left turning movements are likely to impede through traffic on Bealey Avenue May be uncomfortable for cyclists crossing a large intersection without protection from adjacent traffic. Large crossing distance may cause cyclists to get trapped in the intersection during a phase change. Requires a ban of left turning vehicles from both approaches on Colombo Street. Left turning vehicles can be accommodated by reducing the footpath width to near minimum width or altering lane and cycleway widths. Some possibility that cyclists will over take through the intersection potentially causing conflict with adjacent traffic Removal of existing P30 and bus stop outside Medical Centre is required. Consultation outcome may dictate chosen option
Option 1A	All Bealey Ave and Colombo Street movements retained.		<ul style="list-style-type: none"> This keeps all existing connectivity of the intersection. Consistent with major cycleway proposals north and south of Colombo Street Maintains Bus route along Colombo Street Provides access to local P30 zones on Bealey Ave near shops and therefore is likely to be favoured by Local Business owners 	<ul style="list-style-type: none"> Widening of the intersection is required to maintain traffic lanes and provide a separated cycleway in each direction Some conflicts with cyclists remain for left turns from Colombo st Conflict with left turning traffic from Colombo Street. This can be minimised through design (of signal phasing) but cyclists are unable to be fully protected without additional delays to cyclists and vehicles. Widening into existing footpath space may be an undesirable solution for local business. More expensive than option 1C (similar cost to Option 1B) Existing P30 zone outside 24 hour surgery removed Bus Stops relocated On street parking removed south of Colombo St

Option	Description	Description	Pros	Cons / Issues to be Addressed
Option 1B	Ban left turns from Colombo St.	<p>All Bealey Ave connectivity to remain. Ban left turns from Colombo St.</p> 	<ul style="list-style-type: none"> This keeps all connectivity for Bealey Ave. Modelling indicates minimal changes to intersection performance 	<ul style="list-style-type: none"> Requires a ban of left turning vehicles from both approaches on Colombo Street. This may be difficult to enforce – and may not be favoured by Local Business Owners Widening into existing footpath space may be an undesirable solution for local business owners More expensive than option 1C (sim to 1A) Existing P30 zone outside 24 hour surgery removed Bus Stops relocated On street parking removed south of Colombo St
Option 1C	Ban all turns from Colombo Street	<p>All Bealey Ave connectivity to remain, ban all turns from Colombo Street</p> 	<ul style="list-style-type: none"> Banning all turns from Colombo Street provides best safety/comfort for cyclists cross Bealey Ave Does not limit connectivity on Bealey Ave Requires least amount of kerb realignment and no widening (ie can be achieved within existing kerbs) – least cost option Of the other options this option provides arguably the most comfort, protection and safety for cyclists as all turning from Colombo is banned. Very direct route easily identifiable. Cheapest Option with minimal widening and less overall disruption during construction 	<ul style="list-style-type: none"> Bans right turns from Colombo St south – re-routing this movement likely to be up Colombo then right at Purchas/Canon Sts. (turning movements currently are mainly right turn from Colombo South for access to Sherbourne St) Widening into existing footpath space may be an undesirable solution for local business owners Some concern that Local Business may object as this removes access to existing P30 zones on Bealey for Colombo St motorists. Bus Stops relocated On street parking removed south of Colombo St Existing P30 zone outside 24 hour surgery removed

Option	Description	Description	Pros	Cons / Issues to be Addressed
Option 2	One Way Cycle Crossings (ViaStrada Option 2)	<p>This option consists of constructing a solid median on Bealey Avenue through Colombo Street with a bypass for cyclists.</p> <p>This will convert Colombo Street to a left-in-left-out arrangement with signals provided to assist with cyclists crossing. Also Bealey Avenue right turns will be banned.</p>  <p>(above plan c/o ViaStrada)</p> <p>OUTCOME: This option was discounted in Beca earlier SAR. Option has been discounted (before undertaking an MCA review) as it does not maintain connectivity for the number 28 bus route on Colombo Street, and restricts Bealey Avenue and Colombo Street connectivity.</p>	<ul style="list-style-type: none"> Improves provisions for Bealey Avenue through traffic by removing through and right turning traffic from Colombo Street. Dedicated cycle crossing phases may negate these gains. Cyclists can be fully protected from conflicting traffic Cyclists able to overtake when crossing Cyclists able to cross intersection in two stages reducing the required crossing distance for cyclists 	<ul style="list-style-type: none"> Unable to maintain connectivity for through or right turning traffic from both Colombo Street approaches. Unable to maintain right turning traffic connectivity from Bealey Avenue Does not retain connectivity for existing bus route on Colombo Street. Dedicated cycle crossing phases may negate any increase in efficiency on Bealey Avenue these gains.

Option	Description	Description	Pros	Cons / Issues to be Addressed
Option 3	Two – Way Cycle Crossings	<p>This option consists of constructing a solid median on Bealey Avenue through Colombo Street with a bypass for cyclists. This will convert Colombo Street to a left-in-left-out arrangement with signals provided to assist with cyclists crossing Bealey Avenue. Cyclists are to cross Bealey Avenue in the Centre of Colombo Street with a mid-block transition provided to connect to the facilities to the north and south of the intersection.</p>  <p>(above plan c/o ViaStrada)</p> <p>OUTCOME: This option was discounted in Beca earlier SAR. Do not take forward for MCA assessment. Option 3 was rejected by CCC as it does not maintain connectivity for the number 28 bus route on Colombo Street and restricts Bealey Ave connectivity. The facility creates unnecessary conflict with between cyclists and traffic in order to enter and exit the shared facility in the middle of Colombo St. Cyclists would be required to transition to a two-way crossing facility mid-block without formal protection that is out of context of the adjacent cycleways.</p>	<ul style="list-style-type: none"> Improves provisions for Bealey Avenue through traffic by removing through and right turning traffic from Colombo Street. Cyclists fully protected from conflicting traffic Cyclists able to overtake when crossing. Cyclists able to cross intersection in two stages reducing the required crossing distance for cyclists 	<ul style="list-style-type: none"> Unable to maintain connectivity for through or right turning traffic from both Colombo Street approaches. Unable to maintain right turning traffic connectivity from Bealey Avenue Does not retain connectivity for existing bus route on Colombo Street. Likely to result in downstream effects on Bealey Avenue as traffic previously using Colombo Street must re-route. Cyclists required to transition to a two-way cycle crossing mid-block without formal protection. This brings cyclists in conflict with traffic on Colombo Street

Option	Description	Description	Pros	Cons / Issues to be Addressed
Option 4	One Way Cycle Crossings (Two-stage crossing movements)	<p>This option consists of cyclists crossing Bealey Avenue in two stages shared with pedestrians. The separator will lead cyclists to the crossing point. Cyclists can be fully protected from conflicting traffic via signal phasing. An example of the layout is shown below.</p>  <p>OUTCOME: This option was discounted in Beca earlier SAR. Option discarded going forward as it requires the cyclists to cross in two-phases. This will delay cyclists crossing Bealey Avenue and may be confusing and uncomfortable for cyclists due to the indirect routing. This option was rejected by CCC as which is not the desired solution for a major cycle way.</p>	<ul style="list-style-type: none"> Retains connectivity for through and right turning movements. Can accommodate left turning vehicles by reducing footpath width to near minimum or arranging phasing so pedestrians and cyclists do not run during Colombo Street Phase Retains connectivity for existing bus route on Colombo Street. Retains continuity with cycleways to the north and south of Bealey Avenue. Cyclists fully protected from conflicting traffic. 	<ul style="list-style-type: none"> More delay for cyclists than the other options and requires cyclists to stop in the middle of the intersection to wait for the second stage crossing. Potential conflict between pedestrians and cyclists. This can be minimised by a suitable width crossing. Slight deviation from the most direct route for cyclists. Storage for right turn from Bealey Avenue is reduced by approximately 2 cars.

2.0 Colombo Street – Existing Layout

Description

Colombo St, north of Bealey Ave, is a residential street with low-density development on the west side, and medium density development on the eastern side.

Between Bealey Ave and the end of Colombo St at the intersection with Edgeware Rd, there are 2 stop controlled cross road intersections, at Purchas St, and Canon St. The intersections are evenly spaced along Colombo St. The width of Colombo St locally narrows to 13m at the intersection with Bealey Ave and Purchas St.

The existing cross section of Colombo St includes:

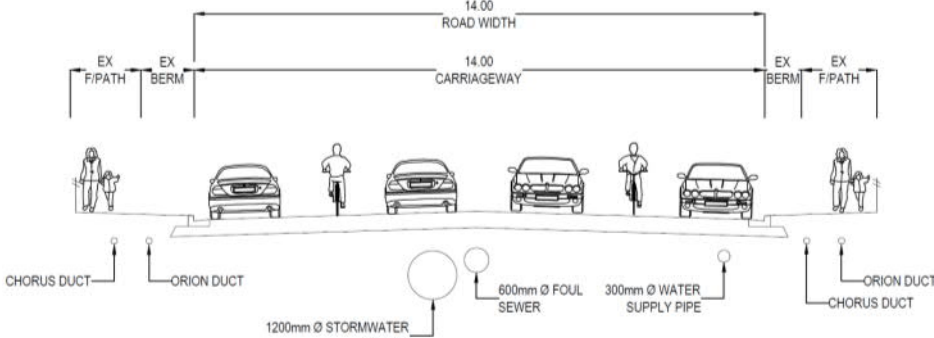
- ~1.5m Footpath
- ~1.5m Verge
- 14m Carriageway (2 traffic lanes with parking on both sides), narrowed in some locations for bus stops, loading zones / P5 zones and intersections)
- ~1.5m Footpath
- ~1.5m Verge

Colombo St currently allows for on street parking in both directions. *A total number of 150 spaces are available.*

Local Business (refer section 4.7 of this report) are located around Purchas St and Canon St and at Bealey Ave and Edgeware Road. Some P5 and P30 parking restrictions support these businesses and need to be considered.

The No 28 bus service has bus stops in both directions at Bealey Ave, Purchas Street and Edgeware road. The CCC plan indicated Colombo would remain as a key public transport route.

There are currently no formal provision of cycle facilities along Colombo St. Cyclists are expected to cycle between the parked cars and traffic lanes. The AADT of Colombo St is ~5000vpd.



Services and Utilities

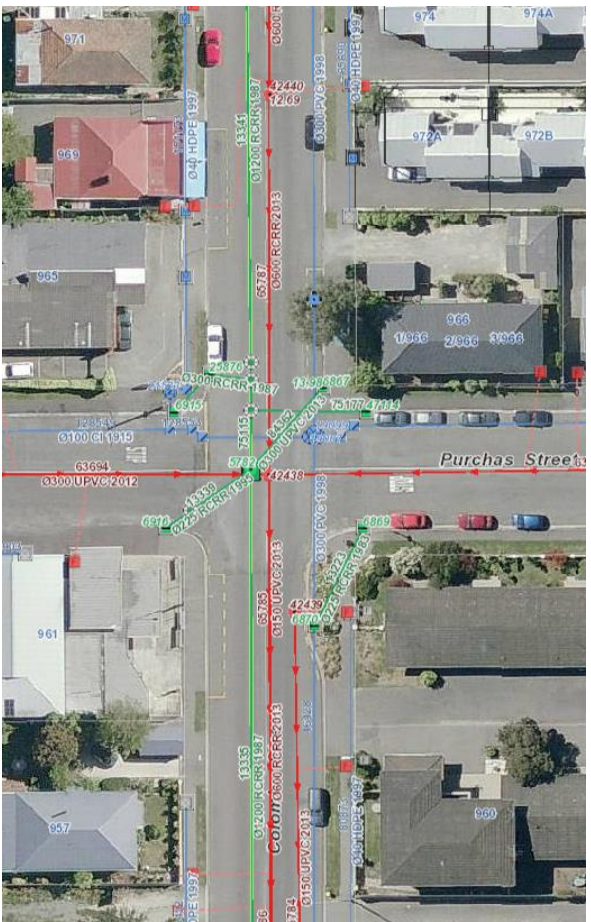
- Existing services within the Colombo Street include water supply, wastewater and stormwater. A 600mm ww main is located close to the Colombo St Centreline. A 300mm ws main is located in the eastern shoulder and
- Utilities within the corridor include Telecom, Orion, Chorus underground and overhead cables. Lighting includes.
- Lighting is located along the boundary line on both sides of Colombo Street. A lighting assessment is required to confirm lighting requirements for the scheme
- For Services and Utilities plans refer table in this report.

Additional Considerations

- Traffic Volumes – approx. AADT of Colombo St is 4,175 veh/day. Preferred volumes for a cycleway street much lower to improve safety by reducing volume and hence likelihood of conflicts
- Local Businesses along route – these will have to be accommodated to ensure their viability
- Consider alternative route or other means of reducing traffic volumes, noting to allow for CCC bus route
- Two intersections along this route create conflict points for cyclists. Combined with the high volume on Colombo ideally measures as required to reduce traffic volumes
- Purchas Street and Canon Street intersections will require treatments to give priority to Colombo Street cyclists.

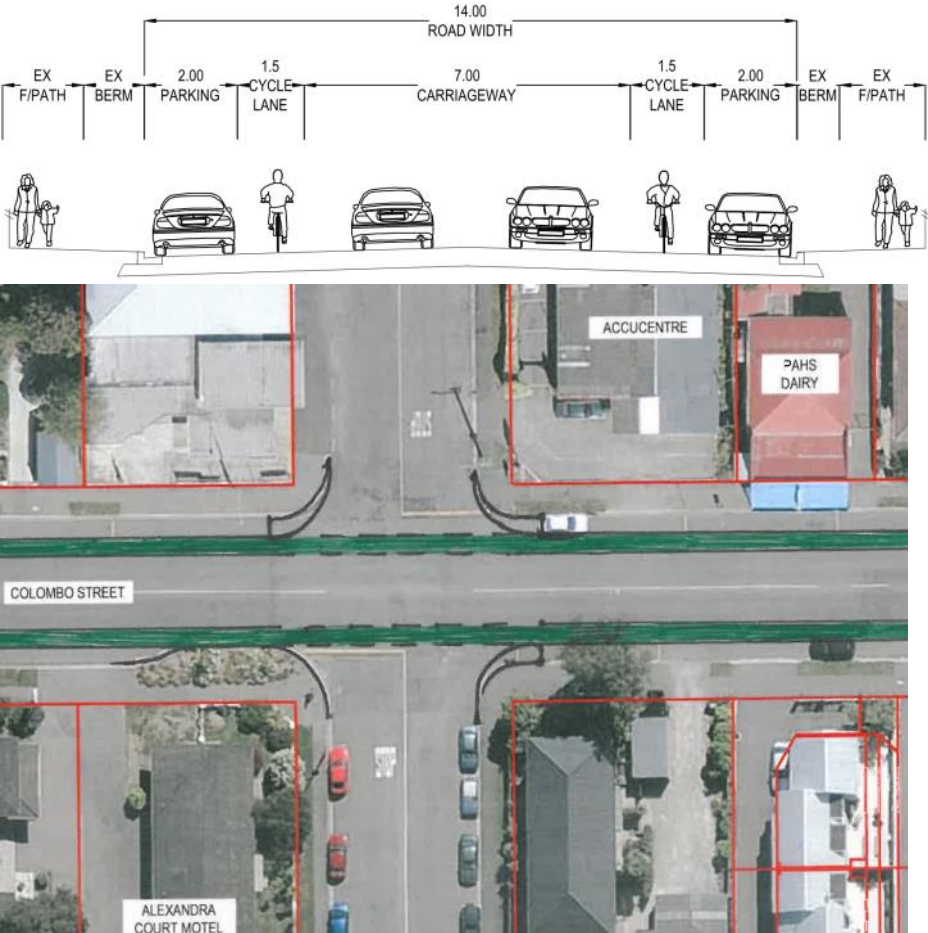



Example Utilities Plan – Orion, Chorus, Lighting etc.

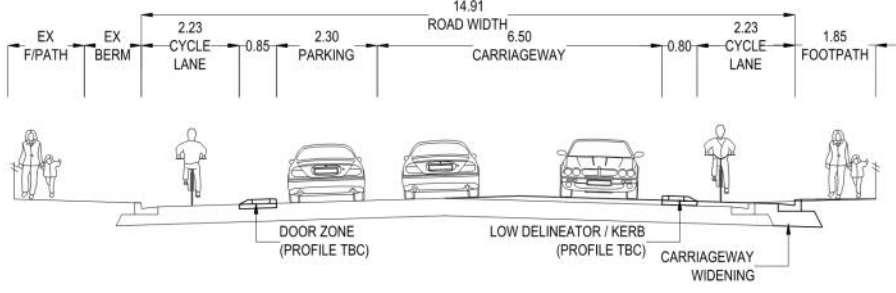


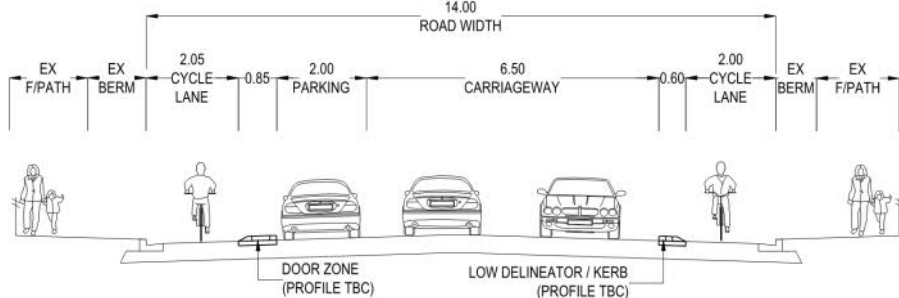
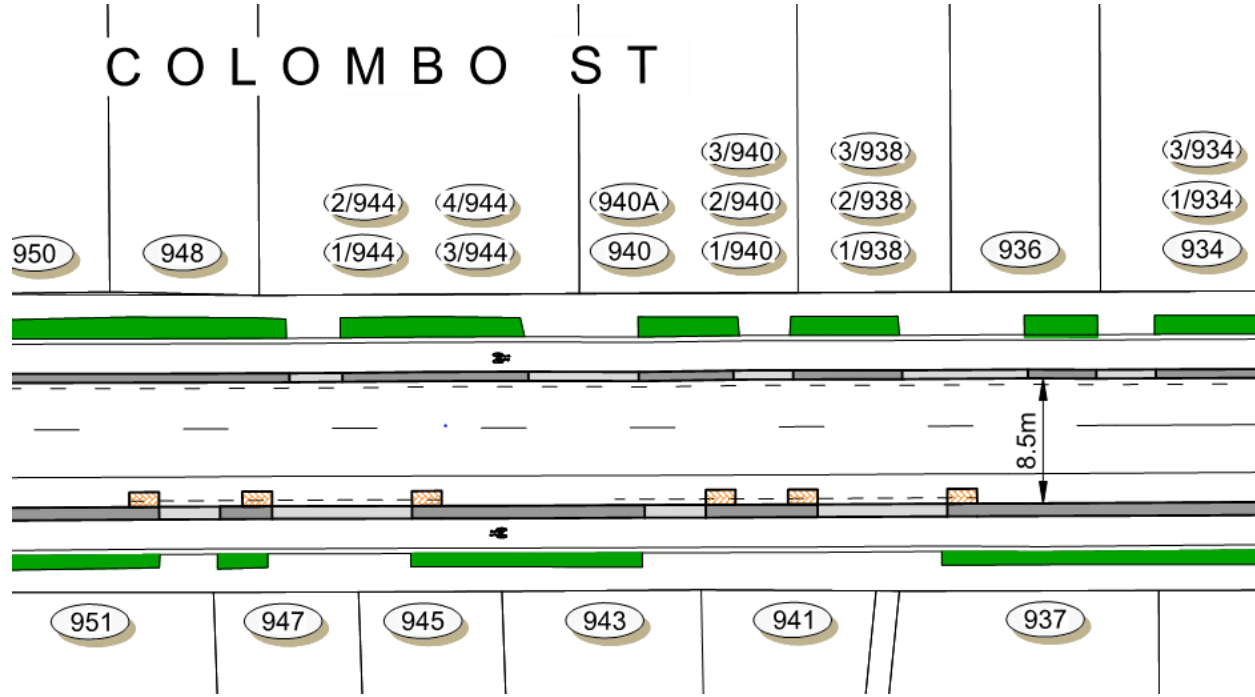
Example Services Plan – WW, WS and SW

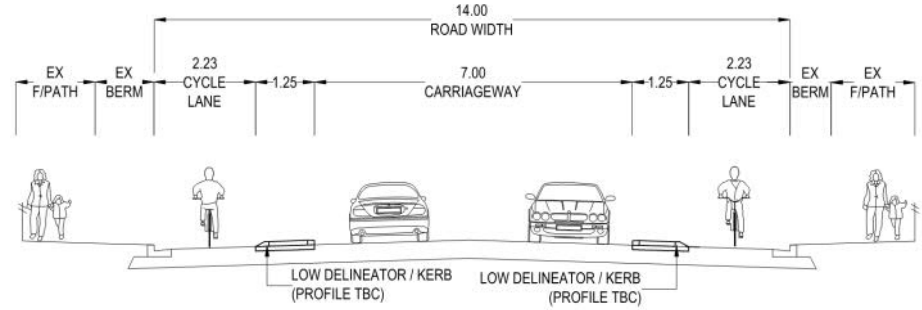
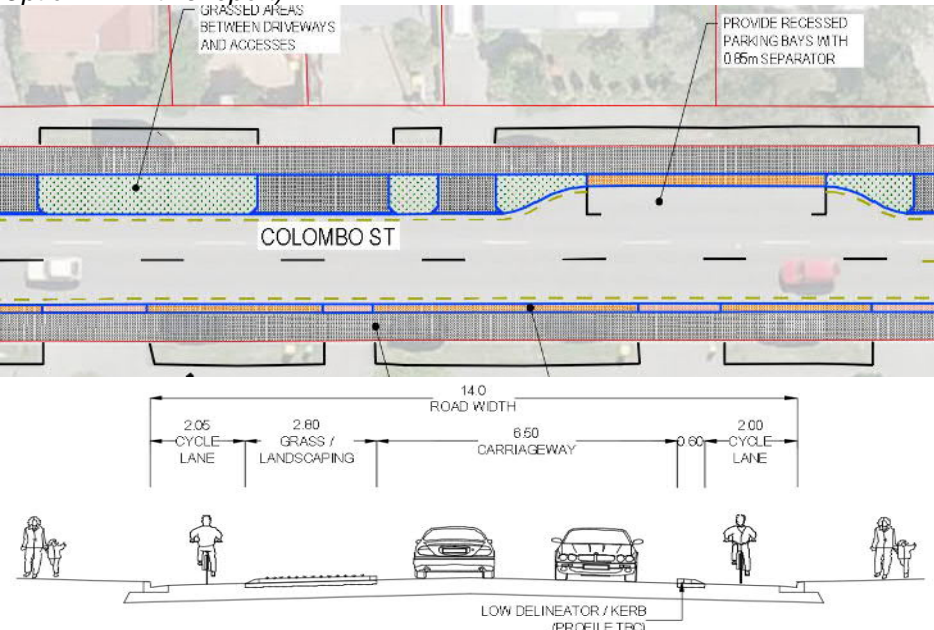
2.1 Colombo Street – Option Development

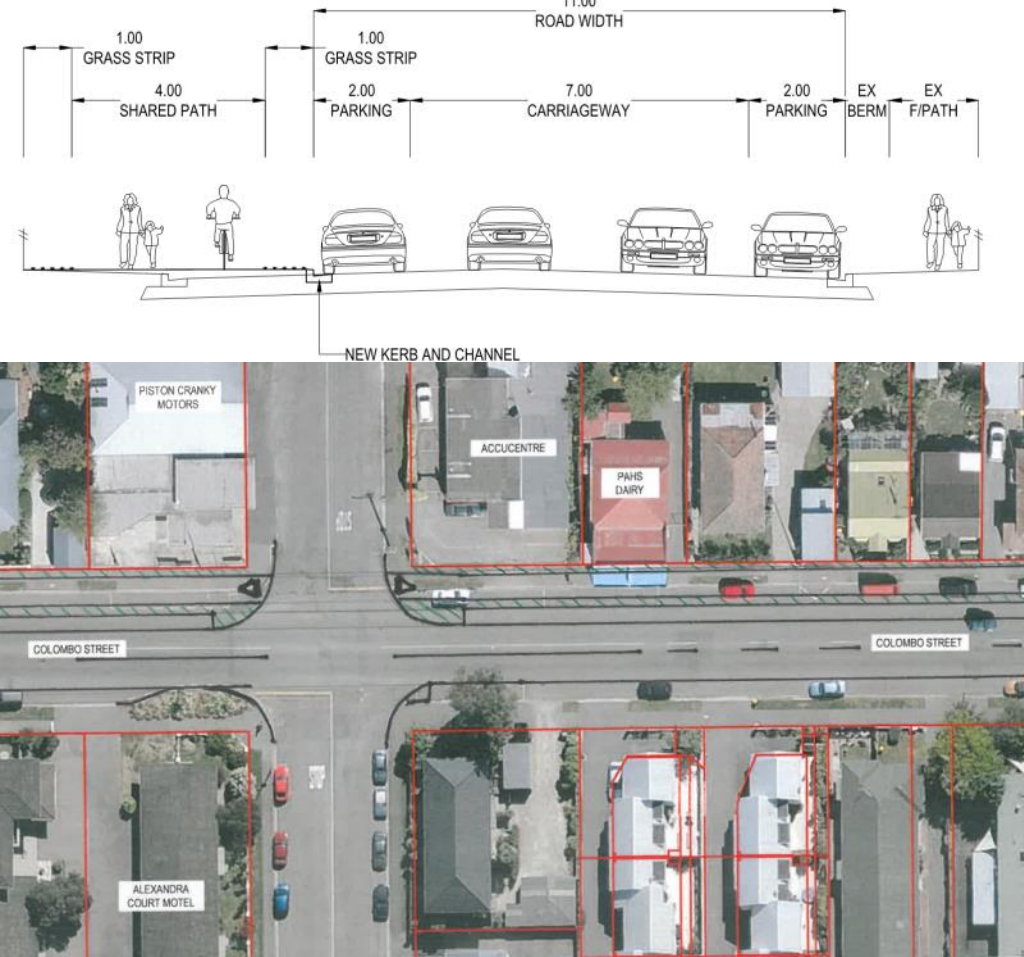
Option	Description	Description and Outcome	Pros	Cons
Option 1	Colombo Street Do minimum – On Road Cycle Lanes	<p>Provide on road one-way cycle lanes in both directions. Within the existing 20m road reserve, the kerb to kerb width is 14.0m. The Do Minimum cross section would accommodate:</p> <ul style="list-style-type: none"> 2 x 3.5m traffic lanes 2 x 1.5m on street cycle lanes 2 x 2.0m on street parking <p>Cycle lanes could be marked in standard green or simply be delineated with 100mm white line and cycle symbols. A rumble strip is recommended to alert errant vehicles to encroachment into cycle lane.</p>  <p>OUTCOME: Based on this option not supporting the Major Cycleway Objectives in particular the lack of separation and on-going encroachment of the cycle lane (by service and on street parking at the kerb side) it was decided not to take the Do minimum Option forward for MCA assessment.</p>	<ul style="list-style-type: none"> Cheapest option Quick and easy to incorporate (no kerb extensions/services relocations/protection Keeps parking along the street (at expense of cyclist safety) Some delineation provided by no physical separation Better than existing (no facilities) Allows additional landscaping in existing verges 	<ul style="list-style-type: none"> Does not provide a level of safety for cyclists consistent with a Major Cycleway Route. Poor safety performance compared to other options as cycle lanes not segregated Lack of comfort for user – as no protection or delineation Inconsistent with adjacent sections Inconsistent for existing traffic volumes Conflicts between cyclists and parked and moving vehicles – similar to existing Cyclists at risk at intersections and conflicts with on street parking traffic Unlikely to encourage new cyclists to use this facility as it does not provide a safe zone for cycling

Option	Description	Description and Outcome	Pros	Cons/Issues to be Addressed
Option 2	Separated on road cycleways (one way)	<p>The separated on road one way facility was the preferred option by CCC. All of the following options 2a, 2b and 2c the traffic volumes and speeds are likely to be similar.</p> <p>Major Cycleway Objectives. Each option has adequate separation and delineation from the traffic and parked vehicles to minimise the potential conflict with other road users. Traffic speeds and traffic volumes are unlikely to differ between the various options. A consistent level of light can be provided for all options as the existing lighting poles are evenly spaced along the route.</p> <p>On-Street Parking. CCC guidelines recommend a 5.0m parking exclusion zone around all driveways along major cycle routes. The additional space can be used to incorporate landscaping along the cycleway. The tracking for vehicles around these landscaping areas has been considered with appropriate manoeuvring space provided. The reduction in on street parking is significant to the point where it was recommended that an alternative strategy be adopted to maintain parking for local residents.</p> <p>Intersections create conflict points for cyclists and crossings require careful consideration at the next phase. Potential options discussed include treatment types and alignment for the cycleway across side roads. Refer later comments in this table.</p> <p>The safest alternative would be to close access of Purchas Street and Canon Street onto Colombo Street. This has not been assessed within this SAR for the following reasons.</p> <ol style="list-style-type: none"> 1. It is proposed to provide additional parking in Purchas Street to offset the loss of parking on Colombo Street. 2. Canon Street provides alternative parking to Colombo Street which is likely to be in more demand with the loss of parking as a result of the Major Cycleway project 3. Access to both roads off Colombo Street may be required following the development of Bealey Avenue / Colombo Street Intersection. <p>Three Options were developed for this type of facility and further discussion is included below:</p> <p>All of the following options 2a, 2b and 2c the traffic volumes and speeds are likely to be similar.</p> <p>The key aspect of difference between each option is the cross section width for the cycle lane and associated separator. (see discussion opposite)</p>	<ul style="list-style-type: none"> ■ Good safety, coherence and Connectivity, directness and comfort for cyclists ■ No potential conflicts with cyclists – other than at intersections where potentially cyclists could use the facility in the wrong direction for convenience. ■ Additional green space generated by parking restrictions if 5m clear zone adopted. ■ Consistent with current CBD proposals and implementation 	<ul style="list-style-type: none"> ■ Marginally reduced width for Options 2B and 2C, however unlikely to be perceived by cyclists ■ Reduced on street parking likely to create public objection ■ Impact on Local Business to be considered ■ Impact on Local Residents to be considered ■ Impact on Public Transport Routes to be considered ■ Site Constraints will need to be addressed
			<p>■ Plan view of typical Separated On Road One Way Cycleway</p>  <p>Cycle Lane Width – Desirable v Minimum Standards</p> <p>The options developed look at either a solution to provide the full desirable standard width for the cycle lane and separator. The MCR group view is that a 2.1 -2.2m width is a desirable standard and 2.0m can be accommodated over short lengths. However, other factors include the width of separator and for options that look to minimise disruption associated with widening, the minimum standard is generally required to allow the option to remain within the existing kerbs. Arguably, most users will generally not notice a 100mm difference in cycle lane width. The issues associated with widening should be part of the consideration when deciding on an acceptable standard. In the case of the options presented below, Option 2B proposes to reduce the cycle lane to 2.0m along Colombo St. This recognises the site constraints and deems the 100mm reduction to be an acceptable compromise. Alternatively the cycle lane could be 2.1m with a reduction in the eastern separator from 0.6m to 0.5m</p> <p>Should the reduced width be taken further CCC will need to agree to a relaxation to the requirements of Table 7-2 in the MCR Design Guideline for One Way separated cycle lanes.</p>	

Option	Description	Details and Outcome	Pros	Cons
Option 2A	Separated on road cycleway (desirable standard widths)	<p>Option 2A widens the existing kerb to kerb road width to accommodate a Desirable Standard cross section. Option 2A consists of the removal of parking along the eastern side of Colombo Street and the construction of a widened carriageway to accommodate 2.2m wide cycle lanes with a 0.80 - 0.85m wide separator on each side of the road. The widening will require the relocation of the eastern kerb lines.</p>  <p>Note variations on the above cross sectional width were discussed and the above – showing a reduced width traffic lane was put forward to keep a desirable minimum footpath width on the eastern side.</p> <p>OUTCOME: It was agreed to take this option forward for MCA review. With good support to the CCC's CW groups objectives the main disadvantages for Option 2A relate to Risks to Delivery and impact on Local Business and Local Residents. Implementation should consider alternatives to support local business and residents and CCC's public transport plan.</p>	<ul style="list-style-type: none"> Good safety for cyclists due to physical separation between cyclists and traffic, however only marginally better (in theory) than Option 2B and 2C Good level of comfort from width of cycleway and one-way cycle traffic, very similar to Option 2B and 2C. On street parking removed on southbound lane gives increased inter visibility Direct route without conflicts with other cyclists – compared to Option 3 and 4. Good desire line match with limited diversions Minimal delays as route is straight and cyclists have priority at intersections 5m parking exclusion zone on northbound lane adjacent to driveways, accesses and intersections increases inter visibility This option offers a continuous route with cyclists having priority at the intersections of Purchas St and Canon St Landscaping provision (based on 5m exclusion zone) will enhance the route aesthetics creating an attractive environment Reduction in the available cross section is likely to constrain traffic and may result in slower speeds. Good coherence and connectivity – Similar to Options 2B and 2C Consider cycle parking facilities at local shops No land purchase requirements 	<ul style="list-style-type: none"> Significant loss in on-street parking when adopting the 5m parking exclusion zone on northbound lane results in a total on street parking provision of 20 spaces. Colombo St currently provides 154 spaces. Refuse trucks must straddle cycle separator on southbound lane to reach kerbside to collect bins. This will conflict directly with cyclists travelling south. More expensive than Option 2B-4 which utilise existing kerb to kerb width. There are a significant amount of services in each verge along the length of Colombo St. Widening the carriageway to either side may require significant services/utility relocation or protection. Note a 300mm water main is located under the eastern road shoulder with laterals to the sub main to be considered. Chorus and Orion underground Telecom and Power cables located in eastern footpath/verge. Stormwater laterals to be adjusted Existing Bus Shelters on the east side will need to be altered, as the reduced verge/footpath does not leave enough space to maintain the existing facility. Impacts on local businesses if loading zones / P5 zones cannot be maintained.(see alternative below) Impacts on local residents if bus stops need to be relocated. .(see alternative below) Negative impact on Local Residents with loss of parking and not alternative provided May also lead to safety issue at night with longer than expected journeys for pedestrians Buses in the southbound lane will have to stop in the traffic lane to pick up / drop off passengers, causing disruption to traffic and possible safety issues due to 6.5m wide carriageway. Alternative alignment to be considered.

Option	Description	Description and Outcome	Pros	Cons
Option 2B	Separated on road cycleway (minimum width using existing cross section)	<p>Option 2B is based on Option 2A, however the widths of the cycle lanes, separators and parking bays have been reduced slightly to ensure the cross section stays within the existing kerblines. This option has been considered to ensure a cost effective alternative to the desirable standard is achievable should the project budget be restricted.</p>  <p>Option 2B provides a cycleway that is compliant with the design guidelines for the Major Cycleway Network but will have localised narrowing around parking areas. This localised narrowing will not allow cyclists to ride two abreast. However, it is unlikely to affect the overall safety of the cycleway as these sections are relatively short and are well spaced throughout the length of this section. A reduced width separator on the east side is proposed to be 0.60m as parking has been removed on this side. The west side parking is to be maintained with a 0.85m separator provided which is considered the minimum standard to allow for passenger door space</p> <p>OUTCOME: Take forward for MCA assessment – consider alternative local treatments at existing P5/30 zones, bus stops, mid-block intersections and to retain as much on street parking as possible. Seek approval of 2m exclusion zone.</p>	<ul style="list-style-type: none"> Increased safety for cyclists due to physical separation between cyclists and traffic.(assume that from a cyclists perspective very similar to Option 2A) Good level of comfort from width of cycleway and one way cycle traffic. On street parking removed on southbound lane gives increased inter-visibility. 2m parking exclusion zone on northbound lane to retain as much parking as possible A continuous route with cyclists having priority at the intersections of Purchas St and Canon St. No kerb widening which removes any need to relocate services. This reduces cost and improves constructability. Cheapest option - has less capital cost than Options 2A,C and D. Could be implemented quickly as no kerb widening and service relocations are required. No requirement to purchase land. Consider cycle parking facilities at local shops. 	<ul style="list-style-type: none"> Significant overall loss in on street parking is likely to cause public unhappiness with the project. This option reduces on street parking from 154 spaces to 33 spaces. Recommend reduction in exclusion zone to retain more parking for residential use. Refer option 2a, above. Reduction in 5m exclusion zone would be a departure from Guideline. The guideline does not have a desirable minimum dimension for parking exclusion Bus stops on the Eastern side will need to stop on road, resulting in potential safety issues or delays to southbound motorists (refer alternative). It should be noted that having bus stops within the lane is not uncommon in Christchurch on roads with this AADT. Refuse trucks must straddle cycle separator on southbound lane to reach kerbside to collect bins. Impacts on local businesses if loading zones cannot be maintained. (alternative required) Impacts on local residents as bus stops will need to be relocated. Does not comply with CCC Major Cycleway guidance. Cycleway width does not comply with Table 7-2 of MCR Best Practice Design Guide Reduced widths of cycle lanes and delineators could affect rider comfort and have a small effect on safety. However the designer considers the user will not notice the difference
				

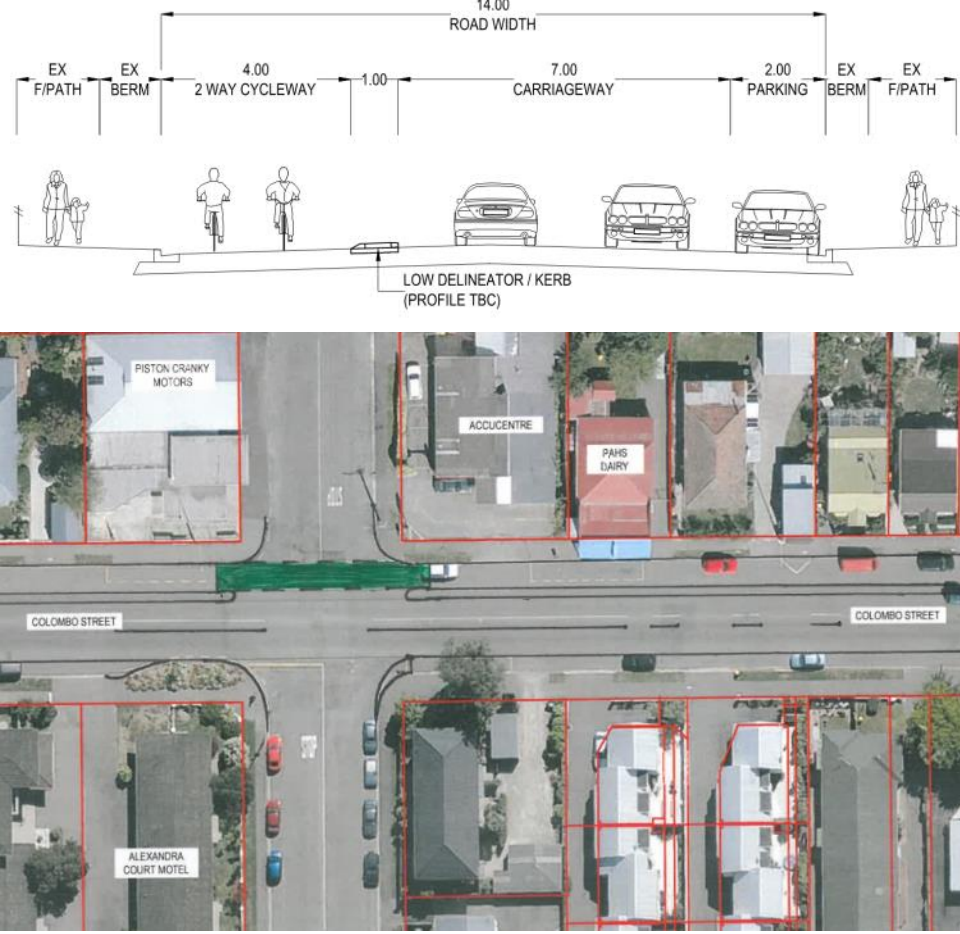
Option	Description	Description and Outcome	Pros	Cons
Option 2C	Separated on road cycleway (remove on-street parking)	<p>This option is based on option 2, this option removes all on street parking for the length of Colombo Street. This option does not require carriageway widening.</p>  <p><i>Figure 1.3: Separated cycle lanes within existing carriageway. No parking provision for Colombo St.</i></p> <p>OUTCOME: The Team agreed that this option was desirable for cyclists as removal of parking allows wider separators that provide more security for cyclists. It provides better visibility between cyclists and motorists that is desirable from a safety and security viewpoint. However, implementation would likely meet with strong objection from the Community. Therefore, this option is not preferred over other options that support local business and residential requirements. Application of alternative to retain some existing on street parking is recommended.</p>	<ul style="list-style-type: none"> Desirable cycleway standards achieved Increased safety for cyclists due to wider physical separation between cyclists and traffic. Added comfort from width of cycleway and one-way cycle traffic. Removal of on street parking gives increases comfort and safety for cyclists. This option offers a continuous route with cyclists having priority at the intersections of Purchas St and Canon St. There is no requirement for kerb widening which removes any need to relocate services. This reduces cost and improves constructability. Increased Landscaping provision due to increased separator widths will enhance the route for all users. No requirement to purchase land. Consider cycle parking facilities at local shops. 	<ul style="list-style-type: none"> Removal of on street parking is will lead public objection to the scheme. Residents likely to park in cycle lane, more likely with higher density development on the eastern side of Colombo St. Without viable alternative parking areas designated, unsafe parking in verge or cycleway more likely Bus stops on both sides will need to stop on road, resulting in potential safety issues or delays to southbound motorists Refuse trucks must straddle cycle separator on southbound lane to reach kerbside to collect bins. Customers are much less likely to stop at local businesses if loading zones /P5 /30 cannot be maintained and they cannot park outside. Impacts on local residents as bus stops will need to be relocated. Wider carriageway – and open aspect likely to increase traffic speeds relative to Options 2A and 2B, 3 and 4. Removal of all on street parking will be a political issue once released for consultation – likely to result in delays and redesign to accommodate parking for local businesses etc.
Option 2D	Separated on road cycleway (wider verge/grass area)	<p>This option is based on option 2B. However, this option introduces new kerb on the west side of Colombo Street and build 2.8 m wide verge/grass area as the separator. <i>An alternative put forward by CCC is to apply the proposed cycleway within existing kerb lines but adopt the 5 m exclusion zone (known as Option 1D in this report).</i></p>  <p>OUTCOME: No taken to MCA Assessment due to high impact on local business and residential on street parking. (Second Preferred)</p>	<ul style="list-style-type: none"> Provides good sight distance to northbound cyclists Enhanced green space within road reserve Complies with standard kerb returns for easy street cleaning Opportunity to enhance green space in the future 	<ul style="list-style-type: none"> Limited on street parking opportunities Likely to be subject of objections from local businesses and residents Removal of all on street parking will be a political issue once released for consultation – likely to result in delays and redesign to accommodate parking for local businesses etc More cost than Option 2B with addition of excavation and reinstatement of existing road surfaces and additional kerb lines needed.

Option	Description	Description and Outcome	Pros	Cons
Option 3	5m wide shared path	<p>Option 3 – This option provides a 4-5m off road shared use path to cater for cyclists and pedestrians. The carriageway would be narrowed to 12m but still achieves 7.0m carriageway with on street parking provision on both sides of Colombo St.</p>  <p>OUTCOME: The Team decided to take this option forward for MCA review. Consideration to reduce 5m parking exclusion zone to facilitate on street parking demand is recommended. Bus stops and P5/30 parking restrictions can be accommodated in parking areas on west side. If this option is preferred (following the MCA assessment) the cross section width alternatives (shown opposite) should be reviewed at the next phase</p>	<ul style="list-style-type: none"> ■ Maintaining on street parking will satisfy local residents. ■ Off street cycle facilities maximise safety and negates vehicle conflicts. ■ Bus stops and loading zones can be maintained on both sides of Colombo St. ■ Familiar layout will make cyclists feel comfortable. ■ No carriageway widening therefore no service relocations. ■ Parking areas can accommodate existing Bus stops and P5/P30s for local businesses ■ Refuse collection is unaffected by the facility. ■ No requirement to purchase land. ■ Consider cycle parking facilities at local shops. 	<ul style="list-style-type: none"> ■ Increased chance of conflicts between cyclists and pedestrians (on shared path). ■ Pedestrians likely to walk in cycle area - requiring delineation or Copenhagen Style path if possible. ■ 5m parking exclusion zone reduces available on street parking by 87%. (Consider reduction in exclusion zone to increase on street parking closer to existing level) ■ Safety/ Delay -Cyclists would not have priority at intersections ■ Minimal green space for larger tree planting and Narrow green space strips may be difficult to maintain ■ Accommodation works to the canopy of Pah's Dairy would be required as the supports sit on the edge of the existing footpath and would subsequently be in the middle of the shared path.

Possible Alternative Cross Section Widths

Several alternative widths could be put forward and further development at the next stage is recommended to ensure the best fit solution for all options.

- Alternative – Option 3B - Adopt Copenhagen Style path to separate pedestrians and cyclists
- Alternative – Option 3C -change 1.0m grass strip between on street parking and shared path to mountable island with cobble/concrete infill (less green space)
- Alternative – Option 3D -change 1.0m grass strip at LHS boundary to remain as footpath – create separation between LHS footpath and on street parking and shared path to mountable island with cobble/concrete infill
- Alternative – Option 3E - change 1.0m grass strip between on street parking and shared path to mountable island with cobble/concrete infill

Option	Description	Description	Pros	Cons
Option 4	Two way on road cycleway (within existing carriageway)	<p>This option retained existing kerb lines with the installation of a 3.5m two-way cycleway on one side of Colombo Street with parking provided on the other side of Colombo Street. The cycleway would be separated from the footpath with the provision of a narrow verge.</p>  <p>Figure 1.5: 2 Way on road cycleway</p> <p>OUTCOME: The Team felt that this option provided good separation between cyclists and motorists and pedestrians but two-way cycleways may create conflict between cyclists. Option to be put forward for MCA review.</p>	<ul style="list-style-type: none"> Clearly defined layout reasonably direct Good separation to pedestrian and motorists Similar levels of comfort to other options Reduction of on street parking improves inter visibility of cyclists/motorists. Layout would be familiar to users due to other applications within Christchurch. No requirement to purchase land. Consider cycle parking facilities at local shops Provides desirable separation between cyclists and vehicles. Cyclists maintain priority over side road vehicles 	<ul style="list-style-type: none"> Conflict possible between cyclists Slightly more complicated than one way options Significant overall loss in on street parking is likely to result in objections from local residents and businesses (consider reduction in 5m Clear Zone is recommended) Refuse collection would be impacted on and would be a hazard for cyclists Impacts on local businesses if loading zones cannot be maintained. Impacts on northbound bus stops - will need to be accommodated.


- Bus Stop Treatment Alternative should be considered
- Loading zones P5/P30 parking restrictions Need to be considered
- On Street Parking to be maintained should consider a reduced clear zone to retain as much on street parking as possible (as parking lost entirely on east side of Colombo St)

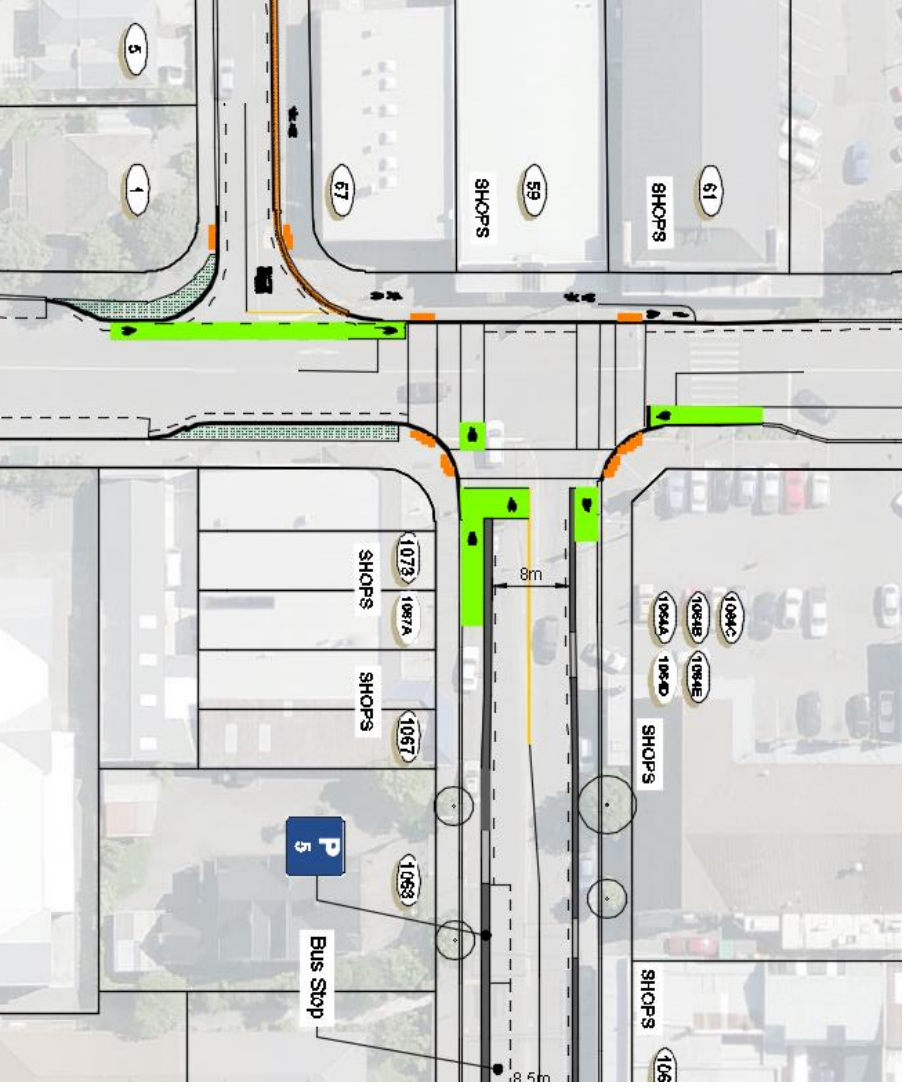
	OPTIONS							
	Western Side 2-way	Eastern Side 2 way	2B Trimmed edge (5m exclusion)	2B Original (2m exclusion)	2D (5m exclusion)	EXISTING	MWH 3-5-8m	
Public Parking	37	46	18	35	13	104		38
P5	6	6	3	6	3	6		6
P30 & Mobility	11	5	2	4	1	20		4
P120	6	8	0	0	0	15		0
Total	60	65	23	45	17	145	22	48

3.0 Edgware Village – Existing Layout

Description	Services and Utilities	Additional Considerations
<p>Edgware village is centred on a staggered intersection of Colombo St, Edgware Rd, and, Trafalgar St. The area has a number of businesses surrounding the intersection, including, a pub, supermarket, pharmacy, hardware, take-away restaurants etc.</p> <p>The carriageways are generally wide, approximately 13m with both formal and informal pedestrian crossing facilities provided.</p>	<p>For Services and Utilities plans refer Appendix C.</p>	<p>There are no formal facilities for cyclists. The AADT of Edgware Rd is approximately 9000vpd.</p> <p>Christchurch City Council are currently developing a master plan for the village area, which is likely to maintain a kerb and channel type environment due to flooding issues, however the master plan is likely to increase footpath widths and increase landscaping features within the extent of the project. Each of the proposed options discussed below would suit the proposed improvements.</p>

3.1 Edgware Village – Options Consideration


Option	Design	Description	Pros	Cons
Option 1	Copenhagen style path	<p>This option will require cyclists using the southbound cycleway on Colombo Street to cross the road at a signalised crossing on Colombo Street. These cyclists will join the cyclists using the northbound cycleway on Colombo Street on a contraflow Copenhagen style cycleway on the western side of Colombo Street. This will lead up to a signalised crossing on Edgware Road between Colombo Street and Trafalgar Street. This will link into a shared path that leads to Trafalgar Street. The existing stop control at Colombo St intersection at Edgware and the splitter island and pedestrian refuge is to remain unchanged.</p> 	<ul style="list-style-type: none">■ Copenhagen path minimises conflicts between cyclists, pedestrians and motorists.■ Signalised crossings provide a safe method of crossing both Edgware Rd and Colombo St.■ Pedestrian desire lines are maintained.■ Business accesses remain unaffected.■ Works with options 1, 2 & 3 for Colombo St (described above).■ Traffic signal timings can be used to help reduce traffic volumes on Edgware Rd and Colombo St.■ <i>This option will call a cyclist phase at the crossing allowing cyclists to cross the road at the provided crossing points while traffic is stopped. There is a risk that traffic turning left from Colombo Street may not see signals for the Edgware Road crossing. Cyclists will be separated from traffic through Edgware Road.</i>■ <i>Users should easily recognise this option with the crossing movements being simple movements. This option would form a continuous link between the cycleways on Colombo Street and Trafalgar Street.</i>■ <i>The crossings provided should be simple to use and relatively familiar to most cyclists. The ride quality should be the same as the other option</i>■ Good connectivity to Trafalgar St facility	<ul style="list-style-type: none">■ Small loss of on street parking.■ Unfamiliar layout within Christchurch and New Zealand could lead to initial confusion for cyclists and pedestrians.■ <i>This option does not directly increase the visual amenity of Edgware Village by the way of street-landscaping. It is anticipated this will be provided as part of the Edgware Master Plan.</i>■ <i>This option is likely to have comparable construction costs with similar parking restrictions as the other option.</i>■ <i>This option requires southbound cyclists to cross two roads at two different locations however, extra delay can be minimised in signal design. This will introduce an extra delay for southbound cyclists compared to the other solution.</i>■ Safety for pedestrians in areas of shared use to be monitored■ Commuter Cyclist may use road when signals in operation■ Requires southbound cycles to cross back to east side. Not ideal connectivity to Colombo St facility for southbound users


		<p><i>Figure 2.1: Copenhagen path</i></p> <p>Whilst this option provides a single crossing it creates potential for high volume pedestrian and cyclist interaction, as cyclists are concentrated across Edgware Road. Similarly, when crossing Colombo Street south of Edgware where south bound cyclists return to the east side of Colombo. Colombo Street traffic may need advanced warning of shared path facility.</p> <p>OUTCOME: Take forward for MCA review. Slightly less favoured than option 2, but marginal cons compared to Option 2.</p>		
Option 2	Signalised T-intersection with shared spaces	<p>This option will be the signalisation of the Colombo Street / Edgware Road intersection and the construction of a shared cycleway along the northern side of the Edgware Road to connect to facilities provided for Trafalgar Street.</p>  <p><i>Figure 2.2: Signalised intersection</i></p> <p>This option could be adapted later to a Barnes dance style facility, where all traffic stops. However at this point the traffic volumes on Edgware are significant and delay may have adverse performance affects. Modelling of the intersection is required to determine the best solution.</p> <p>OUTCOME: Take forward for MCA review. The chosen facility will be the best fit for the selected facility on the adjacent sections (Colombo Street and Trafalgar Street subject to traffic modelling outcomes)</p>	<ul style="list-style-type: none"> ■ Signalised crossings provide a safe method of crossing both Edgware Rd and Colombo St. ■ Pedestrian desire lines are maintained. ■ Business accesses remain unaffected. ■ Works with options 1, 2 & 3 for Colombo St (described above). ■ Traffic signal timings can be used to help reduce traffic volumes on Edgware Rd and Colombo St. ■ This option will call a cyclist and pedestrian crossing phase on all approaches to stop traffic entering the intersection. Cyclists will be separated from traffic through Edgware Road. ■ Users should easily recognise this option with the crossing movements being simple movements. This option would form a continuous link between the cycleways on Colombo Street and Trafalgar Street. ■ This option will form the most direct route as it will require cyclists in both directions to use one signalised crossing ■ The crossings provided should be simple to use and relatively familiar to most cyclists. The ride quality should be the same as the other option. 	<ul style="list-style-type: none"> ■ Small loss of on street parking. ■ Likelihood of conflict between pedestrians and cyclists is increased due to shared spaces. ■ This option does not directly increase the visual amenity of Edgware Village by the way of streetscaping. It is anticipated this will be provided as part of the Edgware Master Plan. ■ This option is likely to have comparable construction costs with similar parking restrictions as the other option.

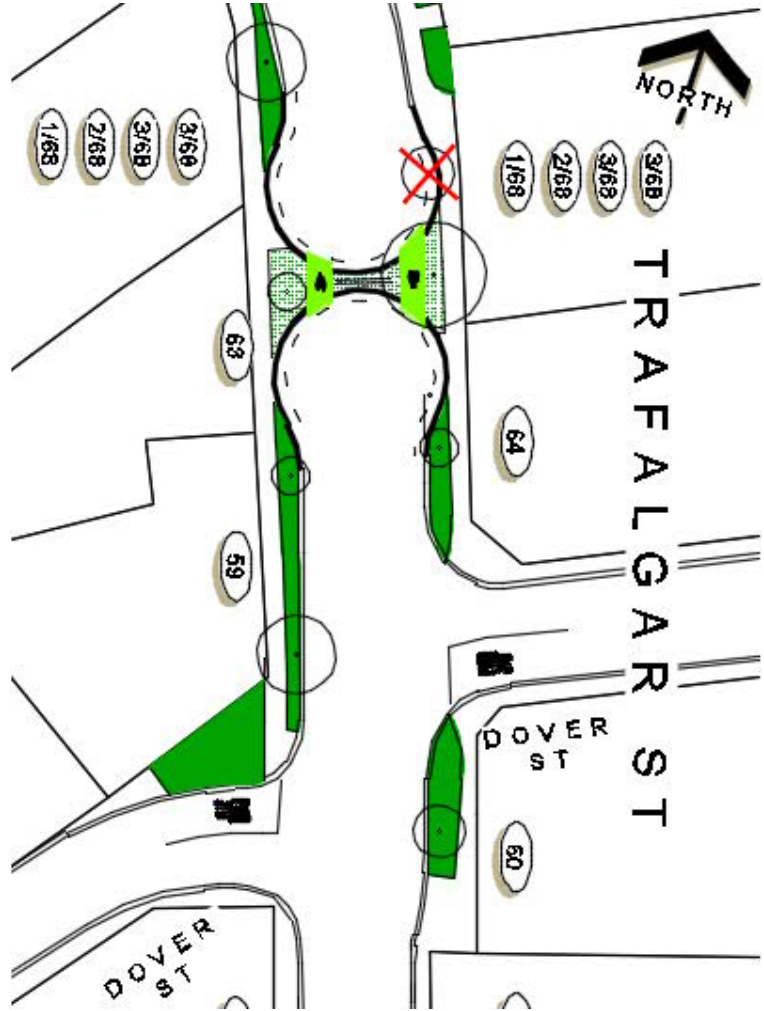
4.0 Trafalgar Street – Existing Layout

Description	Services and Utilities	Additional Considerations
<p>Trafalgar St is a residential St with low density development. The existing carriageway varies in width between approximately 6m and 8m.</p> <p>Trafalgar St has already some threshold treatments installed along with a number of road humps, however, Trafalgar St is still used as a “rat run” to avoid Cranford St in the peak hours.</p> <p>At the northern end of Trafalgar St, St Albans School is accessed from Sheppard Pl and Westminster St. At drop off / pick up time, there is a significant increase in the amount of parked vehicles and vehicles using Trafalgar St.</p>	For Services and Utilities plans refer Appendix C.	There are no formal facilities for cyclists. The AADT of Trafalgar Street is ~2,625vpd.

4.1 Trafalgar Street – Option Development

Option	Design	Description	Pros	Cons
Option 1	4m Shared Path, off road on east side	<p>This options involves the construction of a 4.0m shared path on the eastern side of Trafalgar St. The path will be hard up agaist the road reserve boundary and require some width from the existing carriageway.</p> <p>The shared path segregates the cyclists from traffic and gives shared path users priority over side road traffic. These side road crossings will require clear signage and marking to establish that the shared path has priority over side road traffic as set out in the Major Cycleway Design Guide. The shared path will run mainly along the boundary so will be next to property boundary fences. This will severely limit the inter-visibility of cyclists and vehicles exiting properties that could potentially have large implications on the safety of the shared path.</p> <p>This option does not attempt to reduce traffic volumes although they would be largely segregated from cyclists.</p> <p>The proposed layout allows for 2.3m wide parking bays with a 1.0m door zone to separate pedestrians from vehicles on the west side of Trafalgar St.</p>  <p><i>Figure 3.1: Shared path</i></p> <p>OUTCOME: Take forward for MCA review, some implementation issues to consider are SW level changes due to the new shared path.</p>	<ul style="list-style-type: none"> ■ Maintains Trafalgar Street as a continuous route. ■ Provides formal parking areas. ■ Inclusion of trees / planting creates a pleasant experience for cyclists. ■ Facility would work well with tidal traffic at school times ■ This option requires cyclists to use a shared path that separates them from traffic. Intersection crossings could potentially problematic as it may not be clear who has priority ■ This option will be continuous for the length of the road and will have way finding consistent with other Major Cycleways to ensure it is recognisable as a Major Cycleway. This option will provide a consistent level of protection through the length of Trafalgar Street ■ This option will give shared path users priority over side road traffic. Appropriate signage and road marking are required to establish shared path priority. ■ This option will provides the most direct line to St. Alban Street/Edgware Village and the rest of the cycleway. ■ A shared path would be attractive to less confident cyclists, as this would separate them from traffic. ■ This option has few complicated manoeuvres. 	<ul style="list-style-type: none"> ■ Highest cost option ■ High risk of conflict with vehicles exiting driveways. ■ Option does not offer a greenway effect that is desired by the Client for this street. ■ Existing power poles would require undergrounding to remove from middle of shared path. ■ Cyclists have priority but safety issues may occur at Sheppard Place where there is a high volume of turning traffic during school peaks due to St. Albans School. ■ Pathway would undulate due to number of property accesses. ■ Loss of parking compared to existing situation will be an issue for the local residents at consultation. ■ Option 1 requires the removal of the existing lights on the eastern side so a full lighting design will be required to ensure adequate lighting is provided for the shared path. Options 2 and 3 do not require any changes to the existing carriageway so the existing lighting mast arms can be used if any lighting upgrades are required. ■ This option will likely have level changes due to the presence of driveways. ■ This option would not provide any opportunities to enhance the streetscaping on Trafalgar Street to compliment the surroundings. This does not preclude any potential future changes to upgrade. ■ Removes existing trees in the eastern verge to accommodate the shared path

Option	Design	Description	Pros	Cons
Option 2	Neighbourhood greenway with traffic calming and recessed parking area on the west side	<p>This option severs Trafalgar St at the intersection of Dover St. with the construction of a cul de sac arrangement, with through route for cyclists. This significantly reduces traffic flows along Trafalgar St. Dedicated parking bays are provided on both sides of Trafalgar St. Parking bays are staggered along the route.</p> <p>The severance will eliminate all through traffic so only traffic related to the land served by Trafalgar Street will be present. Trafalgar Street services approximately 38 houses on the southern side of the severance while north of the severance, Trafalgar Street services 90 homes and St. Albans School (with a school roll of 523 students as of 2013 ERO Report). The NZ Trips and Parking Database indicate each home is likely to generate 10 vehicles / day / house while primary schools generate 1.4 vehicles /day /pupil. This equates to traffic volumes of approximately 380 vehicles/day south of the severance and approximately 900 vehicles/day due to the houses north of the severance and approximately 700 vehicles/day due to St. Albans School.</p> <p>This option requires cyclists to ride on the existing road with lower traffic volumes than current/forecasted volumes. This will result in cyclists interacting with cars less often reducing potential conflicts.</p> <p>This option will be continuous for the length of the road and will have way finding consistent with other Major Cycleways to ensure it is recognisable as a Major Cycleway. This option will provide a consistent level of protection through the length of Trafalgar Street</p> <p>This option will require traffic modelling to assess the impacts on the surrounding road network.</p>  <p><i>Figure 3.2: Neighbourhood Greenway with Traffic Calming</i></p> <p>OUTCOME: Take forward for MCA review. Option requires lower volumes on Trafalgar St that can be achieved with proposal to cul-de-sac at Dover Street. More expensive than Option 3, cheaper than Option 1.</p>	<ul style="list-style-type: none"> Traffic volumes would be reduced and greenway concept would be achievable in line with Client aspirations. However, the short section of road between Sheppard Place and St. Alban Road is likely to have traffic volumes approximately 100 vehicle/day above requirements for a greenway due to the presence of St. Albans School. Formal parking areas are created for residents. Cyclists can cut through the cul de sac, thus providing a direct route. Improved landscaping features can be incorporated into the scheme to improve the environment for all users. This option provides some opportunities for landscaping on Trafalgar Street to make it a visually attractive environment. The low speed environment and traffic volumes will make this attractive to less confident cyclists Cheaper than Option 1 	<ul style="list-style-type: none"> Residents may object to the cul de sac and severance. Dover St north would be turned into a very long cul de sac / dead end with potential operational issues for rubbish collection and street sweepers This option will provide a good quality riding surface and will limit the any complicated manoeuvres. During the school peak periods, there will be high volume of turning movements at the Sheppard Place / Trafalgar Street intersection to access St. Albans School. This option will require extensive consultation to close the short section of Trafalgar Street. There is a potential risk that creating a cul-de-sac in options 2 and 3 will cause traffic to divert to another part of the network that may not have sufficient capacity and will reduce the performance of other intersections. There is also a risk that the severance of Trafalgar Street may be unpopular with residents as this may result in longer journeys More expensive than Option 3

Option	Design	Description	Pros	Cons
Option 3	Neighbourhood greenway using existing layout	<p>The option involves severing Trafalgar St at the intersection with Dover St, as per option 2. The remainder of the route remains the same as the existing situation.</p> <p>The severance will eliminate all thoroughfare traffic so only traffic related to the land served by Trafalgar Street will be present. Trafalgar Street services approximately 38 houses on the southern side of the severance while north of the severance, Trafalgar Street services 90 homes and St. Albans School (with a school roll of 523 students as of 2013 ERO Report). The NZ Trips and Parking Database indicates each home is likely to generate 10 vehicles/day/house while primary schools generate 1.4 vehicles/day/pupil. This equates to traffic volumes of approximately 380 vehicle/day south of the severance and approximately 900 vehicles/day due to the houses north of the severance and 700 vehicles/day due to St. Albans School.</p> <p>This option will require extensive consultation to cul de sac the short section of Trafalgar Street (at Dover St). This option will require traffic modelling to assess the impacts on the surrounding road network</p>  <p>Figure 3.3: Cul de sac only</p>	<ul style="list-style-type: none"> Traffic volumes would be reduced and greenway concept would be achievable in line with Client aspirations. However, the short section of road between Sheppard Place and St. Alban Road is likely to have traffic volumes approximately 100 vehicle/day above requirements for a greenway due to the presence of St. Albans School. Cyclists can cut through the cul de sac, thus providing a direct route. Improved landscaping features can be incorporated into the scheme to improve the environment for all users. Surface changes enhance environment. Cost of implementation would be cheaper than options 1 & 2. This option will be continuous for the length of the road and will have way finding consistent with other Major Cycleways to ensure it is recognisable as a Major Cycleway. Minimises the delays, as this option will have cyclists on the road so they will not have to give way to traffic on side streets. By putting cyclists on road this means they will be on the most direct line to St. Alban Street/Edgeware Village This option will provide a good quality riding surface and will limit the any complicated manoeuvres. This option is likely to be the least expensive option as the only construction will be the cul-de-sac elements. Less services/utilities to relocate than option 1 	<ul style="list-style-type: none"> Residents may object to the cul de sac and severance as it will be a longer journey and travel time to some destinations. Dover St north would be turned into a very long cul de sac / dead end with potential operational issues for rubbish collection and street sweepers This option requires cyclists to ride on the existing road with lower traffic volumes than current/forecasted volumes. This will result in cyclists interacting with cars including crossing traffic at cul de sac at Dover Street and merging onto Greenway from each end of the street (from Shared Paths) During the school peak periods there will be high volume of turning movements at the Sheppard Place / Trafalgar Street intersection to access St. Albans School. This option does not include as many landscaping opportunities as Option 2 but it does not preclude future landscaping works and it saves green space on the eastern side compared to Option 1. The low speed environment and traffic volumes will make this attractive to less confident cyclists There is a potential risk that creating a cul-de-sac in options 2 and 3 will cause traffic to divert to another part of the network that may not have sufficient capacity and will reduce the performance of other intersections. There is also a risk that the severance of Trafalgar Street may be unpopular with residents as this may result in longer journeys

		<div><div>WEST</div><div><div><div>14.5</div><div>3.4</div><div>9.00</div><div>2.1</div></div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div></div></div></div><div>EAST</div></div><div>OUTCOME: Take forward for MCA review</div></div>		
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4.2 Trafalgar Street – Option 2 & 3 Tie-in to Adjacent Scheme

There are 2 options for tying the proposed 2 way cycleway and separate footpath into the proposals for the section immediately north of the scheme extents.

Both options for location are similar, and have similar risks for users. Users would encounter residential driveways and a road crossing in both options. In addition, cyclists would be required to cross Trafalgar St for both options to enter or leave the neighbourhood greenway.

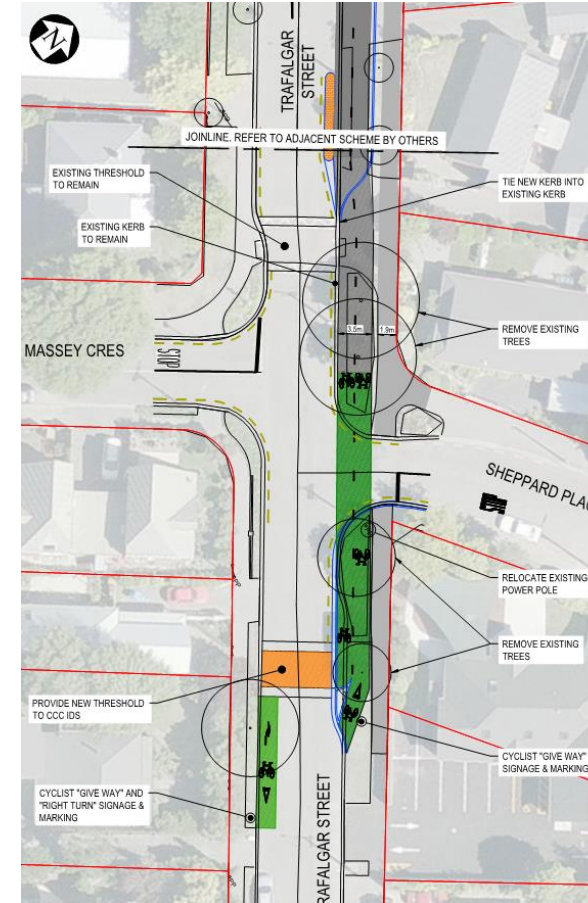
Option 3 (shown opposite) shows the cycle facilities on the eastern side of Trafalgar St. This ties in to the proposals to the north of this section of the route. However, there is an increased chance of conflict between all users of the environment due to the location of St Albans School. There are high traffic volumes around Sheppard Place due to parents dropping off and picking up their children from school. There are also a number of school children who use the footpaths in the vicinity who may spill over onto the cycleway and cause conflicts to occur.

If the path was constructed on the western side of Trafalgar St. the path still has a road crossing (Massey Crescent), however the vehicle movements associated with this are much less than those at Sheppard Pl. There is also likely to be less pedestrian / cyclist conflicts as pedestrians walking to the school are likely to be on the opposite side of Trafalgar St. It should be noted that if the path were to be implemented on the western side of Trafalgar St, a small amount of redesign work would be required by MWH for the next section of the route.

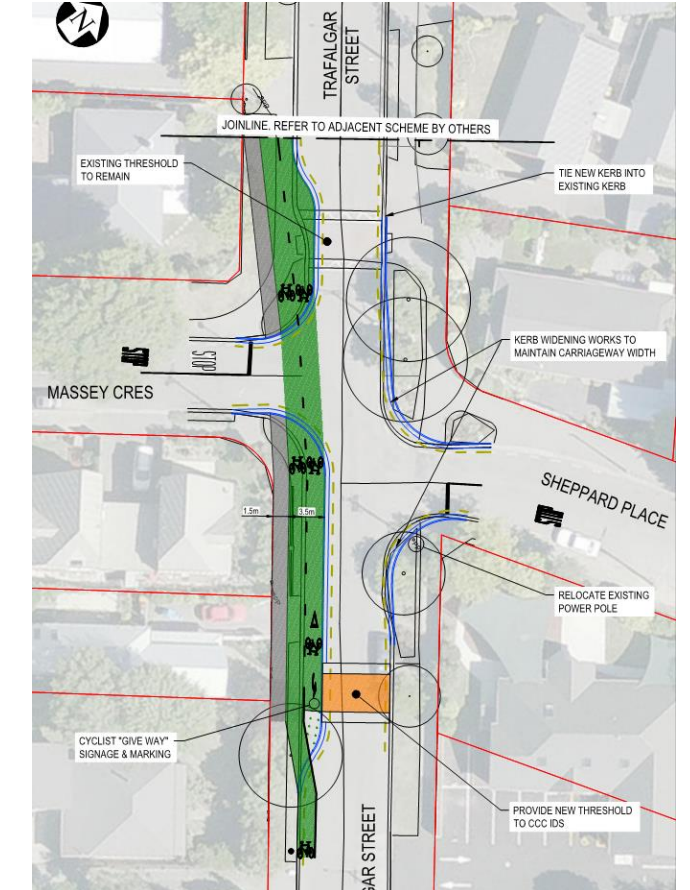
Cost associated with both paths would be similar. Both require a similar scope of works to be implemented.

Considering the above, the preferred option is option 3a, providing the path on the western side of Trafalgar St. It is considered that this option provided the safest route for cyclists and pedestrians.

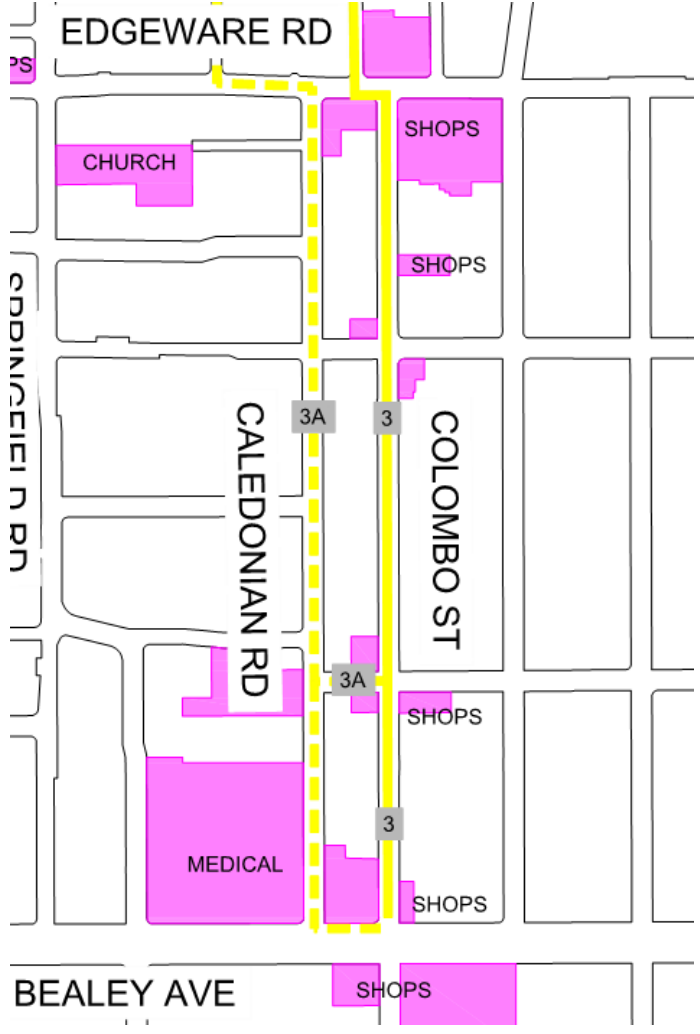
Path on eastern side



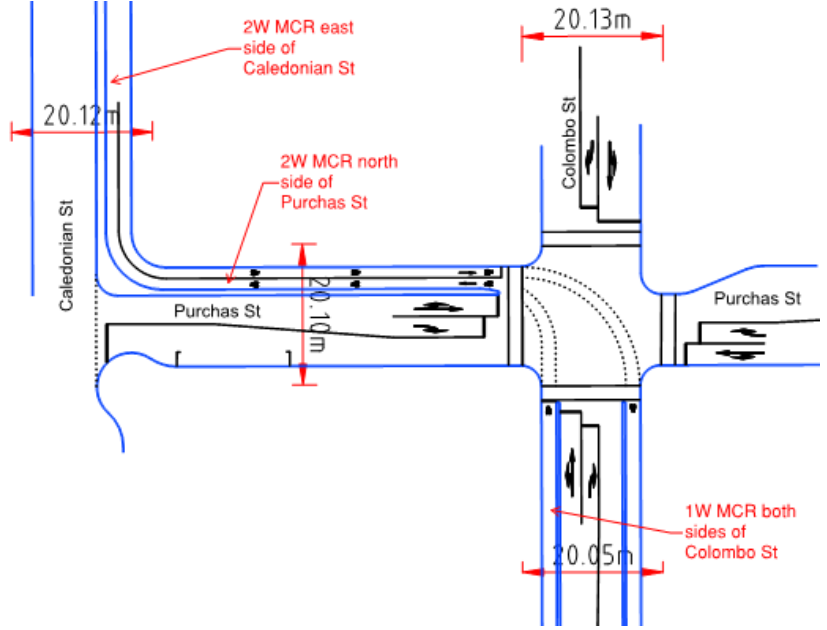
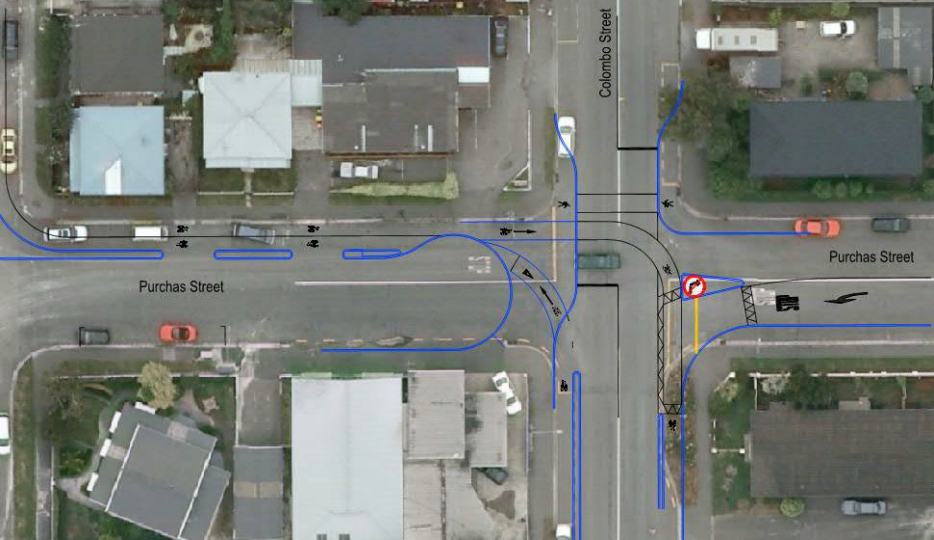
Path on western side

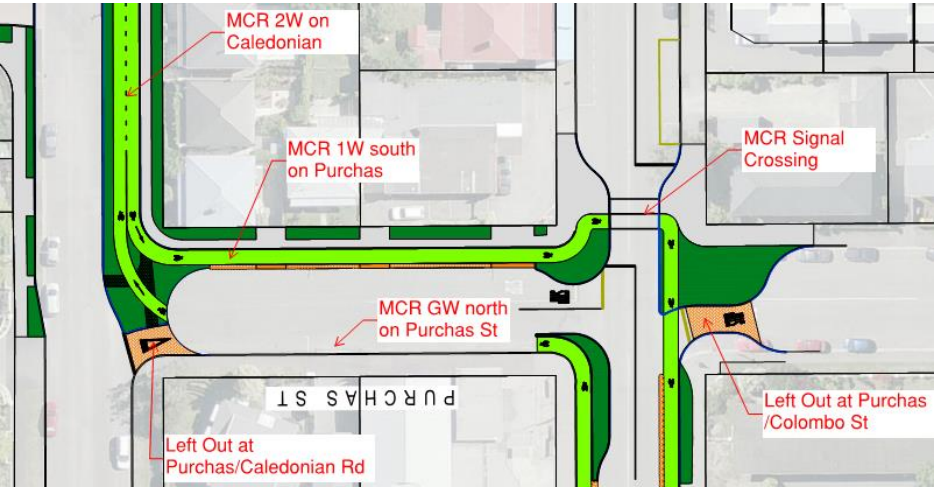
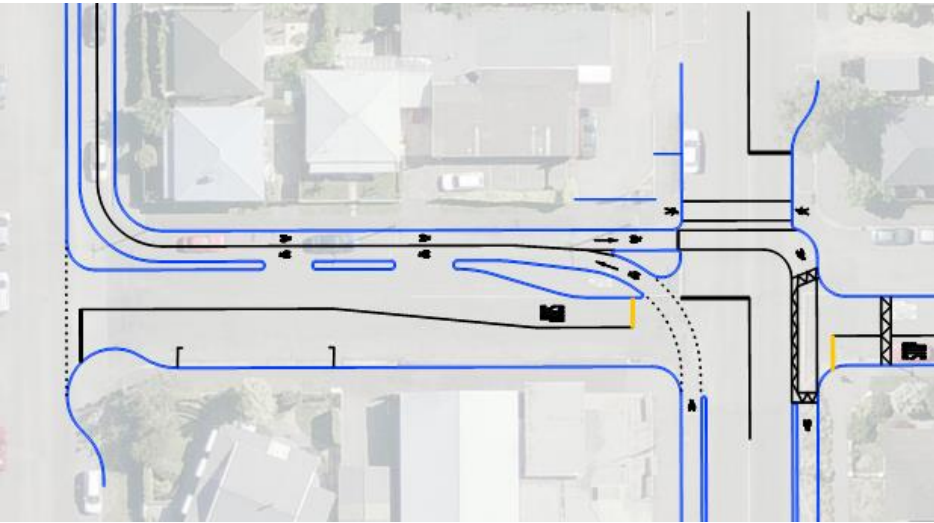


5.0 Yellow Route Alternative – Via Purchas Street and Caledonian Road

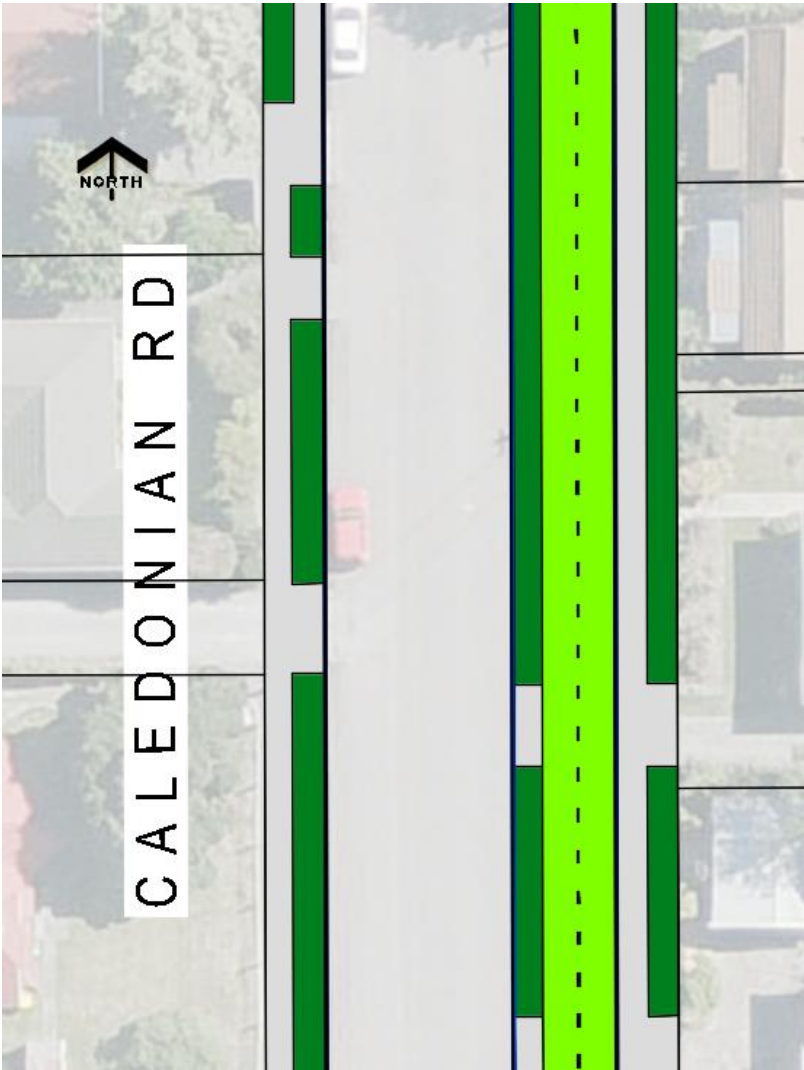
Option	Description	Details	Pros	Cons
5.0 Yellow Route Alternai tives	Yellow Sub Route 3A – via Caledonian Road	<p>The following Yellow Route is a suggested alternative to the Colombo Street route. This route as shown in the figure below.</p> <p>The MCA review suggests route 3A along Purchas and Caledonian could be implemented</p> 	<ul style="list-style-type: none"> Less impact on Local Business and Residential on street parking than Colombo Street 	<ul style="list-style-type: none"> Less direct for cyclists wanting to travel on the route desire line. Some connections required to local amenity Less obvious with link through Purchas Street

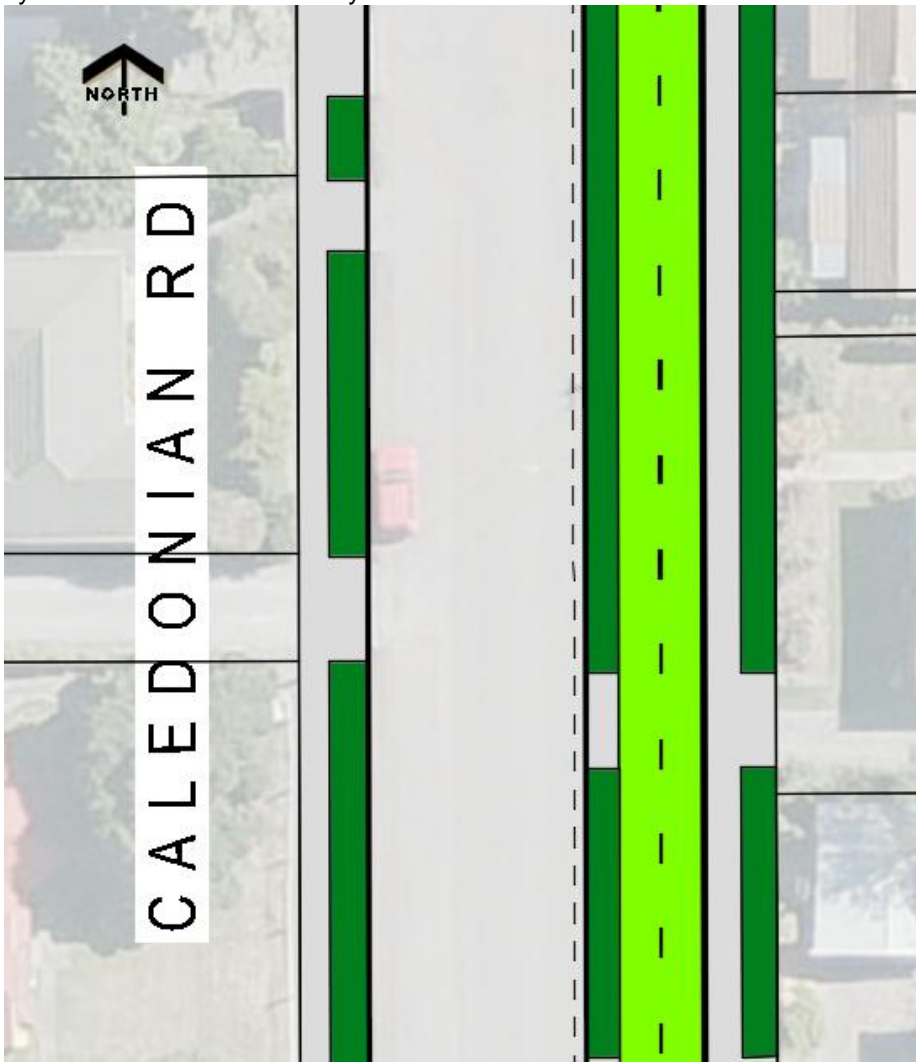
5.1 Purchas Street – For Colombo-Purchas – Caledonian Alternative Route

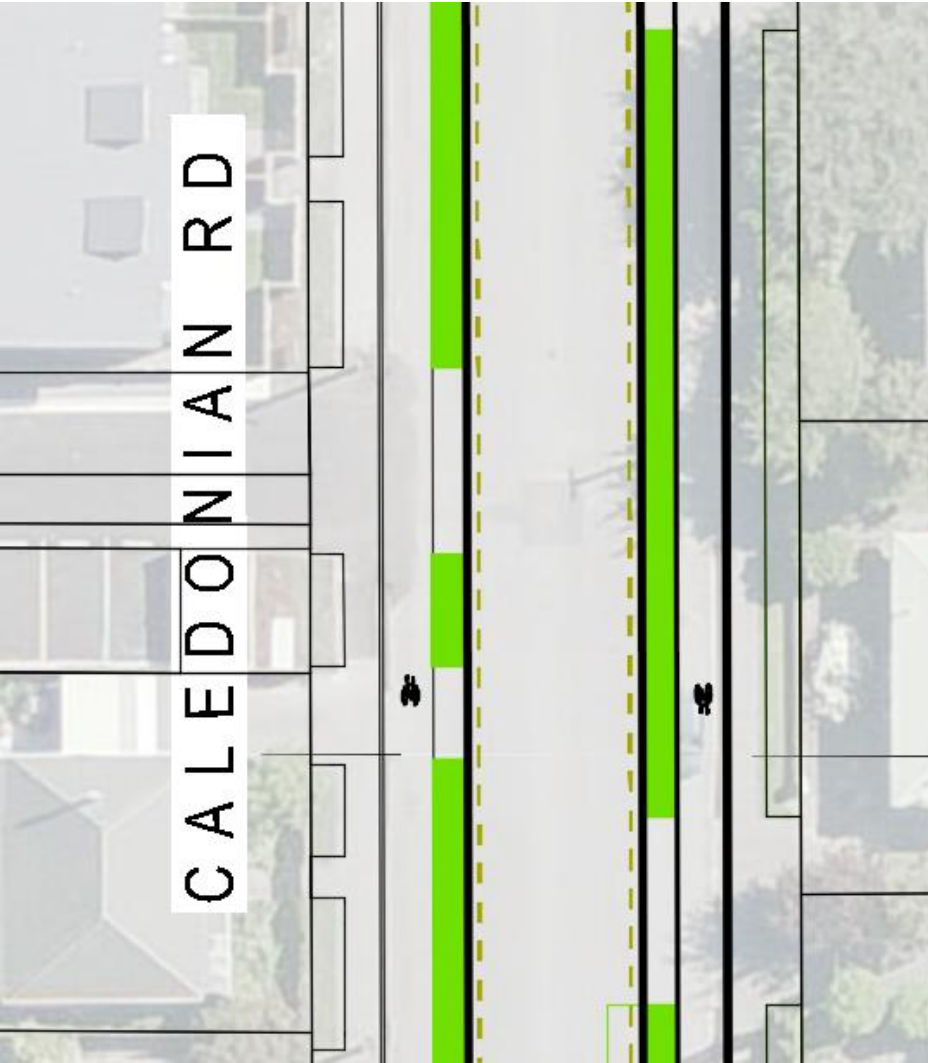
Option	Description	Details	Pros	Cons
Option 1	Fully signalised Intersection, two way MCR along north side of Purchas Street to join 2W facility in Caledonian	<p>The option involves installing a fully signalised intersection at Colombo /Purchas Street with phasing for cycleway users and Purchas Street, predominantly on green for Colombo Street.</p> <p>Requires clear direction for both sound and north bound cyclists to transition to and from Colombo Street.</p> <p>Need for turning lanes to be confirmed (unlikely for Purchas)</p> 	<ul style="list-style-type: none"> Keeps good access for business – garage on SW corner has access off Colombo and Purchas St Gives safe crossing facility for cyclists Retains all existing traffic movements that other options do (eg cul de sac) Provides good connection to Caledonian 2W facility Allows good connection for cyclists joining leaving facility [remove Purchas turn lanes] 	<ul style="list-style-type: none"> Removes some parking on street Cost of full signals expensive compared to other options Installation of turning lanes will require kerb widening not required for other options Signals not warranted on Purchas as low volume road Restrict traffic flow on Colombo for Purchas Street phasing Access to Acupuncture clinic will be affected Costs higher \$350 + TM P&G contingency (\$550k) excluding Design and Supervision
Option 2	Cul-de sac Intersection at Colombo Street, two way MCR along north side of Purchas Street to join 2W facility in Caledonian	<p>This option provides a cul de sac at the east end of Purchas St to facilitate This option keeps eastbound access to Purchas Street and west</p> 	<ul style="list-style-type: none"> Safe crossing for cyclists Minimise delay for Colombo Street traffic compared to Option 1 Mid-block signals cheaper than fully signalised Eliminated rat running so good for local residents Less impact on Acupuncture Centre as both accesses can be retained 	<ul style="list-style-type: none"> Impact on garage access worse than Option 1 and 3 Impact of Purchas St access at Colombo St – moves rat running to Canon St – crossing the MCR Cost = \$480k excl design

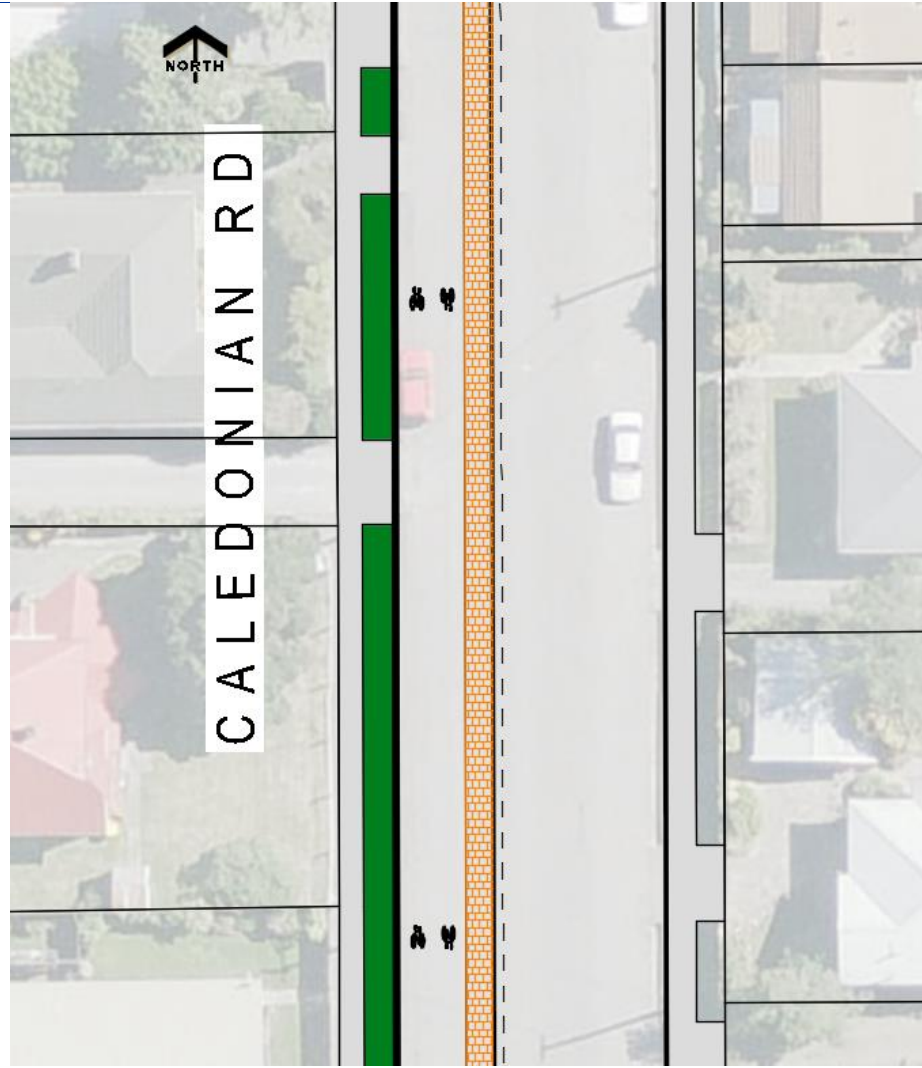
Option	Design	Description	Pros	Cons
Option 3	Left In Left Out at Purchas Street with Greenway for northbound cyclists / 1W facility to mid block signals over Colombo Street	<p>This option restricts Purchas Street Traffic movements to provide protection to cycleway users. A “mid block” signal crossing is proposed across Colombo St for south bound cyclists. Some interpretation is required for northbound cyclists, protected for the left turn into Purchas Street from Colombo, but then on road to the end of Purchas (50m) to join the 2W path north on Caledonian Rd.</p> 	<ul style="list-style-type: none"> Keeps good access for local businesses Safe crossing for southbound cyclists Good connection to Purchas for southbound users 	<ul style="list-style-type: none"> Some interpretation required for northbound cyclists Costs - \$500k similar to options 2 and 4 GW exposes NB cyclist to weaving with Purchas St westbound traffic and possible Garage patrons Restrict access for local residents (with left in left out arrangement)
Option 4	2W on Purchas + Signals for southbound Colombo St	<p>Similar to Option3 but 2w along Purchas. Also this option allows more traffic movements into Purchas east of Colombo and from Purchas at Caledonian.</p> 	<ul style="list-style-type: none"> Good connection to Caledonian facility Better protection using a 2W facility along Purchas Safe for southbound cyclists with signals Better detail for southbound crossing – provides width to include cycle lanes on Colombo to connect to MCR 	<ul style="list-style-type: none"> Poor protection to northbound cyclists joining 2W facility on Purchas Street. Poor protection against Colombo St left turns into Purchas for north bound cyclists Purchas St eastbound exit limit line set back behind NB MCR likely to result in creep over cycle lane
		<p>Existing Street Features a dish channel on both sides. To install a MCR on the north side the dish is best removed and replaced with Kerb and flat</p>	<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

6.0 Caledonian Road - Alternative Route



Option	Design	Description	Pros	Cons
Option 1	Colombo St to Purchas (1W), Purchas into a 2W facility in Caledonian on east side	<p>The 2W facility meets traffic volume criteria for this Local Road. Caledonian is an alternative to Colombo Street to minimise impacts. Cross section proposed is 2 x 3m verge/footpaths; 9.5m traffic carriageway; 3.5m two way cycleway with a 1.0m separator. The carriageway will be consistent with local roads with no road marking to allow OSP on both sides.</p> <p>The existing Caledonian Road kerb width is generally 14m. Existing Dish channel on the eastern sides will be replaced with kerb and flat channel.</p> <p>Long term west side dish should be replaced – cost estimate is approx. \$900k</p> 	<ul style="list-style-type: none"> ■ Good safety and comfort for cyclists ■ Less side streets to cross than option 5 ■ Direct with priority and few side roads (Canon St) ■ Good for local business and residents for Caledonian section as OSP is kept ■ Good continuity with Colombo South of Bealey 	<ul style="list-style-type: none"> ■ Some potential safety issues with narrow road with OSP both sides – and maintaining a dish channel on the west side – in this layout oncoming cars may have to yield to get past each other. Also parked vehicles may be reluctant to park close to west side dish. ■ 1W on Colombo removes more parking than 2W on Caledonian between Bealey and Purchas St ■ Network impact on Purchas St users ■ More expensive than 1W facility on Colombo between existing kerb lines – cost higher as dish channel needs to be replaced include shoulder regrading

Option 2	As per Option 1 but no parking on east side	<p>This option will remove parking on the east side – to provide better safety for cyclists at residential driveways.</p> 	<ul style="list-style-type: none"> ■ Better safety at driveways (with no parking on 2W cycleway east side) 	<ul style="list-style-type: none"> ■ Removes 50% of OSP ■ Network impact on Purchas St users
Option 3	Bealey Ave, Caledonian Road route 2W	<p>This route was considered as an alternative to the Colombo Purchas Street route. With Caledonian being a left in left out at Bealey Ave a mid block crossing of Bealey is required and connection from Colombo Street which is difficult for southbound users. It is possible a 2W facility be provided in the central median on Bealey as a two way facility.</p>	<ul style="list-style-type: none"> ■ Less impact to local business and residents as more parking retained compared to 1W options 	<ul style="list-style-type: none"> ■ Not as direct, with more crossing points
Option 4	Caledonian 1W	<p>Possible alternative with Traffic volumes 1200-2300vpd</p>	<ul style="list-style-type: none"> ■ Neutral compared to Option 1 or 2 wrt impact – as the Bealey to Purchas st section will be impacts to a similar extent as the Colombo St section. ■ 	<ul style="list-style-type: none"> ■ Less direct than option1-3


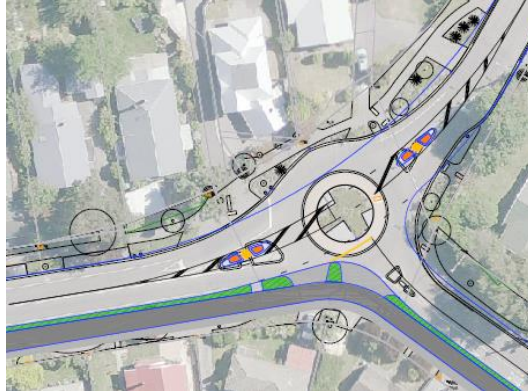
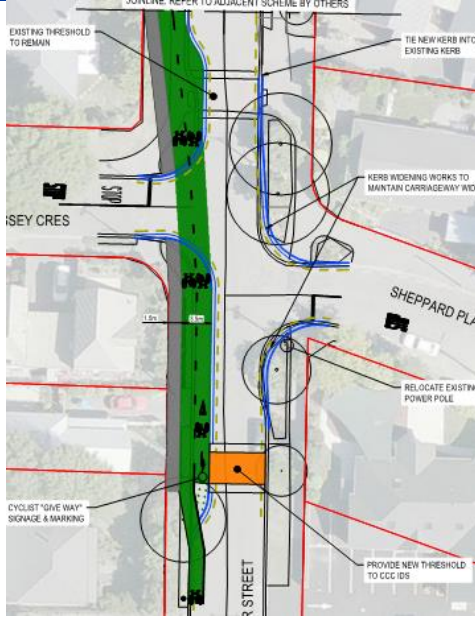
				
Option 5	Caledonian 2W on west side	<p>Possible alternative to option1 and 3. This option provides additional crossing points to get across Caledonian Road from either Bealey or Purchas Street and to get back to Trafalgar Street. As this option provides no additional benefits to Option 1 or 3 it was rejected from further assessment due to cost reasons (more expensive for no additional benefits).</p>	<ul style="list-style-type: none"> ■ Additional OSP retained at Bealey to Purchas St section for 2W compared to 1W Colombo Option 	<ul style="list-style-type: none"> ■ More side road crossings ■ Needs to cross over at north end to connect to Trafalgar st ■ More expensive for no additional benefits

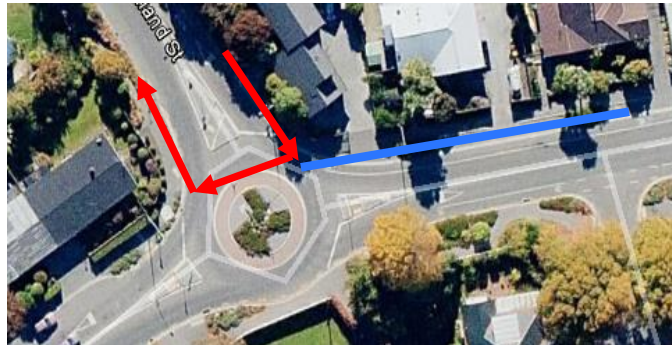

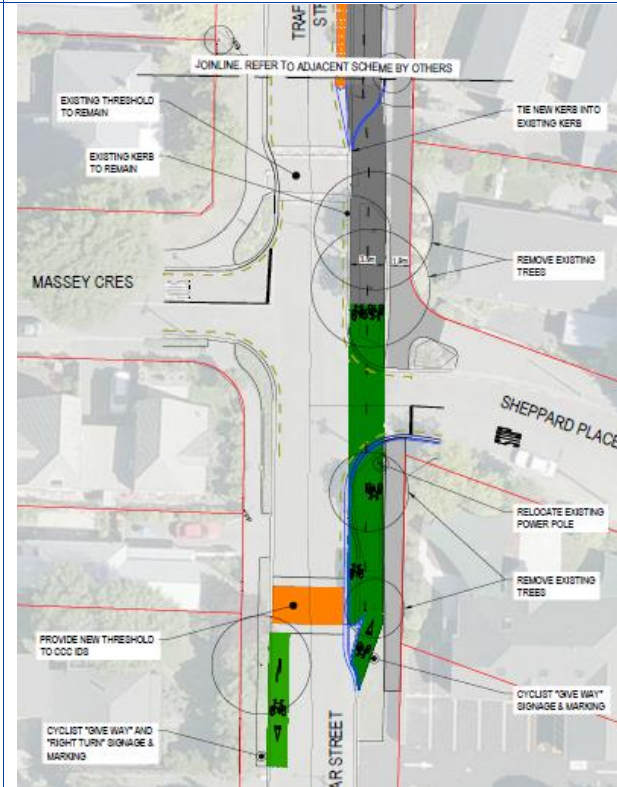


7.0 St Albans Street/Trafalgar Street to Rutland Street St Albans Street Intersection – Existing Layout


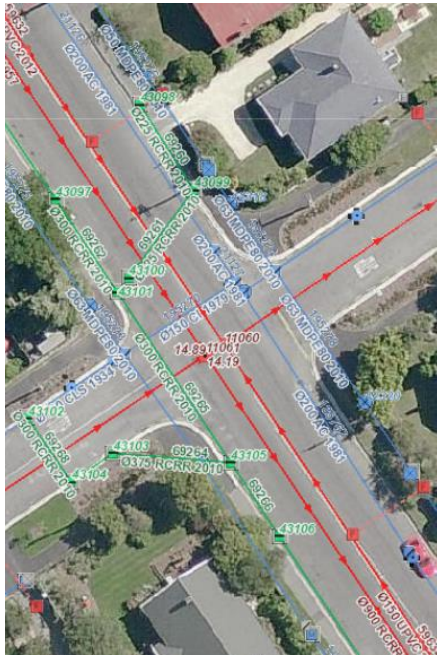


Description	Services and Utilities	Traffic Volumes
<p>Rutland Street / St Albans Street intersection – St Albans Street – St Albans Street / Trafalgar Street intersection</p>  <ul style="list-style-type: none">▪ Rutland Street, St Albans Street and Courtenay Street are Collector Roads. Trafalgar Street is a local Road. Both intersections are currently roundabouts which were installed, along with upgrades to the connecting section of St Albans Street in approximately 2004.▪ St Albans Street and Trafalgar Street are 20m boundary to boundary, while Courtenay Street is 12m boundary to boundary.▪ All streets have parking on both sides – St Albans Street parking is indented in formed parking bay areas.▪ Intersection counts – the latest recorded on CCC system is 2008. 2011 CAST Model depicts the intersection volumes as shown▪ All adjacent properties are residential.▪ Additional Consideration: the intersection of Westminster Street and Rutland Street is very close to the Rutland Street / St Albans Street intersection. It will need to be considered in any intersection form.	<ul style="list-style-type: none">▪ Existing services with the intersection include water and waste water mains. A wastewater pipe, reportedly laid in 1882 runs along the approximate centre of St Albans Street and connects to a similar aged pipe in Trafalgar Street▪ Utilities within the corridor include Telecom, Orion, Chorus underground and overhead cables. A large Chorus copper cable runs through the middle of both of the existing roundabouts.▪ Lighting is included.▪ Other than the ancient waste water main described above, the services and utilities are predominantly located in the berms, or adjacent to them. <p>Services and Utilities Layout</p> <div><p>Refer Appendix C</p></div>	<ul style="list-style-type: none">▪ CAST 2021 volume projections for the intersections with no MCR actions 

7.1 St Albans Street/Trafalgar Street to Rutland Street /St Albans Street Intersection – Option Development

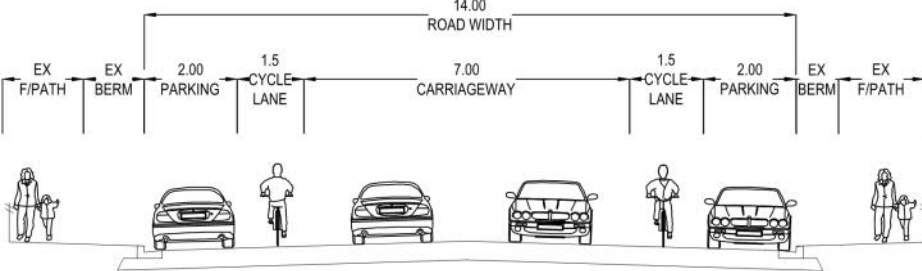

Option	Description	Description	Pros	Cons / Issues to be Addressed
Option 1	Two-Way cycle facility south side of St Albans)		<ul style="list-style-type: none"> With the traffic volumes on St Albans Street and Rutland Street, traffic signal controlled crossing would be required for all cycle crossings. This arrangement provides minimum intersection delay to vehicles out of the available options. Minimises the potential delay for cyclists. Is intuitive for cyclists as path required is simple. Retains connectivity for all cycle movements. Signal phasing will provide protection to crossing cyclists May improve attractiveness of St Albans – Courtenay link, and reduce traffic volumes on Rutland Street. 	<ul style="list-style-type: none"> Will remove all parking from this section of St Albans Street. May receive local resistance to installation of traffic signals, and perception that St Albans/Courtenay is becoming a more important link (issues with this in St Albans St upgrade in 2004). Both current roundabouts have property accesses connecting to them, which will complicate revised intersection layouts.
				
		<p>Rutland/St Albans Intersection</p> <p>This option consists of a transition from Greenway to a two-way cycle facility on the west side of Trafalgar Street, connecting to a two-way facility on the south side of St Albans Street. This facility connects to single lane facilities on Rutland Street through traffic signals at Rutland / St Albans. Both roundabouts are replaced:</p> <ul style="list-style-type: none"> St Albans / Trafalgar is replaced by priority intersection – give way control against Trafalgar Street. Rutland / St Albans is replaced by traffic signals. Crossing cyclists can be fully protected from conflicting traffic via signal phasing. <p>OUTCOME: Option has been taken through to MCA.</p>		
		 <p>Trafalgar Street Transition</p>		

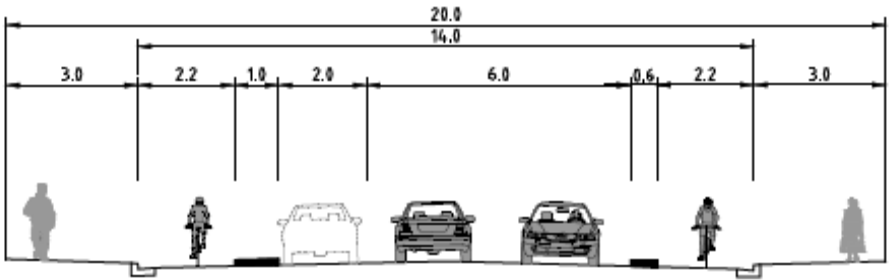
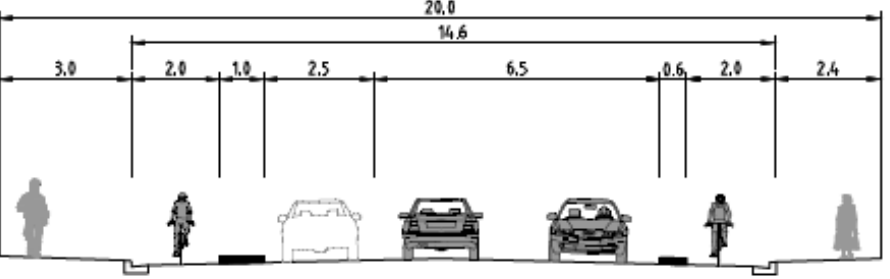
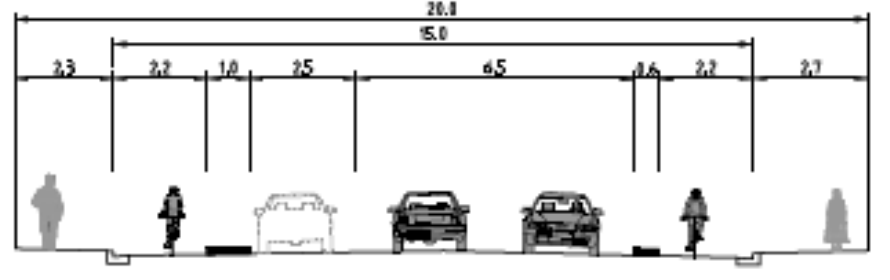
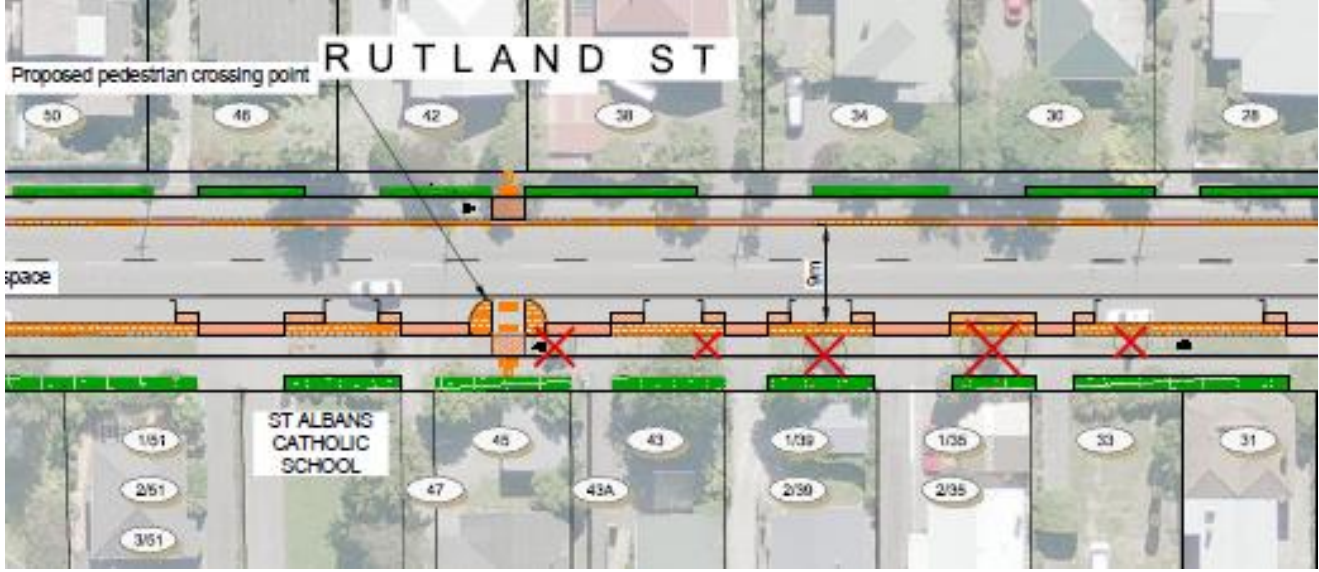
Option	Description	Description		Pros	
Option 2	Two-Way cycle facility north side of St Albans)	 Rutland/St Albans Intersection	 St Albans/Trafalgar intersection	<ul style="list-style-type: none">With the traffic volumes on St Albans Street – Courtenay Street and Rutland Street, traffic signal controlled crossing would be required for all cycle crossings.Signals provide lowest risk type of crossings for cyclists.Facility arrangement is intuitive for cyclists as path required is simple.Retains connectivity for all cycle movements.Signal phasing will provide protection to crossing cyclists	
		<p>This option consists of a transition from Greenway to a two-way cycle facility on the east side of Trafalgar Street, connecting to a two-way facility on the north side of St Albans Street. This facility connects to single lane facilities on Rutland Street through traffic signals at Rutland / St Albans – the cyclists crossing Rutland Street.</p> <p>Both roundabouts are replaced:</p> <ul style="list-style-type: none">St Albans / Trafalgar is replaced by priority intersection – give way control against Trafalgar Street and signals are installed to provide a cycle and pedestrian crossing of Courtenay Street.Rutland / St Albans is replaced by traffic signals. Cyclists cross to and from the two way facility through the separate cycle phase crossing Rutland Street <p>OUTCOME: While this option will have significant impacts on traffic efficiency on St Albans – Courtenay due to two signal sets, it is carried through to MCA as it still offers and excellent facility for cyclists.</p>	 Trafalgar Street Transition	<h3>Cons / Issues to be Addressed</h3> <ul style="list-style-type: none">This arrangement requires two sets of signals along St Albans – Courtenay Street link. This is considered to be a major drawback to the efficiency of the link, and may impose higher traffic volumes on Rutland Street.Will remove all parking from this section of St Albans Street.May receive local resistance to installation of traffic signals, particularly on Courtenay Street as they would seem more out of character for Courtenay St than Rutland/St Albans.Both current roundabouts have property accesses connecting to them, which which will complicate revised intersection layouts	
Option 3	One way facilities from Trafalgar, along St Albans Street to Rutland Street	<p>Option 3 (not illustrated) is a combination of Option 1 and 2, where the north bound cyclists on Trafalgar Street turn left onto a one way facility on St Albans Street, then right turn onto one way facilities on Rutland Street at a fully signalised Rutland/ St Albans intersection (as per option 1). Southbound cyclists from Rutland Street turn left onto one way facilities on St Albans Street north side, before turning right onto Trafalgar Street at a signalised crossing (as per option 2).</p> <p>OUTCOME: While this option will have significant impacts on traffic efficiency on St Albans – Courtenay due to two signal sets, it is carried through to MCA as it still offers a coherent connection to Rutland Street facilities.</p>		<h3>Pros</h3> <ul style="list-style-type: none">With the traffic volumes on St Albans Street – Courtenay Street and Rutland Street, traffic signal controlled crossing would be required for all cycle crossings.Signals provide lowest risk type of crossings for cyclists.Facility arrangement is intuitive for cyclists as path required is simple.Retains connectivity for all cycle movements.Signal phasing will provide protection to crossing cyclistsRetains consistent style of cycle facilities for length of St Albans and Rutland Streets.	<h3>Cons/Issues to be Addressed</h3> <ul style="list-style-type: none">This arrangement requires two sets of signals along St Albans – Courtenay Street link. This is considered to be a major drawback to the efficiency of the link, and may impose higher traffic volumes on Rutland Street.Will remove all parking from this section of St Albans Street.May receive local resistance to installation of traffic signals, particularly on Courtenay Street as they would seem more out of character for Courtenay St than Rutland/St Albans.Both current roundabouts have property accesses connecting to them, which which will complicate revised intersection layouts

8.0 Rutland Street – Existing Layout

Description	Services and Utilities	Additional Considerations	
<p>Rutland Street, from St Albans Street to Tomes Road, is a Collectors status road. It is effectively broken into two parts (north and south), separated by the Innes/Rutland intersection.</p> <p>South of Innes Road, Rutland Street is predominantly residential with non residential activities including:</p> <ul style="list-style-type: none">• A church (cnr of Westminster and Rutland Streets).• A Catholic School (west side of Rutland Street, south of the shops)• Shops and a café (west side, south of Hawkesbury Ave)• Rugby ground and reserve (east side, between Malvern Street and Innes Road).Between Bealey Ave and the end of Colombo St at the intersection with Edgeware Rd, there are 2 stop controlled cross road intersections, at Purchas St, and Canon St. The intersections are evenly spaced along Colombo St. The width of Colombo St locally narrows to 13m at the intersection with Bealey Ave and Purchas St. <p>North of Innes Road, the street-side use is almost entirely residential, with a preschool at the northern end, east side, north of Mays Road.</p> <p>Typically, Rutland Street is 20m boundary to boundary, however the alignment of this 20m corridor is not consistent, with a slight east/west variation between sections north of Innes Road intersection. The Rutland Street component of the Innes/Rutland intersection is itself skewed, with Rutland Street north being west of a straight-through alignment (see next section).</p> <p>The existing cross sections of Rutland Street vary – some sections are 14m kerb to kerb, others are 12m kerb to kerb. Parking is permitted for both sides of Rutland Street, for its full length. There are currently approximately 188 carparking spaces for the full length of Rutland Street. Only the parking outside the shops (west side, south of Hawkesbury Ave) has parking time restrictions. A cycle lane is marked on the northern approach to the Innes Road signals only (on Rutland Street).</p> <p>There are no bus routes on Rutland Street – the 2014 route revision removed the bus route from the street.</p> <p>Rutland Street tends to serve as an alternative access to and from the northern corridor - northbound vehicles use Rutland Street, then McFaddens Road (also collector) to join Cranford Street</p> <p>The AADT of Rutland Street (north) is approximately 7400 vpd; and Rutland Street (south) 7500 vpd taken from the CAST model for 2011.</p>	<ul style="list-style-type: none">■ Existing services within the Rutland Street corridor include water supply mains and submains, wastewater gravity mains and laterals, and stormwater gravity mains and manhole/chambers. A 200mm water supply main runs along the eastern side of the carriageway slightly outside the current kerbline.■ Utilities within the corridor include Telecom and Chorus cables (these appear mostly overhead; Orion power cables (which are all overhead) and Enable fibreoptic cables (underground).■ Lighting is located attached to power poles along the eastern side of Rutland Street only.■ All power/telecommunication poles are typically in the berms, set back a metre or so from the kerb line and are likely to be affected by kerb line changes■ A lighting assessment is required to confirm lighting requirements for the scheme■ For more details on services and utilities, see Appendix F in the report.■ <p>Example: Services – Rutland/Westminster</p> 	<ul style="list-style-type: none">■ Traffic Volumes – approx. AADT of Rutland Street is 7,400 to 7,500vpd. This is expected to increase significantly (to over 10000vpd) in 2031, due partly to the influences of the northern arterial development. The traffic volume on the street would preclude any cycle facilities other than shared pathways or one-way separated cycle lanes.■ Local Businesses along route typically require (or seek) on street parking – these will have to be accommodated to ensure their viability■ Currently vehicles use Rutland Street to drop-off children at the St Albans Catholic School (south of shops). There will inevitably be drop off requirements (or behaviours) if parking is reduced or removed.■ The multiple side street intersections along this route create conflict points for cyclists and will require treatment to give priority to cyclists.■ The highest parking demand for Rutland Street is on Saturdays (sports events at Rugby Park/ Malvern Park) and on Sunday mornings for church services toward the south end of Rutland Street. <p>Example: Services – Rutland/Knowles</p> 	<p>Example: Utilities</p>  <p>Example:</p> 

8.1 Rutland Street – Option Development

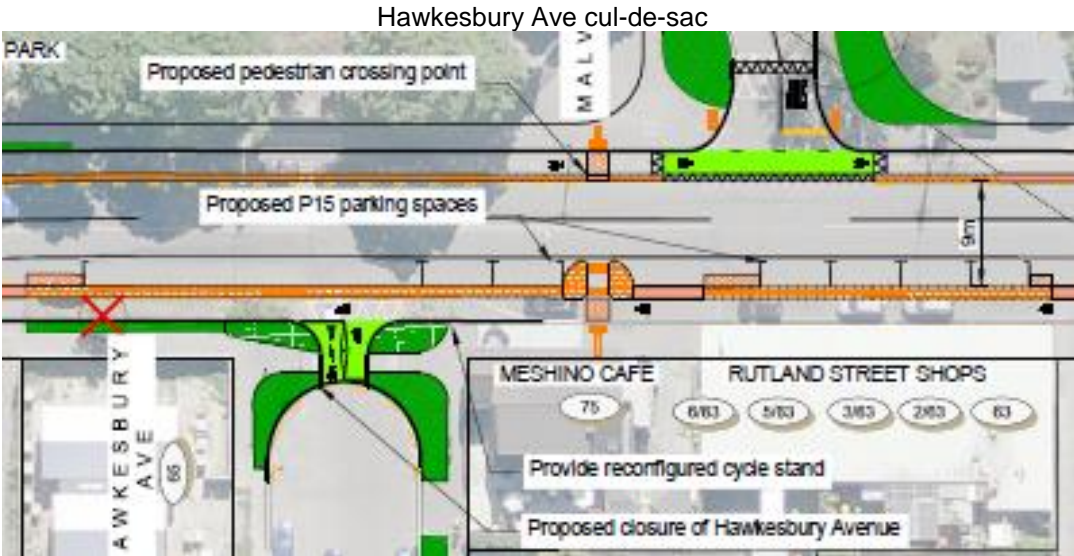
Option	Description	Description and Outcome	Pros	Cons
Option 1	Rutland Street Do minimum – On Road Cycle Lanes	<p>Provide on road one-way cycle lanes in both directions. Within the existing 20m road reserve, the required kerb to kerb width is 14.0m, so kerb modification will be necessary</p> <p>The Do Minimum cross section would accommodate:</p> <ul style="list-style-type: none"> 2 x 3.5m traffic lanes 2 x 1.5m on street cycle lanes 2 x 2.0m on street parking <p>Cycle lanes could be marked in standard green or simply be delineated with 100mm white line and cycle symbols. A rumble strip is recommended to alert errant vehicles to encroachment into cycle lane.</p>   <p>OUTCOME: Based on this option not supporting the Major Cycleway Objectives in particular the lack of separation and on-going encroachment of the cycle lane (by service and on street parking at the kerb side) it was decided not to take the Do minimum Option forward for MCA assessment.</p>	<ul style="list-style-type: none"> Cheapest option Quickest and easiest to incorporate – there will be some kerb work to reach the 14m required. On the other hand, 12m kerb to kerb would be appropriate if parking on one side of the road is removed. Keeps most of the parking along the street (depending upon original kerb to kerb width) at expense of cyclist safety. Some delineation provided by no physical separation Better than existing (no facilities) Allows additional landscaping in existing verges 	<ul style="list-style-type: none"> Does not provide a level of safety for cyclists consistent with a Major Cycleway Route. Poor safety performance compared to other options as cycle lanes not segregated Lack of comfort for user – as no protection or delineation Inconsistent with adjacent sections Inconsistent for existing traffic volumes Conflicts between cyclists and parked and moving vehicles – similar to existing Cyclists at risk at intersections and conflicts with on street parking traffic Unlikely to encourage new cyclists to use this facility as it does not provide a safe zone for cycling

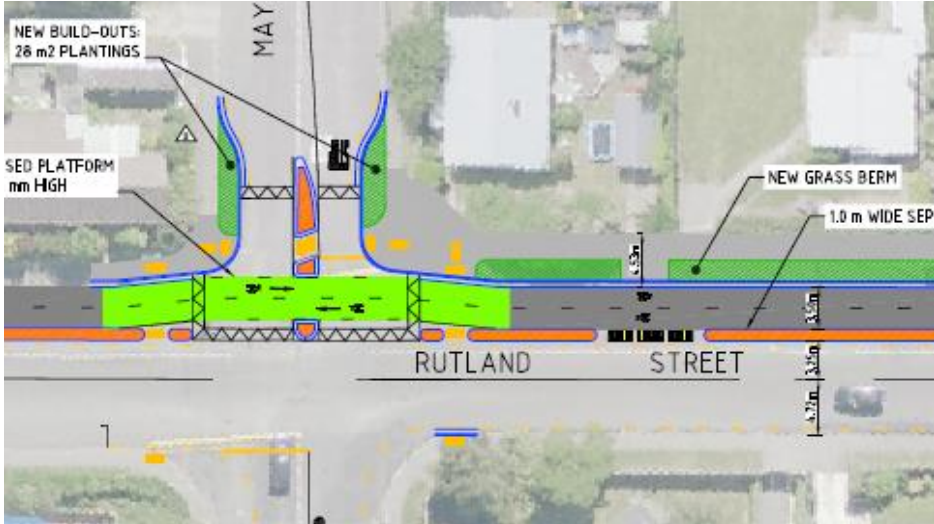
Option	Description	Description and Outcome	Pros	Cons/Issues to be Addressed
Option 2	Separated on road cycleways (one way)	<p>The separated on road one way facility was the preferred option by CCC.</p> <p>This option considers a separated, on-road, one-way facility. Facility width and kerb to kerb width is optimised within the existing corridor width: that is – where the kerb to kerb width is 14m, this remains, and the facility fits within it, with on-street parking where sight lines permit.</p>  <p>Where existing kerb to kerb width is 12m, it has been variously widened to either 14.6m or 15m.</p>   <p>The difference in the widths is to provide some additional pedestrian space – in locations where there are likely to more pedestrians than other locations (outside the schools, outside the shops, adjacent to the sports grounds) additional footpath space has been created.</p> <p>Major Cycleway Objectives. This arrangement has adequate separation and delineation from the traffic and parked vehicles to minimise the potential conflict with other road users, and meets or exceeds the MCR guidelines minimums for cycle lane widths. The MCR group view is that a 2.1 -2.2m width is a desirable standard and 2.0m can be accommodated over short lengths.</p> <p>On-Street Parking. A separate investigation has been undertaken to assess and appropriate distance of set back from driveways, for vehicles to park, when adjacent to cycle facilities. For this scheme layout, the design setback is chosen at</p>	<ul style="list-style-type: none"> Good safety, coherence and Connectivity, directness and comfort for cyclists No potential conflicts with cyclists – other than at intersections where potentially cyclists could use the facility in the wrong direction for convenience. Space generated and specifically marked for rubbish bins, making use of minimum 2m clear zone set back for parking. Consistent with current MCR standards and implementation and consistent standard for Colombo Street lengths of one-way facilities. Provides maximum opportunities for on-street parking outside businesses. Provides pedestrian crossing opportunities 	<ul style="list-style-type: none"> Marginally reduced width of cycle facility for 14m sections and where pedestrians are found. Reduced on street parking likely to create public objection Generally may be considered a fairly narrow roadway for a collector road, and with the traffic volumes expected. Traffic signals at St Albans may attract vehicles to this route. Impact on Local Business to be considered Impact on Local Residents to be considered Site Constraints will need to be addressed
			<ul style="list-style-type: none"> Plan view of typical Separated On Road One Way Cycleway  <p>Description and Outcome continued.....</p> <p>Hawkesbury Ave intersection special consideration: Hawkesbury Avenue and Rutland Street intersection have been given special consideration.</p> <p>The scheme plan (extract below) shows Hawkesbury Avenue closed at Rutland Street. If Hawkesbury Ave remained a full access side street, the line-of-sight required for exiting traffic would require the removal of some of the existing parking south of the intersection, and north of the intersection- considered to be approximately 4 to 5 spaces. This does not consider the spaces removed further south of the shops or on the other side of the road.</p> <p>Providing a cul-de-sac closure to Hawkesbury Ave provides an additional 7 spaces in close proximity to the shopping area, as well as the opportunity for a properly-formed pedestrian crossing facility, noting the proximity to Rugby Park/Malvern Reserve.</p>	

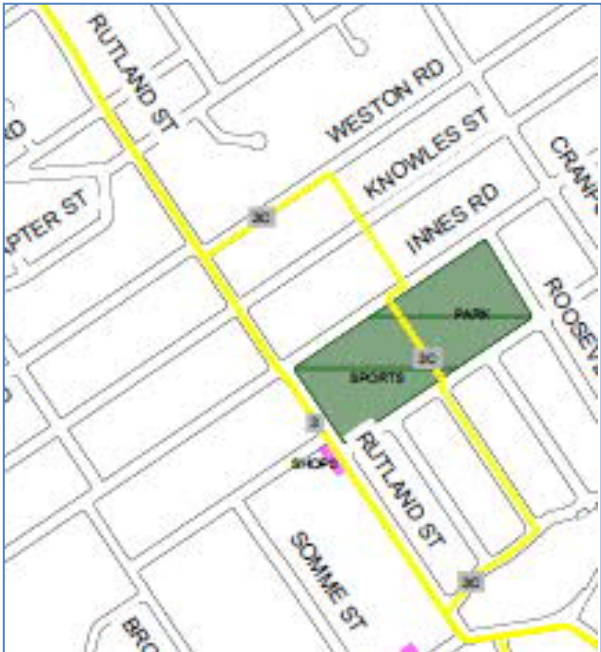
2m. Parking spaces have been fitted on the western side to meet this requirement. Kerbside space unavailable for parking is shown as marked in stamped concrete, to provide a space for rubbish bins. A total of 53 parking spaces are provided in the version as shown and described.

Side Street Intersections: Intersections create conflict points for cyclists and crossings will require careful design. All side streets at this stage include a raised platform with a stop control and green marking. Westminster Street is considered left-in/left-out to ensure there are no right-turn crossings of the cycle lane, when the southbound lane is queued at the signals. For other side streets, the lowest risk options would be closure (Mays, Chapter, McFaddens, Knowles, Weston, Malvern and Hawkesbury. This has not been assessed within this SAR because, the sides streets can provide some overflow parking for Rutland Street (so access is important); and all the side streets on the eastern side will be affected by turning restrictions when the northern arterial is developed, so it is important to avoid too severe restrictions on other access

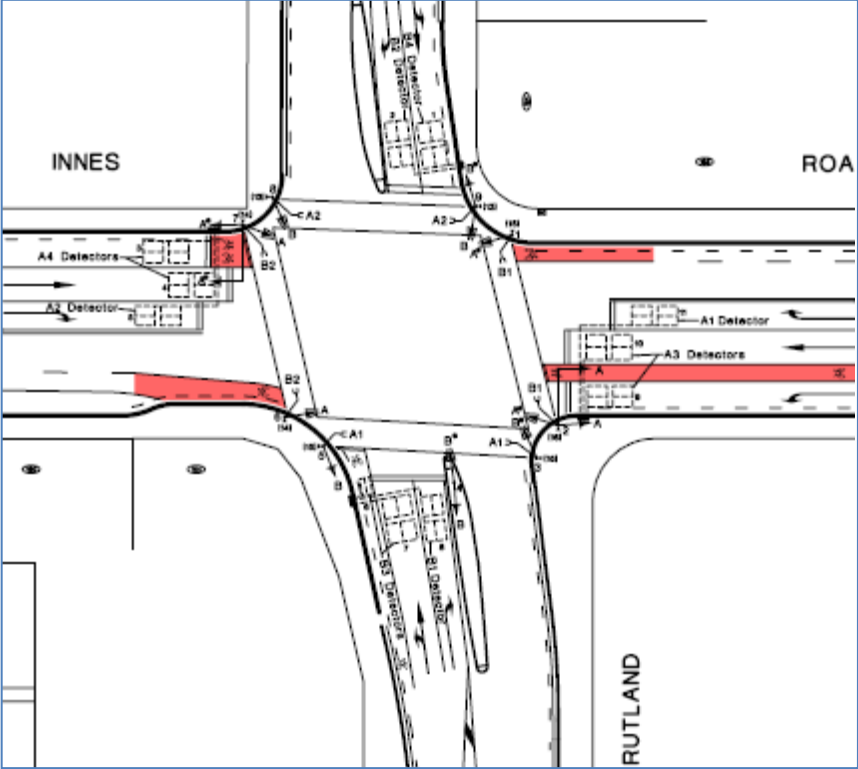
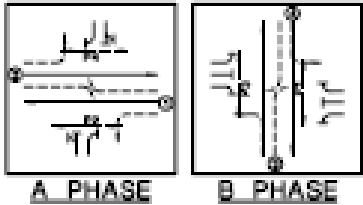
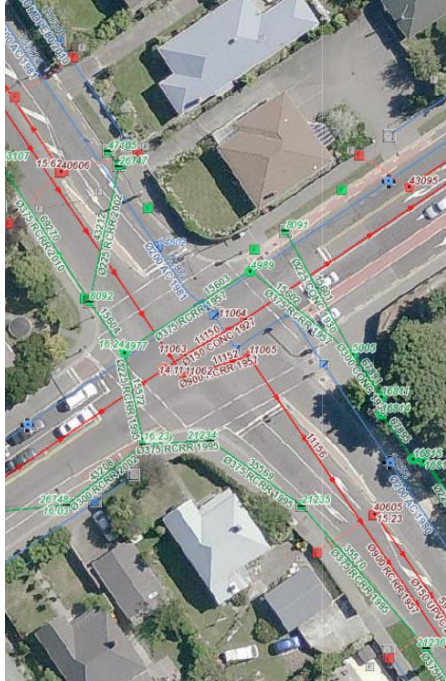
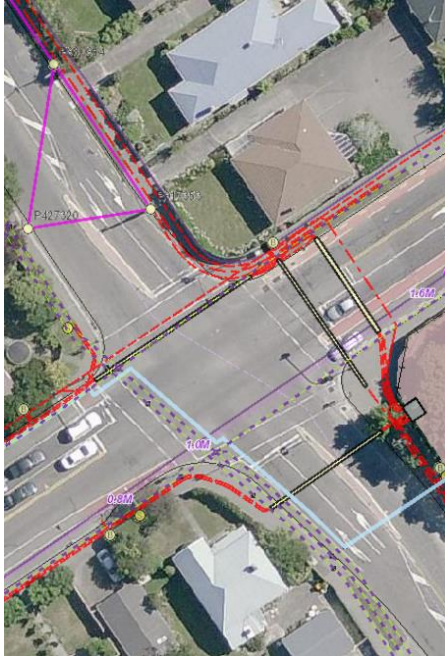
OUTCOME: The one-way, separated cycle facility option, with 2m parking set-back from accesses, and the Hawkesbury Ave cul-de-sac (maximum parking opportunity); and cycle facility development to MCR standards, is carried through to MCR assessment.



Option	Description	Details and Outcome	Pros	Cons/Issues to be Addressed
Option 3	Separated on road cycleway two-way)	<p>This option considers a two way cycle facility on the eastern side of Rutland Street, as indicated in the plan below.</p>  <p>A 3.5m wide cycle facility is provided. The cross-section will reduce to 3.0m at some locations where pedestrians are concentrated.</p> <p>For most of the length of Rutland Street is not necessary to move the kerbs (approx. 200m of kerb require replacing).</p> <p>The intersections have the cycle facility with a green surfacing and a deflection to inform cyclists of the change to the road environment.</p> <p>No parking can fit against the separator, but almost all existing on-street parking on the west side of the road remain (approx. 80 spaces).</p> <p>The key shortfall of the two way facility is that the MCR guide advocates that they should not be used where traffic volumes are greater than 5000vpd. Options exist to reduce traffic volume on Rutland Street by severe access restrictions at Innes/Rutland however such a limitation has been clearly rejected by CCC.</p> <p>OUTCOME: Despite this option being unable to proceed due to failing to meet MCR standards, it is carried into the MCR process for information and comparison against the other options.</p>	<p>On the assumption that a two-way facility were permitted on Rutland Street, because traffic volumes had been reduced through turning restrictions at Innes/Rutland:</p> <ul style="list-style-type: none"> ■ Good level of comfort from width of cycleway (even 3m minimum is comfortable width). ■ Good safety for cyclists due to physical separation between cyclists and traffic, however, on-coming cycleway traffic may reduce overall perception of safety. ■ On street parking removed on southbound lane gives excellent visibility from/to accesses ■ Only half of existing on street parking lost (least of all options). ■ Direct route without conflicts with other cyclists. Good desire line match with limited diversions ■ Minimal delays as route is straight and cyclists have priority at intersections ■ Reduction in the available cross section is likely to constrain traffic and may result in slower speeds. ■ Consider cycle parking facilities at local shops ■ No land purchase requirements ■ Cheapest of all forms of separated cycle facility on Rutland Street. ■ Minimal impact on utilities (therefore cost) 	<p>Traffic volume reduction on Rutland Street is due to significant turning restrictions at Innes/Rutland</p> <ul style="list-style-type: none"> ■ Significant turning restrictions, plus Northern Arterial turning restrictions will provide severe limitations for local access into block between Rutland, Innes and Cranford Street. ■ Refuse trucks must straddle cycle separator on southbound lane to reach kerbside to collect bins. This will conflict directly with cyclists. ■ Approximately half of on-street parking lost. ■ McFaddens Road is a collector – all other side streets are local roads. How to differentiate between two types of side streets is a concern, as McFaddens Road will have considerably more traffic turning in and out than other side streets. Traffic volumes may even reach a point where signals are required, which would be very out of place in this strongly residential environment. ■ Two way cycle facilities will always carry the concern as to whether drivers will look in the opposite direction to prevailing traffic, when exiting or entering side streets and accesses. Lower traffic volumes reduce this concern, as turning vehicles have less pressure to turn and can take the opportunity to look both ways. In higher traffic volumes, this concern is more pronounced, particularly for narrowed carriageway, hence the vpd restriction on this type of facility.

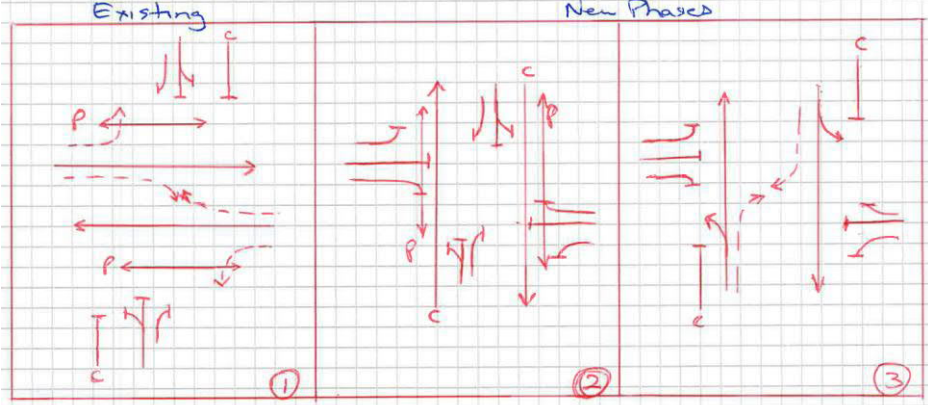
Option	Description	Description and Outcome	Pros	Cons
Option 4	Off-Rutland Alternative (Westminster – Carrington or Gosset – Malvern Reserve – right-of-way – Weston – Rutland.	<p>This option considers a route between Rutland/St Albans intersection, and Rutland Reserve in the north that does not travel on Rutland Street for most of its length. The route is shown as “3C” in the graphic below.</p> <p>In detail:</p> <ul style="list-style-type: none"> the route starts at the Rutland /St Albans intersection with a two-way facility on the east side of Rutland Street: crosses Westminster Street and continues on its north side to either Carrington Street or Gossett Street. Either Carrington Street or Gossett Street can be either a greenway or shared path (low traffic volumes). Carrington Street offers a slight advantage, in that the greenway connects to a crossing point on Malvern Street directly linking to the existing path through Malvern Park (which would be widened). Pathway connects to a signalised crossing point on Innes Road, then through the existing right of way, crossing Knowles Street to Weston Road. Two-way path on north side of Weston Street, connects to two way facility on eastern side of Rutland Street. Mays Road could be cul-de-sac at Rutland Street so that two-way path crosses McFaddens Road only. <p>In general, 50% of on street parking would be removed on each of the streets. Overall this route removes less parking than the other Rutland Street options, as much of the route is off-street.</p> <p>OUTCOME: Take forward for MCA review.</p> 	<ul style="list-style-type: none"> Generally improved cycle safety through facilities on streets with very low traffic volumes, and, on Rutland Street, physical separation from traffic. Good level of comfort from width of cycleway and greenway, and full width two-way facility. No inter-visibility issues anywhere on the route from vehicles parked adjacent to cycle facility. Continuous cycle facility. There is no requirement for kerb widening anywhere on the route, which removes any need to relocate services. This reduces cost and improves constructability. No requirement to purchase land. Consider cycle parking facilities at local shops. 	<ul style="list-style-type: none"> The northern section of this route, on Rutland Street, suffers the same problems that the two-way option does, in that the traffic volumes are generally too high to meet two-way MCR standards. If Mays Road is cul-de-sac, this reduces the crossing issue marginally, but not enough to promote this facility. It would seem pragmatic that cyclists starting at one end of Rutland Street are unlikely to want to deviate toward Cranford Street for some considerable distance, before returning to Rutland Street – it is considered many cyclists would remain on Rutland Street as a direct route. There are CPTED concerns through much of the route. While Gossett/ Carrington, Malvern Park and the right-of-way may be quiet pleasant cycling environments in daylight, at nighttime they may be considered a safety risk, particularly from lack of passing traffic and passive security. Significant additional lighting required. Possible conflict with other park users as path passes next to play area and toilet/club facilities. Additional signal set on Rutland Street, close to Cranford Street, may create network capacity/ efficiency issues. Other than Malvern and Rugby Parks, the route does not service the local shop amenities or St Albans Catholic School. MCR facility changes type from two way to greenway, to path to two way.

9.0 Innes Road/Rutland Street Intersection - Existing Layout

Description	Services and Utilities	Additional Considerations
<p>The existing layout of the Rutland/Innes intersection is as follows.</p>  <p>The intersection is a conventional signalised cross-roads with a slight skew on the Rutland Street approaches. Cycle facilities are marked on the Innes Road approaches, but only a north bound cycle lane is marked on Rutland Street. The signals operate to a simple two phase programme. No turns or phases are protected.</p> 	<p>All water services run through the intersection.</p>  <p>See Appendix C for more Details</p> <p>Utilities generally appear to run around the peripheral of the intersection.</p> 	<p>This intersection is anticipated to accommodate over 20,000 vpd in 2021 with approximately two and a half times more traffic on Innes Road than Rutland Street. SiDRA modelling (using CAST volumes for 2031) gives the intersection a LoS C in the PM peak.</p>

9.1 Innes Road/Rutland Street Intersection – Options Consideration

Option	Design	Description		
Option 1	One-way cycle facilities	<p>This option (shown in the layout to the right) has one-way cycle facilities on either side of Rutland Street, both approaches. Hook turn boxes are marked for right turning from all approaches, and a left turn by-pass for cyclists travelling from Innes (east approach) to Rutland (southbound) is marked. Solid cycle lane separators are continued as close to the limit lines as possible.</p> <p>Traffic lanes are retained from as their existing configuration, and right turn vehicle queuing lanes are approximately the same length as existing.</p>		
Option	Design	Description	Pros	Cons
Option 1a	One-way cycle facilities – existing phasing	<p>This option retains the existing phasing for the intersection – that is cyclists on the MCR will progress through the intersection on the normal green phase, given to Rutland Street vehicles. For this, both left and right turning vehicles will need to filter through the straight through cyclists. Cyclists have no particular priority over vehicle movements. Cyclists and vehicles will need to filter with pedestrians crossing.</p> <div> </div> <p>Cyclists progress on the “B Phase” – Rutland Street (orientation different to graphic above).</p> <p>OUTCOME: Take forward for MCA review.</p>	<ul style="list-style-type: none"> Retains existing phasing and phase timing – theoretically there should be no loss of intersection efficiency. Arrangement is generally similar to current signalised intersections with cycle lane approaches. Offers much greater protection for queuing cyclists than non-separator intersections. Cyclists cross in one movement Pedestrian desire lines are maintained. All vehicle tracking lines are maintained. Traffic signal timings could be used as a tool to modify demand on Rutland Street (although not used successfully in the past). 	<ul style="list-style-type: none"> As arrangement is generally similar to current signalised intersections with cycle lane approaches, it is subject to similar safety concerns – with turning vehicles failing to filter with straight or turning cyclists. Filtering for young, inexperienced cyclists (as MCR is aimed at), may be an uncomfortable (and considered unsafe) manoeuvre, therefore reducing the attraction of the facility. All parties may find the awareness requirements of the movements complex/overpowering.

Option	Design	Description	Pros	Cons
Option 1b	One-way cycle facilities – separate phasing	<p>This option develops a separate phase for cycle and pedestrian movements for the intersection – that is cyclists on the MCR will progress through the intersection on their own green phase, and hold when Rutland Street vehicles move. No vehicle/cycle filtering is required. Pedestrian / cycle filtering is.</p>  <p>Cyclists progress on the “2 Phase” shown in the plan above (also oriented 90deg to aerial graphic above).</p> <p>OUTCOME: Take forward for MCA review.</p>	<ul style="list-style-type: none"> ■ Separate cyclist phase provides improved protection for cycle movements – more in keeping with MCR intent. ■ Movements simplified. ■ Arrangement is generally similar to current signalised intersections with cycle lane approaches. ■ Offers much greater protection for queuing cyclists than non-separator intersections. ■ Pedestrian desire lines are maintained. ■ All vehicle tracking lines are maintained. ■ Traffic signal timings could be used as a tool to modify demand on Rutland Street – which may be a natural consequence of the LoS change. 	<ul style="list-style-type: none"> ■ An additional phase will impact on intersection efficiency. Early SiDRA modelling advises intersection LoS drops to F on pm peak in 2031, however this might change with other network changes as part of Northern arterial which have not been included in this early modelling.