



mainroads
WESTERN AUSTRALIA



Cocos (Keeling) and Christmas Island, Sign & Pavement Marking Corrective Report

June 2019

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1 PURPOSE

Primarily to obtain a detailed record of Signs and Pavement Markings across the islands so the collected data could be utilised for the following purposes:

- i. Identification of Asset Scale
- ii. Assess condition of existing Assets for maintenance planning
- iii. Identify alignment with current Standards
- iv. Identify Road Safety Improvements
- v. Produce a detailed report for future reference.

Secondary purpose, to identify any severe pavement failings in need of immediate remedial action.

2 SCOPE

Travel on all publically accessible roads across both of the islands road networks and record all of the Sign and Pavement Marking details with a data collection application called Collector for ArcGIS by Esri (the App) via a hand held Surface Pro Tablet. Longitudinal Linemarking was not included in the Scope of this collection.

3 ROLES & RESPONSIBILITIES

Name	Responsibility
Darren Horsfield	Record data and identify possible improvements, create detailed report.
Tony Lendrum	Record data and identify possible improvements

4 DEFINITIONS

Term	Definition
App	Collector for ArcGIS by Esri

5 PROCESS

Travel by 4WD across the entire publically accessible Road Network of each island stopping at each Sign & Pavement Marking Asset then with the use of a hand held Surface Pro tablet record data associated with that Asset via the App.

Whilst stopped at each Asset the following data was recorded via the Surface Pro into the App:

- i. Place a pin point on a corresponding base map via GPS which marked location
- ii. Identify and record the Asset
- iii. Identify and record a Sub Category (Warning Sign / Pavement Arrow)
- iv. Take a photo of each asset
- v. Identify and record the condition of the Asset (this was done via ranking with 1 being the best and 5 being the worst)

6 GENERAL FINDINGS AND RECOMMENDATIONS

A large number of the signs and pavement markings across both islands are in poor condition and require immediate maintenance to make them effective and to improve road safety. Within the Comments field of the details attached with each photo in the App is the 1-5 ranking, I recommend that all assets with a ranking of 4 or 5 be immediately maintained. Due to the condition ranking provided for all the assets, their individual condition is not generally detailed in this report.

Assets that reflect current standards whilst recorded in the App are not mentioned in this detailed report, which only contains items for corrective action.

The data collected by the App can be viewed on a base map via the links provided below. All signs are represented by a blue mark whilst pavement markings have a red icon. These links are also provided at the beginning of each section of this detailed report

[Cocos Island Map](#)
[Christmas Island Map](#)

Unmaintained vegetation obscuring signs was a major problem across all islands, this is a general comment and locations are not specifically detailed within the report.

No severe pavement failings were observed, a maintenance vehicle was actively undertaking maintenance of small failures during our time on Christmas Island.

Specifications for the correct installation of Traffic Facilities can be found on the Main Roads web site at [600 Series - Traffic Facilities](#)

Links to Main Roads standard drawings are used throughout the report; these drawings on the Main Roads web site are regularly reviewed and may be subject to amendment. If a drawing is amended the link provided in this report will be severed, due to this, the link has used the drawing number as its description, to find the drawing if the link has been severed go to Google and put the drawing number into the search field.

Speed Zoning across the islands does not conform to Main Roads [Speed Zoning](#) Policy, a previous audit of speed zoning on Christmas Island from 2012 can be seen in the Main Roads records repository (TRIM) at document number [D12#362646](#).

Application of formal Regulatory Control (Give Way or Stop) at T-junctions is typically against Main Roads [Policy](#), Stop Sign control is only supported if there is limited sight distance.

There are several series of crab grids (under road facility to allow safe passage of crabs from one side of the road to the other) on various roads on Christmas Island. The signing for these grids were generally in poor condition and not appropriate. An advanced warning sign with a distance tag underneath (3 Km (?)) should exist at each end of the series, individual warning signs are not required at the grids, but width markers on either side of the road on each approach are required. Whilst the locations of each grid has been recorded on the map for reference, individual photos of the associated signs have not necessarily been attached, although a ranking has been provided.

This report contains observations and associated recommendations throughout the report, there is no separate page of specific recommendations.

Longitudinal linemarking whilst not looked at specifically or in detail appeared to be in fair to poor condition and most associated raised pavement markers (RRPMs) required maintenance.

This report is broadly broken into three sections, Cocos (Keeling) West Island, Cocos (Keeling) Home Island and Christmas Island.

For reference (reference material can be supplied to island authorities) two previous reports were found (in Main Roads records repository TRIM) where Main Roads had visited the islands and previously reported on traffic management infrastructure.

[Christmas Island Speed Zoning Audit Report - Existing Roads - Sept 2012](#)

[Cocos Island Traffic Management Report 1996](#)

Cocos (Keeling) West Island

Cocos Island Map



Corrective Actions for Cocos (Keeling) West Island

1. Northern end of Sydney Highway veers to the right (to access the fuel storage facility and old Jetty) but there is an access road that continues straight ahead which a tourist could inadvertently travel on. MR-HM-3 Hazard Markers should be placed adjacent to this access road to demonstrate the requirement to deviate to the right.



2. The validity of the “Maximum Speed On This Island 50 KPH” sign is questionable when you consider:

- Applicable speed limits for various road types can be seen within the Main Roads Speed Zone [Policy](#) at item 4.
- Much of the road seal is below the 5.5m required minimum to allow for formal speed zoning as defined within the Main Roads Speed Zone [Policy](#) at item 4.1.3.1.
- Many of the roads on the island are unsealed and as such cannot be speed zoned.
- There is no provision within the Road Traffic Code 2000 which supports this sign.
- This sign is not a standard sign from Australian Standards or Main Roads Standards.

Even if the use of the sign could be successfully argued, the position of the sign is poor as it is at the very Northern end of the island (possibly now redundant as a remnant sign from when the old jetty was operational).

There is another sign replicating this one on Sydney Highway as you head North away from the Settlement just past Alexander Street, the same points made above apply to this sign also.

My recommendation is that advice be sought from the State Solicitors Office to determine the validity / legality of this sign and its intended impact.



3. Give Way sign on Heart Break Drive (access track to Trannies Beach) where it meets Sydney Hwy is on the wrong side of the road (is on the right, should be on the left) but given the nature of the intersection the Give Way could be removed altogether without compromising safety.



4. Road Safety Message sign “DRINK AND DRIVE IT’S A CRIME” which is on the verge opposite Heart Break Drive is ambiguous and should either be removed or the message changed.



5. No Entry sign at access track on Sydney Hwy is in very poor condition and is of an old standard. This needs to be replaced with the current R2-4 No Entry sign.



6. Formal 50 Km/h Speed Zone signs across the island are typically in poor condition and often obscured by vegetation. Signs showing a 50 Km/h speed limit should not be used in built up areas where the operator of a motor vehicle should be aware of their obligations under the Road Traffic Code.



7. On Mahoon Road at Sydney Hwy vegetation has obscured the Give Way sign and a [MR-HM-2](#)



should be installed opposite the intersection. Mahoon Road is the access to the tourist destination “The Farm Shop” where local produce is available and tours of local farming techniques is available, the installation of a Tourist destination sign should be considered.



8. On Sydney Hwy opposite Rumah Baru Road (access to the Ferry) there is a [MR-HM-1](#) which should be replaced with a [MR-HM-2](#)



to bring it up to standard.



9. Along the median island on Rumah Baru Road at Sydney Hwy the Keep Left signs have excessively long posts on them. Given the low volume of vehicles which utilise this intersection I don't think a raised island with signs is required, a painted island could be installed but this may also be excessive and just a length of Separation Line to define the centre of the road would suffice. This intersection has a formal Give Way Sign but no Give Way line. Whilst a line can be installed without a sign, a sign cannot be in place without a line, as such a Give Way line needs to

be installed. If the raised island is to remain then the Give Way sign on the verge should be relocated to the nose of the island and both Keep Left signs removed to align with Main Roads [standards](#)



Additionally, the linemarking to the island is incorrect and should be changed to reflect current standard as demonstrated on standard drawing [200331-0184](#)



10. On Rumah Baru Road approximately 170m East of Sydney Hwy there is a 50 Km/h sign on the Northern verge for road users travelling East with a 30 Km/h sign panel on the back of it. The 30 Km/h sign should be removed as speed zone signs are not used on approach to a terminating road to slow traffic, other measures such as Give Way Ahead Warning sign should be considered.



11. Just prior to the end of Rumah Baru Road where the ferry carpark exists there is a 20 Km/h sign, this is not required and is not supported by the Main Roads Speed Zoning Policy, the termination of the road and change of environment is self-evident resulting in a natural reduction in approach speed.

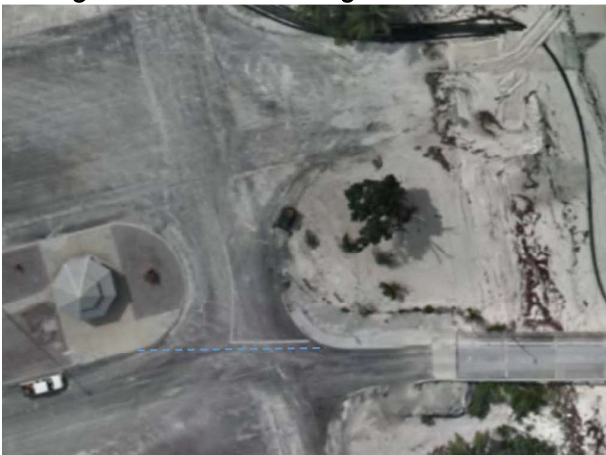
This sign should be removed, if it is felt that advanced warning is required then warning sign W2-14(R) could be installed in its place.



W2-14(R)



12. At the end of Rumah Baru Road immediately prior to the jetty the carpark expands to the North allowing access to a boat ramp. This area is divided from the main ferry carpark by an isolated Stop Sign, this is the wrong application for a Stop Sign and the warrants for installation are not met. If it is felt that formal separation of the two areas is required then a length of Continuity Line could be installed, but assessment of the geometry on site is that safety is not compromised by having this area without signs and lines.



13. On Sydney Hwy just north of the Transfer Station, there is a curve warning sign with a 30 Km/h advisory speed tag. The tag is obscuring the warning sign and needs to be lowered plus both panels are in poor condition.



14. At the entrance to the Transfer Station, the Transfer Station Service sign requires maintenance, the fixing has broken away from one pole and the sign could potentially become a spear during extreme weather.



15. Just south of the Transfer Station access there is an “A” size 50 Km/h speed zone sign, the standard size for repeater speed zone signs is “B”.

More importantly, the sign is located within a series of curves, which are signposted on each approach with a 30 Km/h advisory speed. The inclusion of the regulatory 50 Km/h sign within this length of road creates confusion and should be removed. For further detail, refer to Australian Standard 1742.4-2008 Part 3.3 below;

3.3 CONFLICT WITH ADVISORY SPEED SIGNS

Advisory speed signs within any speed zone or default limit shall not show a speed greater than the speed limit. Speed limit signs and advisory speed signs showing different speed values from one another shall not be placed where drivers can read both at the one time or otherwise so close that they might appear to be conveying contradictory messages.



16. Just prior to the final curve in the series there is a “REDUCE SPEED” sign, which has been overlayed onto an older REDUCE SPEED sign, this should be removed altogether. Other than the reduction of the new signs effectiveness by being placed within an older sign panel, this sign is reserved for use for where a motorist has been travelling at high speed for a considerable time and approaches a significant speed reduction

See extract of Australian Standards 1742.2-2009 Part 4.11.2.14 below;

4.11.2.14 *REDUCE SPEED (G9-9)*



G9-9

The REDUCE SPEED sign may be erected at sites where the approach speed of traffic is high and the majority of drivers must slow down and may be required to stop. Where used, it shall be erected in conjunction with the appropriate standard warning sign so that the reason for the reduction in speed is apparent to a driver.

REDUCE SPEED signs shall not be erected instead of other standard warning devices and signs, and generally should not be erected unless the other devices have proved to be, or are likely to be, ineffective. They should not be regarded as a cure for every high-speed traffic situation; indiscriminate and frequent use will negate the impact that the sign, properly used, has on approaching drivers.

REDUCE SPEED signs should be erected 60 to 120 m in advance of the appropriate warning sign so that both signs are visible at the same time to an approaching driver.



17. As with the complimentary sign on the other end of this series of curves, the combination of curved road warning sign with 30 Km/h advisory speed tag is in poor condition and the tag is obscuring part of the warning sign consider replacing both panels and install correctly.



18. On Sydney Highway south bound just before Alexander St there are a pair of 30 Km/h AREA speed zone signs. At the time of the sign capture, the corresponding END 30 Km/h AREA on the reverse side of these panels for road users travelling north were missing, Google street view shows they were in place in February 2018 [here](#) . Whilst the signs have been used correctly and the intent to reduce vehicle speed around the settlement to improve road safety is understood, given the general environment on West Island and the limited number of vehicles operating on the network, are they really required?


Recommendation is that a 50 Km/h AREA be utilised across the sealed road network on the island. This would bring the settlement roads into line with all other built up areas and the “Maximum Speed On This Island 50 KPH” sign commented on at point 2. could then be removed. 50 Area signs would not be required within the settlement as it is built up, but would need to be installed at this location for North bound traffic exiting the built up area, AREA signs would need to be changed on Air Force Road where the End 30 AREA are currently installed.



19. On Buffett Close at Sydney Highway, there is formal Give Way control. Local access roads in low speed environments do not need formal control as the requirement for motorists on the terminating road to yield to motorists on the through road is already covered under legislation within the Road Traffic Code 2000 (anyone with a driver's license should be aware of their obligations). See Main Roads Policy on the use of Give Way signing [here](#).

There are many T junctions across the island that are under Formal Give Way control, recommendation is to remove the Give Way control if the intersection is a clear T-junction, but retain the Give Way line if the geometry of the intersection is such that the correct position to yield and stage is unclear.



20. Buffett Close Cul-de-sac has a [MR-HM-2](#)  at the end of the road. These signs are used opposite T-junctions when there is not a development opposite. The correct sign to use at the end of a Cul-de-sac is a D4-5 Obstruction Marker; see Australian Standards 1742.2-2009 Part 4.6.7.2(d)



21. On Beacon Heights Road at Sydney Highway this T-junction has a Give Way sign in poor condition, as previously stated T-junctions that comprise of access roads within a low speed environment do not generally need formal control.



22. On Sydney Highway (Fremantle Road) just South of Emden Walk there is a Pedestrian Crossing Ahead Warning sign (W6-2B) which is used prior to formal crosswalks but there isn't a crosswalk over the road.



It is acknowledged that people cross the road at this location due to the Cocos Club and Tropicana being on either side of the road, the correct sign for this instance should be a



W6-1.

I also note that the Pedestrian Crossing Ahead warning sign (at the time of the pick-up) only existed north of the crossing location, a warning sign (W6-1) should exist on either side of this informal crossing point.

23. Clunies Ross Avenue where it meets Sydney Highway (Fremantle Road) – William Keeling Crescent is controlled by a Give Way sign, as there is a business driveway opposite this intersection it in effect turns the location into a 4 way intersection. As such the driveway should be under Give Way control as well.



24. On William Keeling Crescent immediately south of Clunies Ross Avenue there is a 30 Km/h repeater sign. As this is a 30 Km/h AREA, this sign needs to be replaced with a 30 km/h AREA speed limit sign (or removed if recommendation at point 18 is adopted).



25. On Nelson Mandela Walk, south of Clunies Ross Avenue, there is a symbolic children's sign with school tag prior to the Cocos Island District High School. This sign is of an old standard that is no longer supported and should be replaced with a W6-3B and W8-14 tag.



Refer to standard drawing [9120-0174](#). This scenario is replicated at the other end of the High School.



26. Further south on Nelson Mandela Walk there is a Vehicle Activated Sign which displays a driver's current speed. This sign was not working at the time of the pick-up and if it has suffered an unrepairable failure then it should be removed.



27. On Air Force Road, south of the nearby runway there is a long sweeping curve which at the southern end has a [MR-HM-3](#) hazard marker which is supported by two large pine legs. The supports on this sign could be dangerous and potentially become a spear if struck by a vehicle. In addition, the height of this sign is such that at night it is out of the direct reflection range of headlights which reduces its effectiveness. It should be lowered to the standard height, see [Hazard Marker Heights](#) and the supports changed to typical posts.



28. Further South on Air Force Road the undivided unsealed road separates and deviates into an informal dual carriageway separated by a row of palm trees.



This section felt the most unsafe section of road on the island for a driver, especially at night. There is no street lighting and only a uni-direction Hazard Marker attached to a palm tree when approaching from the settlement to highlight the requirement to veer to the left. Approaching from the other direction there is nothing.



There is no clear reasoning for this anomaly in the middle of the road; if it is not required, my recommendation is that it be removed altogether.

If this cannot be done, then I propose that the existing advanced warning signs (W4-4)

(a) *Divided Road (W4-4)*



W4-4

be maintained to highlight the impending hazard ahead, and Keep Left signs should be installed at each end to reinforce the requirement to deviate to the left.

The ultimate treatment would be to have a reflective barrier around this median.

29. Immediately after this median treatment, there are a number of warning signs.



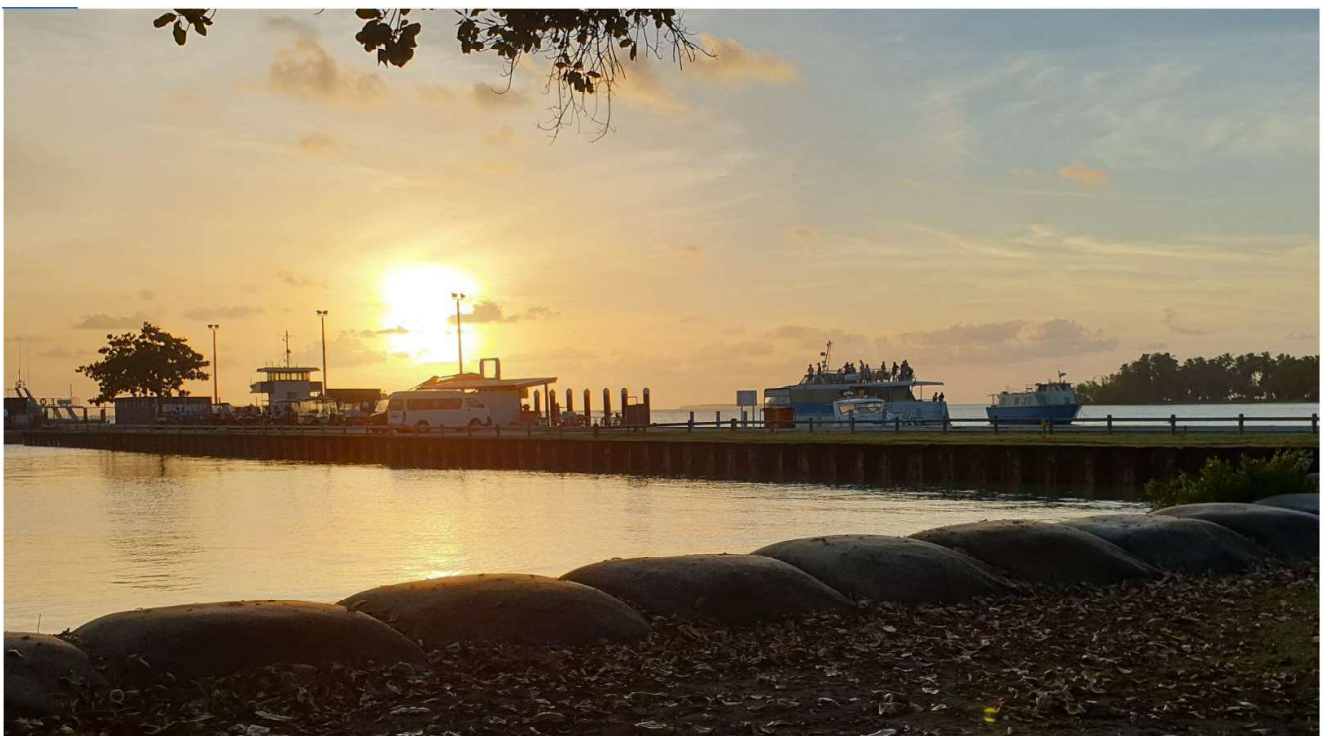
Given the sparsely populated island and little tourist traffic, these signs are unnecessary and don't provide any real safety improvement. Recommendation is to remove them completely.

General comment is that many signs across West Island are superfluous and can be removed with little to no change to the level of safety provided. The majority of the remaining signs are in poor condition (due to local environmental conditions) and need to be replaced.

Regulatory signs such as Give Way and Speed Zoning need to be formally approved by the Delegated Officer authorised by the Commissioner of Main Roads.

Cocos (Keeling) Home Island

Cocos Island Map



Corrective Actions for Cocos (Keeling) Home Island

30. As you arrive on Home Island from the ferry terminal there are two 30 Km/h Speed Zone AREA signs, whilst the application of these signs is correct, their usefulness is queried. Given that there are very few cars on the island and the main mode of transport is on either foot or quad bike / buggy the low speed environment is self-governing. Additionally I suspect that formal approval for this AREA speed limit has not been sought or granted. Recommendation is that all the 30 Km/h AREA Speed Zone signs across the island be removed.



31. At many T-junctions across the Island there is formal Give Way control, this is unnecessary as formal control is typically not required at T-junctions. The requirement to yield to through traffic when on a terminating road is already covered by legislation within the Road Traffic Code. See Main Roads policy on the use of Give Way [here](#).

Give Way control at four way intersections is a requirement; see standard drawing [Typical Intersection G/W control 200331-0141](#))



32. Overgrown vegetation obscuring signs is a general problem across the island and regular maintenance needs to be undertaken to ensure the intent of the sign is clear to road users. Vital information could be missed which could result in serious injury or the delay in finding essential services.

Recommendation is that a quarterly maintenance programme be established to deal with the vegetation.



33. On Jin Melati just North of Jin Rel there is a Warning sign in Malay, whilst the intent of this sign may be obvious to Malay locals, it does not assist any non-Malay tourists to understand what the inherent risk is, which they are being exposed to at that location.


Additionally, in Austroads Guide to Traffic Management Part 10 it says (in part) “..... *The legend used on road signs in Australia and New Zealand must be in the English language. Information on signs is not to be duplicated in another language, as it is not practicable to accede to all such requests from the community. The replication of information in multiple languages would lead to confusing and ineffective signs that have excessive information.*”

The use of Malay on signs was wide spread across the island, in addition to the Warning sign, there were a number of tags beneath Give Way signs, these signs are superfluous even if the observer does not know English, Give Way signs follow an international shape convention so they can be recognised in every country regardless of language.



Of particular concern was a sign that it is presumed the intent of, is to advise that the maximum speed across the island is 30 Km/h which has the Australian Federal Police as well as Main Roads Western Australian insignias on them as endorsement. Recommendation is that this sign be removed.



34. Hazard Marker application across the island was not consistent with Main Roads standards or consistent within its application across the island. Main Roads standard drawing for the application of Hazard Markers can be seen at [200831-0015](#). Hazard Markers are not required opposite T-junctions where there is a structure opposite, the structure demonstrates that the road does not continue. Hazard Markers are required at a T-junction where there isn't a structure, for example if there is bush, parkland, drop off etc. In those cases it should be a [MR-HM-2](#) .

Typically on the Island, a [MR-HM-1](#)  was used at T-junctions and often there wasn't a Hazard Marker when one should be installed.







35. Give Way signs at four way intersections are required, there were no Stop Signs on the island and the warrant for Stop Sign was not met at any intersection.

At the majority of intersections Give Way signs were in poor condition with little or no reflectivity, and the associated pavement marking (Give Way Line) was typically so badly faded that it was difficult to make it out at all.

A comprehensive maintenance programme needs to commence to improve safety at four way intersections across the island.









36. In addition to the 4 way intersections which are under Give Way control there are a series of laneways throughout the residential area allowing rear property access. These laneways form four way intersections with the surrounding road network but are not controlled. They need to have Give Way control placed on them to establish priority and improve road safety.





37. Surrounding the Cocos Island District High School there is a 10 Km/h Shared Zone being utilised as a School Zone. Whilst the intent to alert people that they are alongside a school and they need to be more vigilant is understandable, a Shared Zone is not the correct platform to do it from.

Within a Shared Zone, priority shifts from vehicles to pedestrians, and the impact is probably poorly understood within the community. This could lead to confusion and possible injury. Also some of the roads that are signposted as 10 Km/h Shared Zone are unsealed and unsealed roads cannot be speed zoned as their condition can change rapidly due to environmental factors.

Furthermore, given the type of vehicles on the island and their limited operational speed, a further reduction in speed zone for the school does not seem necessary. Installing SCHOOL ZONE signs around the school is completely acceptable to increase diligence from approaching motorists.

Recommendation would be to remove the 10 Km/h SHARED ZONE altogether, and utilise the standard School Zone as demonstrated within the Main Roads [Speed Zoning](#) policy.



