



Assessing the Feasibility of a National Road Classification

Report to ICSM on National Road Classification Developments

“Road classification is a means to an end, not an end in itself. Successfully allocating agreed labels to each element in the road system involves so much effort and controversy that it is pointless and best avoided unless the labels are going to have some application.”¹

October 2006

Version 2.0

Submitted by the RWG for the ICSM Bi-Annual Meeting

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Executive Summary

The Intergovernmental Committee of Surveying & Mapping (ICSM) formed the Roads Working Group (RWG) arising from Resolution R05/05/01 in May 2005. The Working Group was established to promote and develop a nationally consistent approach to the classification of roads and associated infrastructure information. At this initial meeting the Terms of Reference were discussed, refined and finalised. A major objective was to:

Develop and promote a nationally consistent classification and attribution scheme for the representation of roads and associated infrastructure.

Irrespective of the type of road hierarchy being developed, it is important to emphasise that the process is not an exact or precise science. In principle, there is a diversity of ways of defining and classifying street and road types, and no single variable will ever be sufficient to completely describe a class of roads².

This paper represents the initial research phase towards a national road classification. Its purpose is to investigate the feasibility of developing a new nationally consistent road classification hierarchy; its objective is to provide recommendations to improve the existing national road classifications to better meet the requirements of expected future clients.

An investigation was undertaken into current road classification hierarchies applied by mapping and road traffic authorities, throughout Australia and internationally. Each of these classification hierarchies was reviewed to identify their positive and negative attributes, in an attempt to distil and qualify how best to develop an Australian national classification hierarchy.

The research, undertaken into classifications applied both nationally and internationally, highlighted that no single classification appears to be perfectly applicable. Rather, they all exhibit certain flaws and beneficial elements with respect to fundamental classification characteristics.

This research also indicated that the PSMA classification has, above all other existing Australian road classifications, the potential to be applied as the national model. However, the research did identify several considerations that could improve the PSMA model, that warrant further investigation. These led to the following recommendations:

It is also worth noting that this report represents the initial research phase towards a national road classification and investigates the feasibility of developing a new nationally consistent road classification hierarchy and process. Furthermore, none of the recommendations contained in this report advise for the 'adoption' of a particular approach at this stage. The recommendations are activities that could

potentially improve the utility and usefulness of the current PSMA classification for national applications, and therefore warrant further investigation.

The recommendations of this feasibility study, in no particular order, are:

Recommendation 1: *To further investigate the utility and practicality of a rural/urban segregation of the PSMA road classification hierarchy, through discussion with relevant road transport & traffic authorities.*

Recommendation 2: *To refine the existing PSMA Road classification to enable better differentiation of local and State roads through liaison with relevant government representatives.*

Recommendation 3: *That additional variables of traffic volume, design speed, travel distance, route numbering, population measures and structural considerations, be investigated for possible inclusion as additional determinants of road classification type, either within the classification itself or in additional guidelines or decision trees.*

Recommendation 4: *To engage road traffic and transport authorities to investigate the feasibility of the periodic supply of coordinated higher order roads network classifications from road transport and traffic authorities.*

Recommendation 5: *To develop additional guidelines that contain decision-tree diagrams, supplementary instructions and examples that aid in the interpretation of road classification.*

Recommendation 6: *To consult with National Parks, State Forests and Indigenous Lands authorities to gauge their requirements for attribution of lower order roads for possible inclusion into a national classification, or in a separate attribute field in such a classification.*

Recommendation 7: *To adopt a cooperative approach between all levels of government (to agree) to implement a mutually acceptable national road classification system.*

1. Introduction

Terms of Reference

- 1 The Intergovernmental Committee of Surveying & Mapping (ICSM) formed the Roads Working Group (RWG) arising from Resolution R05/05/01 in May 2005. The working group was established to promote and develop a nationally consistent approach to the classification of roads and associated infrastructure information.
- 2 At this initial meeting the Terms of Reference were discussed, refined and finalised. A major objective was to:

Develop and promote a nationally consistent classification and attribution scheme for the representation of roads and associated infrastructure.
- 3 Attempts at a nationally consistent roads classification have been made numerous times over the past 30 years by the Australian road transport and traffic authorities. Unfortunately, these have been unsuccessful. RWG members have tried to obtain documentation on these failed attempts; however this has proved fruitless. This highlights the difficulty and complexity of the objective. Nevertheless, the RWG is confident that this is the first time such work on developing a national hierarchy has been carried out from a mapping perspective, and is optimistic that this fresh viewpoint could yield the desired outcome that eluded earlier attempts.
- 4 The RWG acknowledged the need for a national road classification, but was conscious that a slight variation of existing classification hierarchies may satisfy clients requirements, rather than designing an entirely 'new' classification hierarchy.
- 5 Therefore, the RWG proposed that the first phase of the project should be to undertake research into all existing road classification hierarchies in use within Australia, as well as some international examples. This would enable a complete assembly of 'current thinking' which is necessary to identify hierarchy variations and shortcomings. Also, this research should reveal whether such comparisons have already been successfully attempted elsewhere, avoiding the risk for potential duplication of effort, which is high given the vast number of stakeholders.
- 6 This paper represents the initial research phase towards a national road classification. The purpose being to investigate the feasibility of developing a new nationally consistent road classification hierarchy; its objective is to provide recommendations for improving the existing national road classifications to better meet the requirements of expected future clients.

2. Background

Australia's Road Network

- 7 Australia has a network of around 800,000 km of public roads, making it one of the most extensive in the world. However, the number of people per kilometre of road is among the lowest in the developed world³. These roads serve a wide variety of users with diverse needs, primarily facilitating interaction of people and the exchange of goods and services. The roads that carry these movements vary considerably, and include modern freeways as well as vast kilometres of unsealed rural roads and vehicle tracks.

The Road Classification Hierarchy

- 8 The road hierarchy is system of network design and management which categorises different types of road in a framework and orders them in relation to each other, in terms of allowable connections between them in the network as illustrated in Figure 1.

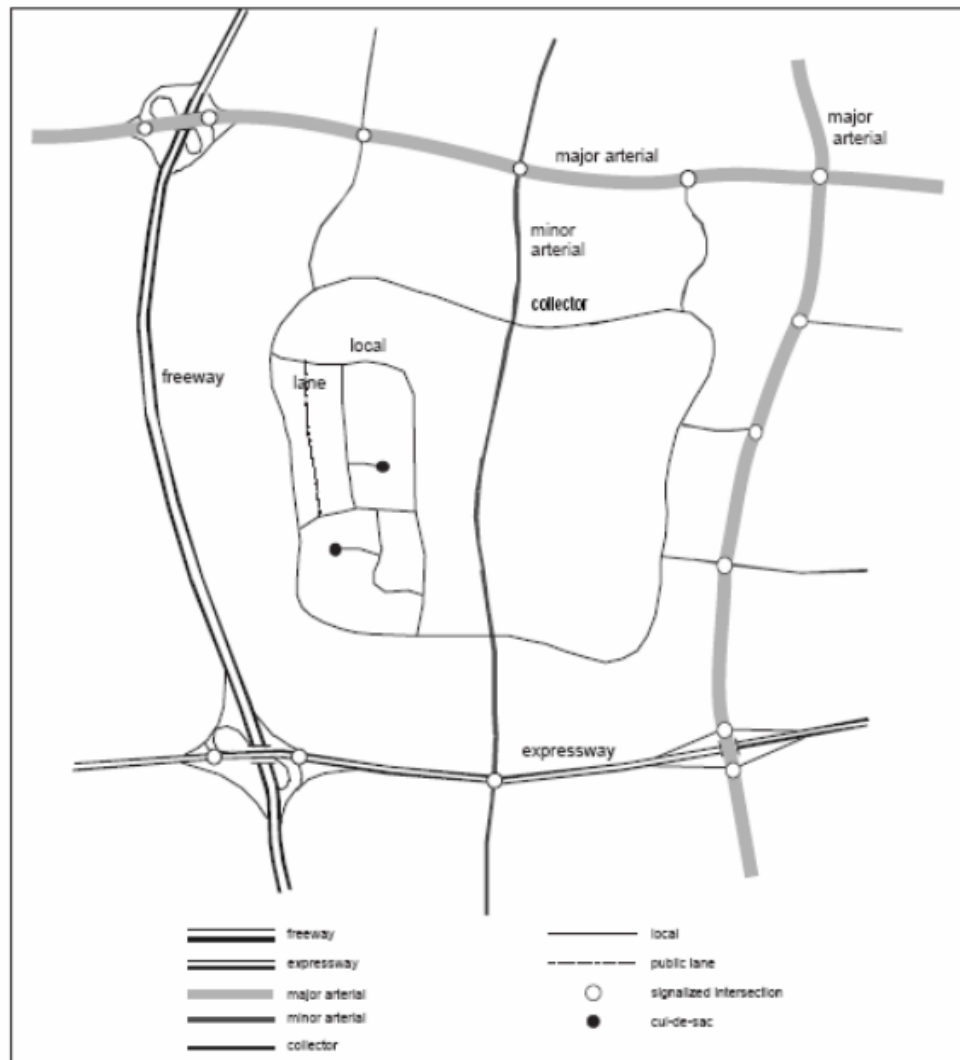


Figure 1. The road classification hierarchy (adapted from⁴).

The Purpose of the Road Classification Hierarchy

- 9 Defining a road classification hierarchy can be undertaken for several purposes, many of which are interrelated and highlight the importance and complexity of defining the road classification appropriately. These purposes include:

Planning and Administration

- 10 The application of a road hierarchy provides a common base from which policy can be established. Moreover, it can be used as a tool to assist in determining the purposes of the various roads in the network. These different purposes will influence planning, in terms of an appropriate level of interaction between the roadway and land use, design standards, operational matters and funding considerations⁵. The process of using a road hierarchy to assist in differentiating road types in order to allocate appropriate roads funding is a particularly contentious area. In practice, the higher levels of government provide limited funding support for roads in the lower classifications. Therefore, the persistence of ambiguous road hierarchies has the potential to enable jurisdictions to 'double-dip' for funding where there is dispute or uncertainty regarding the classification of particular road segments⁶.

Conflict Avoidance - Reduce Overall Impact of Traffic

- 11 At a fundamental level a road classification hierarchy defines the network in such a way that it facilitates the safe and efficient movement of vehicles as well as other roads users, such as pedestrians and cyclists. In essence the hierarchy attempts to avoid conflict between the different roads users by guiding relationships between different types of route, considering both local and regional needs⁷. In the absence of any ordered road classification framework one would expect a potentially volatile and chaotic scenario whereby roads could be used in ways that are incompatible with their intended use⁸.

Improved Recognition of Road Types

- 12 Road users have expectations when using roads within the network, whereby they perceive roads exhibiting certain characteristics to deliver a particular travel expectation. Road user expectations have an important influence on user behaviour and performance in traffic. Therefore, having a well defined and consistent road classification hierarchy can reinforce road user expectations and improve the effectiveness with which the road network carries traffic⁹. This logic applies across the gamut of road user experiences from daily routine journeys to and from work, to extended vacation trips to unfamiliar regions.

Types of Road Hierarchies

There are several types of road hierarchy that differ according to their intended purpose.

Functional Road Hierarchy

- 13 A functional hierarchy is the most common type which ranks roads according to how the roads are expected to function with respect to local through-traffic. In doing so, it recognises that the roads form part of an interconnected network and addresses the competing road uses of mobility and access¹. Fundamentally, streets and highways perform two types of service, either providing traffic mobility or land access (Figure 2). The proportion of service they provide will determine the rank each road is assigned in the hierarchy.

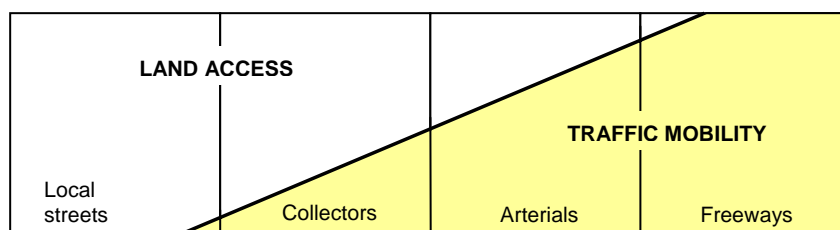


Figure 2: Traffic function versus land function (adapted from¹).

- 14 Defining the hierarchy in this way describes how traffic should flow in a logical and efficient manner through the network, as well as how it should operate and be managed. There is a view, however, that a functional hierarchy should also be used:

“as a basis for allocating jurisdictional responsibility for roads”¹⁰

However, others contend that administrative decision-making is better suited to administrative road hierarchies^{1,11}.

Administrative Road Hierarchy

- 15 An administrative hierarchy assigns an order to roads on the basis of who is responsible for managing a particular segment of road, whether it be Federal, State or local government. In broad terms, the Australian road system consists of National Highways, State Highways, State Roads, Main Roads and Local Roads. Mistakenly, in such hierarchies State Highways, State Roads and Main Roads are often categorised using functional terminology such as ‘Arterial’¹. This misuse of functional terminology in an administrative classification undoubtedly leads to confusion in differentiating these two types of road hierarchy.

Matching Administrative and Functional Hierarchies

- 16 It is important to note that these two road hierarchies should not be considered entirely separate. Increasingly, there is potential for the two hierarchies to match better; however, a complete match is unlikely to occur². Principally, this is because some local roads maintained and managed by local governments, will be required to perform a function greater than a traditional ‘local street’. Nevertheless, there are increasing examples both nationally and internationally where a mixture of administrative and functional characteristics have been used to define a road hierarchy. More will be discussed on this later.

Structural Road Hierarchy

- 17 Another, less common method of road hierarchy classification, is to rank roads according to the structural standards applied to a given segment of road. The structural determinants or geometric design that classify a particular road may vary, depending on the intended purpose of the classification, and can include individual variables or a combination. Variables that are often considered include road width, surface type, gradient, wet weather condition, load bearing and height restriction. Generally, a structural road hierarchy is most often applied in military situations and to a lesser extent, in State Forest and National Park management.
- 18 There is some conjecture as to whether structural considerations should influence certain functional classifications^{1,11}. By definition, the functional classification should be based purely on the location – although the structural characteristics may determine how many of a certain road type are needed to perform a particular function¹².

The Road Classification Challenge

- 19 Irrespective of the type of road hierarchy being developed, it is important to emphasise that the process is not an exact or precise science. In principle, there is a diversity of ways to define and classify street and road types, and no single variable will ever completely describe a class of roads². Because a road classification system is necessary to assist in policy and planning activities, amongst others, jurisdictions often produce their own road classification hierarchies. This accounts for the current situation, here and overseas, where numerous systems exist. Despite the different methodologies, however, there are some accepted fundamental classification criteria that should be addressed in all road classification hierarchies.

Fundamental Classification Criteria

- 20 Irrespective of the type of road hierarchy being developed and applied there are certain characteristics or criteria that are fundamental to all road classifications. It is important in reviewing the current status of road classifications that each be assessed on how well they satisfy these criteria.

Simple Number of Classes

- 21 When attempting to define categories to apply to a road hierarchy it is important to keep the categories to a relatively small manageable number¹¹. Careful consideration must be given to ensure a balance between adequately catering for the majority of class types (not simply all theoretically possible types) while not being too simplistic so as to exclude relevant classes.

Unambiguous – Descriptive Terminology of Classes

- 22 The definitions that comprise each category must be distinct, clear and concise. This is challenging given the often subjective nature of the task. Broad definitions that leave too much scope for interpretation must be avoided otherwise the desirable consistency in application is difficult to achieve^{13, 14}.

Ubiquitous – Across Entire Network

- 23 To attain the greatest benefit from the development of a road hierarchy, it is important that the classification system contains variables that can be used systematically to distinguish roads across the whole spectrum⁵. There is little benefit in attempting to derive a national classification system based on locally unique variables, irrespective of how quantifiable they may be.

Driver Perceptions – Using Common Language Terminology

- 24 Not all users of road hierarchies are experts in road classification terminology. Therefore, considerations must be given to use road definitions that are in line with road user expectations⁹. For example, when road users encounter terminology such as 'arterial road' or 'local road', they will perceive the utility of these roads as different, which will influence their behaviour while on them. It is important that these perceptions of varying road types, which can differ across different States, be considered in the development of a road hierarchy.

Hierarchical Contiguity – Complete Coverage of Network

- 25 A core principle of any road hierarchy is maintaining the concept of hierarchical contiguity, whereby roads classified in the 'highest' category form a single contiguous network as do roads in 'lower' categories⁵. Such considerations may seem obvious but they are important to stress to ensure they are satisfied during network design and classification.

Scaleless – Consistency Across Network

- 26 The development of a road hierarchy must be scaleless, such that the same classification system applies irrespective of the scale at which the classification is being interrogated¹⁵. Too often road hierarchies are modified to include localised or regional significance which reduces the overall effectiveness of the hierarchy in a State-wide or national sense.

3. Road Classification Hierarchies in Australia & New Zealand

- 27 An investigation into current road classification hierarchies in use throughout Australia and NZ reveals that the majority are fundamentally functional classification systems. Those developed by mapping-related jurisdictions tend to be more closely aligned to a classic functional hierarchy, whereas those produced by traffic authorities tend to show some mix between a functional and administrative hierarchy.
- 28 In the following section, each of these classification hierarchies will be reviewed primarily against the fundamental classification criteria highlighted previously. This analysis will identify their benefits and shortcomings against the criteria, as well as in general, in an attempt to determine how best to develop a national road classification hierarchy, as well as whether any existing classification merits consideration for national application. Refer to Appendix A for comparison of the road classifications.
- 29 It is important to emphasise here that the assessment of existing road classifications relates to evaluating the perceived effectiveness of certain characteristics for use in a national classification system. Therefore, some identified shortcomings in existing classifications from a national perspective, may be locally beneficial. Furthermore, this analysis is not intended as a criticism of individual classifications, but in light of the RWG objective, it is important that constructive comments be tabled as a means of progressing discussion on a national road hierarchy.

Mapping Jurisdictions Road Classifications in Australia

Refer to Appendix A for a comparison of road classifications in Australia by mapping authorities.

Australian Capital Territory

- 30 The Roads ACT Department of Urban Services classifies the ACT road network in principle using the National Association of Australian State Road Authorities (NAASRA) (now Austroads) classification, which is based on road function and usage²⁶. However, ACT has further separated Urban Class 4 into an additional three categories of Urban residential 1, 2 and 3, resulting in a total of 12 types in all (Appendix A).

Benefits	Shortcomings
<ul style="list-style-type: none"> - Distinction between urban and rural road regions. - Many other Australian road authorities have adopted the NAASRA classification, with minor variations, making for consistent representation. - Rural Class 5 road less ambiguity in definition, referring to 'exclusively for one activity'. 	<ul style="list-style-type: none"> - Lack of direction on how urban and rural divide is determined. - A Collective name not assigned to each class, such as 'local road' this complicates interpretation by users. - Uses subjective terminology, particularly for Class 2 & 3 roads such as 'key' towns and 'important' centres (not quantifiable). - Greater distinction needed between designating State roads and local council roads. - Does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or Emergency Management (EM) purposes.

Geoscience Australia

31 The road classification hierarchy applied by Geoscience Australia (GA) to its national topographic map and data products is a five level hierarchy that exhibits both a mix of functional and structural characteristics¹⁷ (Appendix A).

Benefits	Shortcomings
<ul style="list-style-type: none"> - Simple number of classification types. - A limited number of classification levels makes it easier to amalgamate multiple different systems into it. - A Descriptive name is assigned to each class, such as 'Secondary Road' assisting interpretation by users. 	<ul style="list-style-type: none"> - Greater distinction needed between designating State roads and local council roads. - Too few classification types make it difficult to combine with more complex classification types. - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'major through routes' (not quantifiable). - Dual Carriageway (Class1) and Vehicle Track (Class 5) introduce structural variables, whereas all other classifications have functional considerations. - Does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM.

New South Wales

32 The NSW road classification hierarchy applied by the NSW Department of Lands (LPI) to its topographic map and data products is a nine level hierarchy¹⁸. It is similar to the GA hierarchy, exhibits a mix of functional and structural characteristics for the lower order classifications of Local Road (Class 6) and Track Vehicular (Class 8) (Appendix A).

Benefits	Shortcomings
<ul style="list-style-type: none"> - Good differentiation of local road types. - A Descriptive name assigned to each class, such as 'Distributor Road', assisting interpretation by users. - Very descriptive definitions, particularly for contentious middle and lower order roads, reducing degree of subjectivity. - Introduces considerations of traffic speed to classify Motorways, to reduce ambiguity, however, fails to quantify. - Definitions reinforce linkages with ICSM standards. 	<ul style="list-style-type: none"> - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'major traffic movements', 'high traffic volume' (not quantifiable). - Local Road (Class 6) and Track Vehicular (Class 8) introduce structural variables whereas all other classifications have functional considerations. - Does not have an additional category of Vehicle Track to discern functions relevant for National Park, State Forest or EM, but can relate surface conditions of Four-Wheel Drive to aid in interpretation. - Includes Path category (not permitted to carry vehicular traffic) which may best be considered outside a road classification hierarchy.

Northern Territory

33 The Department of Planning and Infrastructure (DPI) classifies the NT road network principally with a NAASRA classification which is based on road function and usage; however, NT has further separated Pastoral into another distinct level of classification (Appendix A)¹⁹.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Distinction between urban, rural and pastoral road regions. - Many other Australian road authorities have adopted the NAASRA classification, or minor variations of, making for consistency in representation. - Descriptive definitions which have been enhanced from the standard NAASRA system with examples. - Descriptive name assigned to each class, such as 'Local Road' assisting interpretation by users 	<ul style="list-style-type: none"> - Lack of direction on how urban, rural and pastoral divide is determined. - Uses subjective terminology, such as 'key towns' and 'important centres' (not quantifiable). - Greater distinction needed between designating State roads and local council roads. - Does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM. - Includes category of road type not relevant to the Territory, i.e. State Highway.

New Zealand

34 The NZ road classification hierarchy developed by Land Information Department New Zealand (LINZ) for its topographic map and data products is a four level hierarchy which is based on road function, but some categories do introduce structural characteristics (Appendix A)²⁰. This classification is part of the ESA conceptual data model that is yet to be applied.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Least number of classification types of all hierarchies. - Limited number of classification levels makes it easier to amalgamate multiple different systems into it. - Descriptive name assigned to each class, such as 'Collector' assisting interpretation by users. 	<ul style="list-style-type: none"> - Greater distinction needed between designating State roads and local council roads. - Too few classification types makes it difficult to combine with more complex classification types. - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'major' settlements (not quantifiable). - All categories include the structural variable of lane counts in the definition, whereas the Local Road classification has only functional considerations. - Does not have an additional category of vehicle track to discern different functions relevant for National Park, State forest or EM.

PSMA Australia Limited

35 The PSMA Australia Limited (formerly the Public Sector Mapping Agencies) road classification hierarchy as applied to their Road Transport layer has a nine level hierarchy, that exhibits a mix of functional and structural characteristics²¹, which is based on the Victorian classification system. Notably, this hierarchy is applied to all State, Territory and Commonwealth datasets, and depicts a nationally-applied road hierarchy, which represents the main objective of this RWG project. The method by which the road classification of each jurisdiction is translated into to the PSMA classification is detailed in Appendix E. The RWG members believe that this particular hierarchy is approaching what is required and has the potential to become adopted as the nationally consistent road classification hierarchy (Appendix A).

Benefits	Shortcomings
<ul style="list-style-type: none"> - Good differentiation of local road types, although definitions could be more descriptive. - Descriptive name assigned to each class, such as 'Distributor Road', assisting interpretation by users. - Does have an additional category of Vehicle Track to discern functions relevant for National Park, State Forest or EM. 	<ul style="list-style-type: none"> - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'massive traffic movements', 'key towns' (not quantifiable). - Arterial Road (Class 2) and Track – 2 Wheel Drive (Class 6) and Track – 4 Wheel Drive (Class 7) introduces structural variables whereas all other classifications have functional considerations. - 'Undetermined' category potentially too broad and ambiguous, requires greater definition. - Some very descriptive definitions. However, should provide more detail for contentious middle order roads, reducing degree of subjectivity.

Queensland

36 The road classification hierarchy applied by the Queensland Department of Natural Resources and Water (DRW) to the Queensland Digital Road Network (DRN) is a nine level functional hierarchy (Appendix A)²².

Benefits	Shortcomings
<ul style="list-style-type: none"> - Good differentiation of local road types. - Descriptive name assigned to each class, such as 'Local Connector Road', assisting interpretation by users. 	<ul style="list-style-type: none"> - No distinction between urban and rural road regions. - Does not appear to have documented definitions to describe each classification in detail, making assessment difficult. - Does not have an additional category of Vehicle Track to discern functions relevant for National Park, State Forest or EM. - Includes Bikeway/Walkway//Passenger Ferry and Construction Line category (used for connection through roundabouts) which may best beconsidered outside a road classification hierarchy.

South Australia

37 The SA Department of Environment & Heritage (DEH) has adopted the same road classification hierarchy as PSMA (Appendix A). For the relative benefits and shortcomings of this classification system refer to the PSMA table.

Tasmania

38 The Department of Infrastructure, Energy and Resources (DIER) has adopted for Tasmania a condensed version of the PSMA road classification hierarchy (Appendix A)²³, having only five categories compared to nine.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Good differentiation of local road types, although definitions could be more descriptive. - Simple number of classification types. - Descriptive name assigned to each class, such as 'Collector Road', assisting interpretation by users - Class 5 – 'Local Road' introduces road ownership considerations, however, none of the other classes do. 	<ul style="list-style-type: none"> - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'key towns' (not quantifiable). - Does not have an additional category of vehicle track to discern different functions relevant for National Park, State forest or EM. - Too few classification types makes it difficult to combine with more complex classification types - Some very descriptive definitions. However, should provide more detail for contentious middle order roads, reducing degree of subjectivity.

Victoria

39 The Department of Sustainability and Environment (DSE) for Victoria developed the original classification on which the PSMA classification is based. However, unlike PSMA, has added two additional hierarchy levels (Walking Track & Bicycle Track) and have also added supplementary content to each of the additional classes²⁴ (Appendix A).

Benefits	Shortcomings
<ul style="list-style-type: none"> - Good differentiation of local road types, although definitions could be more descriptive. - Identifiable name assigned to each class, such as 'Collector', assisting interpretation by users. - Does have additional category of Vehicle Track to discern functions relevant for National Park, State forest or EM. - Includes proposed road as a discrete category type with adequate definition. 	<ul style="list-style-type: none"> - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'key towns' and 'massive traffic movements' (not quantifiable). - Arterial Road (Class 2) and Track – 2 Wheel Drive (Class 6) and Track – 4 Wheel Drive (Class 7) introduces structural variables, whereas all other classifications have functional considerations. - Some very descriptive definitions. However, should provide more detail for contentious middle order roads, reducing degree of subjectivity. - Includes Walking and Bicycle tracks which may best considered outside a road classification hierarchy

Western Australia

40 The WA road classification hierarchy applied by the Department of Land Information (DLI) to their Road Centreline Network is a ten level hierarchy which is based on road function, but some categories do introduce structural characteristics (Appendix A)²⁵.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Good differentiation of local road types, although definitions could be more descriptive. - Does have additional categories of Vehicle Track to discern different functions relevant for National Park, State Forest or EM. - Descriptive name assigned to each class, such as 'Minor Road', assisting interpretation by users. - Has accompanying business rules that include further definition examples and diagrams to aid in interpretation and assignment of particular roads. 	<ul style="list-style-type: none"> - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'mass traffic movement' (not quantifiable). - Includes Connectors, Roundabouts & Malls which may best considered outside a road classification hierarchy - but at least they are considered together in one category. - Some very descriptive definitions, however, should provide more detail for contentious middle order roads, reducing degree of subjectivity.

Road Transport and Traffic Authority Road Classifications in Australia

NAASRA

- 41 All States and Territory road transport and traffic authorities, except for NSW, VIC and QLD, have adopted some variation of the NAASRA classification for road management (Appendix B)²⁶. The current NAASRA classification separates road by function, which replaced the State classifications based on legislated definitions. Interestingly, this classification system is used by road management authorities to aid in defining road types eligible for Commonwealth Grants Commission (CGC) funding, despite an administrative classification being more applicable. The variability and inconsistency of results received by the CGC has prompted much debate and discussion over the shortcomings of the NAASRA hierarchy as an adequate classification system.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Distinction between urban and rural road regions. - Many other road authorities have adopted the NAASRA classification, or minor variations of, making for some consistency in representation. - Rural Class 5 roads less ambiguity in definition, refers to 'exclusively for one activity'. 	<ul style="list-style-type: none"> - Lack of direction on how urban and rural divide is determined. - Collective name not assigned to each class, such as 'local road,' complicating interpretation by users. - Uses subjective terminology, particularly Class 2 & 3 roads such as 'key' towns and 'important' centres (not quantifiable). - Greater distinction needed between designating State roads and local council roads. - Because used primarily for funding allocation, it does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM.

Victoria

- 42 VicRoads has adopted several road classification systems to manage the road network that have been more recently refined under the Road Management Act 2004 (RMA)⁵⁶. The most commonly applied of these systems is the Declared Roads classification which is a functional based hierarchy used for road management and funding purposes. The Declared Road classification has two categories, freeways and arterial roads with the roads that fall outside these classifications being predominantly the responsibility of local councils.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Simple number of classification types. - Limited number of classification levels makes it easier to amalgamate multiple different systems into it. - Descriptive name assigned to each class, such as 'Freeway', assisting interpretation by users. - Good distinction between designating State roads and local council roads. 	<ul style="list-style-type: none"> - Too few classification types make it difficult to combine with more complex classification types. - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'major regions' (not quantifiable). - Because used primarily for funding allocation, it does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM.

New South Wales

- 43 The NSW Roads and Traffic Authority (RTA) has two concurrent road classifications, the first being the State's *Roads Act 1993* legislation and the second being the Three Level Administrative Classification. In practice, however, the latter classification is applied for road management and funding activities²⁶. Roads under this administrative classification are classified according to function, being either State Road, Regional Road, or Local Road (Appendix B).

Benefits	Shortcomings
<ul style="list-style-type: none"> - Simple number of classification types. - Limited number of classification levels makes it easier to amalgamate multiple different systems into it. - Descriptive name assigned to each class, such as 'Secondary Road', assisting interpretation by users. - Succinct definitions link to additional criteria and tests as well as specific guideline examples to aid interpretation consistency and reduce ambiguity, such as considerations of traffic volume. 	<ul style="list-style-type: none"> - Greater distinction needed between designating State roads and local council roads. - Too few classification types make it difficult to combine with more complex classification types. - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'major' through routes (not quantifiable). - Because used primarily for funding allocation, it does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM.

New Zealand

- 44 Transit New Zealand (TNZ) has developed a Geometric Design Guide for NZ roads which contains a road classification based on road function. The hierarchy comprises five categories. Unlike other classification systems based on geometric designs (as in Canada: discussed later), which have a tendency to be very rigid, this system introduces considerations of traffic volume, but in a less prescriptive sense²⁷. (Appendix B).

Benefits	Shortcomings
<ul style="list-style-type: none"> - Simple number of classification types. - Limited number of classification levels makes it easier to amalgamate multiple different systems into it. - Descriptive name assigned to each class, such as 'Collector Routes' improving interpretation by users. - Introduces considerations of traffic flow to classify between lower order road types, which reduces ambiguity. - Some very descriptive definitions, however, should provide more detail for contentious middle order roads, reducing degree of subjectivity 	<ul style="list-style-type: none"> - Greater distinction needed between designating State roads and local council roads. - Too few classification types make it difficult to combine with more complex classification types. - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'significant' and 'nationally important' (not quantifiable). - Because used primarily for funding allocation, it does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM.

Queensland

45 The QLD Department of Main Roads (DMR) also has several road classifications, the first based on the State Legal Class legislation and the second being the ‘Current Road Classification System’ applied for road management and operations activities²⁶. The latter is a four level hierarchy defined in Appendix B. Currently the QLD Road Alliance initiative is reviewing the lower-order State-controlled roads under this classification system.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Simple number of classification types. - Limited number of classification levels makes it easier to amalgamate multiple different systems into it. - Descriptive name assigned to each class, such as ‘Regional Road’, assisting interpretation by users. 	<ul style="list-style-type: none"> - Greater distinction needed between designating State roads and local council roads. - Too few classification types make it difficult to combine with more complex classification types. - No distinction between urban and rural road regions. - Because used primarily for funding allocation, it does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State forest or EM.

4. International Road Classification Hierarchies

46 Research was undertaken to review other international road classification hierarchies. The RWG identified that assessment of the US, Canada, EU and Japan, would be most beneficial in assisting Australia’s road classification review. Unfortunately, none of the countries investigated had successfully implemented a true, nationally adopted and consistent road classification hierarchy. Interestingly, the majority of these countries mimicked Australia in the sense that most had developed concurrent road classifications, one applied by the national mapping authority and another by the relevant road transport and traffic authority. However, the degree to which there was commonality between the two varied. Each of these classification hierarchies will be reviewed, as was done for the Australian classifications, to identify their positive and negative attributes, again in an attempt to distil and discern how best to develop a national classification hierarchy. However, the different road classification of each country will be assessed together (Appendix C which compares the international road classifications). When considering international classifications it is also important to recognise that some more complex classification may require extra resource allocation to be effectively maintained; many jurisdictions in Australia may suffer from significant resource restrictions that may limit their capacity to maintain more complex classifications.

United States

US Mapping Authority Road Classification

47 The United States Geological Survey (USGS) is responsible for topographic mapping throughout the country at various scales, their flagship product being the National Map which has complete coverage at 1:24,000 scale. The road classification hierarchy used comprises five categories²⁸. The USGS classification is functional in nature, and aligns quite closely with the US Federal Highway Administration Department (FHWA) (Appendix C).

Benefits	Shortcomings
<ul style="list-style-type: none"> - Simple number of classification types. - Introduces route number variable to assist in interpretation of highest order road. - Limited number of classification levels makes it easier to amalgamate multiple different systems into it. - Includes structural considerations throughout all categories to aid interpretation. ‘Passability’ considerations included for lower order roads. - Uses terminology consistent with Federal Highway Administration to allow comparison and consistency in application. 	<ul style="list-style-type: none"> - Greater distinction needed between designating State roads and local council roads. - Too few classification types make it difficult to combine with more complex classification types. - No distinction between urban and rural road regions. - Uses subjective terminology, such as ‘important private road’ (not quantifiable) in defining Class 3. - Collective name not assigned to each class, such as ‘local road,’ complicating interpretation by users. - Does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM. - Class 3 has a very descriptive definition. However, there should be more detail for Class 4 to reduce degree of subjectivity for these contentious middle order roads

US Road Transport and Road Transport and Traffic Authority Road Classifications

48 The FHWA is a major agency of the U.S. Department of Transportation (DOT) that has developed a nationwide urban and rural classification based on road function. The rural hierarchy comprises five categories, and the urban has four (Appendix C)²⁹. Design standards, such as lane and shoulder width, shoulder radii, are then attributed to each function class. The designation of classification is reviewed at least every decennial census or when stipulated by federal regulation.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Distinction between urban and rural road regions with Census block minimum population density figures used to aid in urban and rural determination. - Many other US departments have adopted the classification, or minor variations of, making for some consistency in representation. - Includes considerations of population sizes for the highest order urban classification to aid in interpretation and reduce ambiguity. - Includes considerations of trip lengths between rural collectors and rural minor arterials to aid in interpretation and reduce ambiguity. - Descriptive name assigned to each class, such as 'Urban Collectors', assisting interpretation by users. 	<ul style="list-style-type: none"> - Uses subjective terminology such as 'larger towns' and 'most important' centres (not quantifiable). - Greater distinction needed between designating State roads and local council roads. - Because used primarily for funding allocation, it does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM.

Canada

Canadian Mapping Authority Road Classification

49 The Centre for Topographic Information, Division of the Department of Natural Resources Canada (DNRC) is responsible for topographic mapping throughout the country at various scales, their flagship product being their 1:50,000 polychrome map series. The road classification hierarchy used comprises 10 categories. This classification is primarily structural in nature, separating roads into different classes based on surface type, seasonal 'passability', lane count and width (Appendix C)³⁰. This was the only structural classification system, with extensive application, that was identified during all the national and international research. It is likely that a structural system was favoured over a functional one, because of the extreme environmental/weather conditions that prevail throughout Canada as well as the remoteness of the landscape. Furthermore, users of the topographic product in such extreme conditions may be more concerned with structural characteristics for planning and safety reasons (Appendix C).

<p>Benefits</p> <ul style="list-style-type: none"> - Introduces considerations of road design (including maintenance 'hard surface', seasonal 'passability' and road width design) to classify between all road types, which reduces ambiguity. - Does have additional category of Vehicle Track to discern functions relevant for National Park, State forest or EM. 	<p>Shortcomings</p> <ul style="list-style-type: none"> - Structural classification not easily comparable with TAC functional classification. - Greater distinction needed between designating State roads and local council roads. - No distinction between urban and rural road regions. - Descriptive name not assigned to each class, such as 'Urban Collectors' to assist interpretation by users.
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Canadian Road Transport & Traffic Authority Road Classifications

50 The Transportation Association of Canada (TAC) has developed a Geometric Design Guide for Canadian roads which contains a rural and urban classification based on road function. This classification system is very rigid in its definitions and classification categories and is based on more discrete measures rather than subjective terminology. The rural hierarchy comprises four categories, and the urban has six (Appendix C)³¹. Design standards, such as traffic volume, design speed and flow characteristics are also characteristics considered in classifying rural and urban roads.

<p>Benefits</p> <ul style="list-style-type: none"> - Distinction between urban and rural road regions - Includes considerations of flow characteristics and land service to aid in interpretation and reduce ambiguity. - Descriptive name assigned to each class, such as 'Rural Collectors' assisting interpretation by users. - Uses less ambiguous terminology in favour of more quantifiable measures, such as traffic volume and design speed. 	<p>Shortcomings</p> <ul style="list-style-type: none"> - Lack of direction on how urban, rural and pastoral divide is determined. - Greater distinction needed between designating State roads and local council roads. - Because used primarily for funding allocation, it does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM. - Some contend quantifiable measures are too inflexible and detailed to be applied by all local jurisdictions.
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Japan

Japanese Mapping Authority Road Classification

51 The Geological Survey Institute (GSI) is responsible for topographic mapping throughout the country at various scales, their flagship product being the 1:25,000 scale topographic national base map. The road classification hierarchy is structural and comprises six categories, based on road width (Appendix C)³². National Highways and Toll Roads, however, are classified separately, not based on road width characteristics.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Is based on considerations of road design (road width) to classify all road types, except National Highways & Toll Roads. - Does have additional category of Vehicle Track to discern functions relevant for National Park, State forest or EM. 	<ul style="list-style-type: none"> - Structural classification not easily comparable with the Road Bureau functional classification. - Greater distinction needed between designating State roads and local council roads. - No distinction between urban and rural road regions. - Descriptive name not assigned to each class, such as 'Urban Collectors' to assist interpretation by users.

Japanese Road Transport & Traffic Authority Road Classifications

52 The Road Bureau within the Ministry of Land, Infrastructure and Transport (MLIT) is the designated body responsible for the administration of roads throughout Japan. Roads are classified for administrative and management purposes according to their function. There are five categories of road type, which are defined in accordance to Japanese Road Law (Appendix C)³³. An additional fifth category of 'other road' is also applied in the real world; however, this classification falls outside the scope of the Road Law. Interestingly 84% of roads in Japan are classified as municipal. It is therefore surprising that this category is not broken down into further classifications, particularly considering that the road network of Japan is four times the density of the United States.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Simple number of classification types. - Limited number of classification levels makes it easier to amalgamate multiple different systems into it. - Descriptive name assigned to each class, such as 'Municipal Road' assisting interpretation by users. - Definitions assigned to roads classification linked to Japanese Road Law, becoming a legal requirement. 	<ul style="list-style-type: none"> - Greater distinction needed between designating State roads and local council roads. - No distinction between urban and rural road regions. - Too few classification types make it difficult to combine with more complex classification types. - Because used primarily for administration, it does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM.

Great Britain

Great Britain Mapping Jurisdiction Road Classification

- 53 The Ordnance Survey (OS) is responsible for topographic mapping throughout Great Britain at various scales. Their flagship map product is the Explorer Map series which has complete coverage at 1:25,000 scale. The road classification hierarchy used comprises nine categories (Appendix C)³⁴. The OS receives information about the classification of all Motorways and A and B roads from the Highway Agency (HA) and Department for Transport (DfT). Therefore, the definitions for the higher order roads are less descriptive, because the OS are not part of the decision-making process for these roads.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Descriptive name assigned to each class, such as 'Local Road', assisting interpretation by users. - Good differentiation of local road types; introduces considerations of alternative access to land or houses. - Succinct definitions with specific examples to aid interpretation consistency and reduce ambiguity, particularly for lower order roads. - Introduces considerations of maintenance and access restrictions for private roads. - Introduces considerations of 'pedestrianised' street being shared zones between pedestrians and vehicles. 	<ul style="list-style-type: none"> - No distinction between urban and rural road regions. - Uses subjective terminology, such as 'regional importance' (not quantifiable). - Does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM.

Great Britain Road Transport & Traffic Authority Road Classifications

- 54 The DfT and HA are responsible for the administration of Trunk Roads and Highways in Great Britain. They have developed a highway system of classification that is based on functional characteristics, with no reference to structural or traffic volume considerations. The highway system divides roads into urban and rural categories, allowing for a total of 12 different road classes (Appendix C)³⁵.

Benefits	Shortcomings
<ul style="list-style-type: none"> - Distinction between urban and rural road regions. - Descriptive name assigned to each class, such as 'Principal Route', assisting interpretation by users. - Many other departments, such as OS, have adopted the classification making for consistency in representation. 	<ul style="list-style-type: none"> - Lack of direction on how urban, rural and pastoral divide is determined. - Greater distinction needed for designating of lower order roads. - Does not have an additional category of Vehicle Track to discern different functions relevant for National Park, State Forest or EM. - Uses subjective terminology, such as 'the most important roads' (not quantifiable).

EuroRoadS

55 The EuroRoadS initiative commenced in early 2004, with a major objective being to develop a pan-European road capture and classification methodology model to be used throughout the EU. However, this will not result in a pan-European dataset. Fundamentally, the standardised classification objective of EuroRoadS appears to be closely aligned with the objectives of the RWG. Given these similarities, Julie Goodgame, a RWG member, attended the closing workshop in Brussels in June as an opportunity to liaise with EuroRoadS participants to gain insight into issues that could assist the RWG in their endeavour. The EuroRoadS specifications provide a good example of core feature attribution, as well as processes for dealing with roundabouts and problematic complex intersections^{15, 36}. While these issues are not directly related to this RWG objective of national classification, this work will undoubtedly help the RWG in other areas. Unfortunately, the road classification template applied under the EuroRoadS model is very generic and simply allows each of the member countries to directly map their existing classification straight to the model³⁷ (For more information on the EuroRoadS initiative refer to the EuroRoadS report compiled for ICSM).

5. Considerations Towards the Development of a National Road Classification System

56 Appendix D summarises the comparative analysis of the road classification systems applied nationally and overseas by mapping and road authorities. The summary highlights the fact that no single classification appears to be perfectly applicable; rather, they all exhibit certain shortcomings and benefits in fundamental classification characteristics. Nevertheless, the assessment did reveal certain characteristics that warrant further discussion for potential inclusion into a nationally consistent road classification.

Will the PSMA Road Classification Suffice?

57 It was the considered opinion of the RWG that the PSMA system, which represented a nationally-applied road classification system, could potentially be adequate as a nationally applied hierarchy. It was the belief of the RWG, however, that the PSMA classification would require a degree of modification to make it more suited as a national model. The research undertaken into classifications applied both here and overseas has indicated that the PSMA classification has, above other existing Australian road classifications, the potential to be applied as the national model. However, the research did identify several considerations that could improve the PSMA model, and warrant further investigation. These are discussed here:

Rural/Urban Dichotomy

58 A potential improvement to the PSMA classification could be to further segregate roads according to whether they are rural or urban. This distinction is currently present in the NAASRA classification system which is applied by the majority of road transport and traffic authorities as discussed previously. Interestingly, there were only a few mapping agencies where the rural/urban dichotomy had been applied. Many more road traffic authorities, however, both nationally and internationally, have developed a road classification system that differentiates between urban and rural roads.

59 There is some debate whether any distinction is necessary. Urbanised areas are concentrations of populations, more intense land use, and higher traffic volumes compared to rural areas. One criticism, however, of this dichotomy, particularly in Australia, has been the lack of direction on how the urban/rural divide is determined in a consistent manner²⁶. A potential solution could be to use Census block minimum population density figures, as is the case in the US³⁸. Certainly, the NSW RTA classification guidelines include a reference to defining urban areas in accordance with the Australian Bureau of Statistics (ABS)^{10, 39}

60 One benefit of differentiation could be the availability of additional road use and design statistics data in urban areas. The availability of this information could allow for further segregation of road types based on these statistics. In the absence of any distinctions this additional information could not be utilised to further differentiate roads within a hierarchy, because such measures could not be applied in a ubiquitous manner across the national network. Indeed, there is still the potential risk for individual road authorities to collect vastly different local traffic information at the urban level, and that little commonality and amalgamation would be possible to enable any nationally consist further differentiation of roads at the urban level^{40,41}. Nevertheless, the RWG feels this warrants further investigation through discussion with each of the road transport and traffic

authorities, in order to determine a baseline of consistency in road attribute capture at the urban level that could be used to further differentiate roads.

- 61 Another consideration is the classification of roads within National Park, State Forests and Indigenous Lands. Typically, these areas are found predominantly in areas outside urban boundaries, therefore, there is potential for complex road issues, such as 'passability' and 4WD access, to be included in rural areas but excluded from urban classifications, because fundamentally they do not apply. Having a rural/urban classification, therefore, has the potential to reduce the complexity of the classification hierarchy by excluding certain considerations that are not relevant in particular areas.

Recommendation 1: *To further investigate the utility and practicality of a rural/urban segregation of the PSMA road classification hierarchy, through discussion with relevant road transport & traffic authorities.*

Differentiate Local Roads from State-controlled roads

- 62 A major criticism of many road classification hierarchies, both nationally and internationally, is their inability to adequately differentiate between local roads (those maintained by local governments) and State-controlled roads. Currently, ambiguous definitions enable subjective interpretation with inconsistent application as a result. In Australia, this inconsistency has significant implications.
- 63 One major area affected by such inconsistencies is the allocation of roads funding through the Commonwealth Grants Commission (CGC) and under Auslink initiatives⁴⁶. Needless-to-say, there are numerous recent reports produced by the CGC in relation to this issue^{6,40,41,42,43}. Notably, some CGC research has identified the inadequacy of the current NAASRA-based classification as a funding allocation tool, and have initially suggested that elements of the PSMA classification would be a more pragmatic alternative⁶. However, the CGC identified that the application of the PSMA classification was compromised because it did not fully consider road condition and usage elements⁶. This CGC finding lends further support to the RWG notion that the PSMA classification has merit as a national system but can be improved.
- 64 More detailed discussions of the complex issue of roads funding allocation and how it relates to road classification is beyond the scope of this paper. There is no doubt that funding considerations complicate the scope of deriving a nationally consistent road hierarchy, and may on the surface appear to relate little to ICSM activities. However, the reality is that funding considerations play a pivotal role in road issues and that a comprehensive assessment of road classification could not be conducted without considering the influence that funding issues have over the application of a road hierarchy. They influence all roads types, from vehicle tracks that receive infrequent minor repairs, to state-of-the-art major arterial roads.
- 65 It is the opinion of the RWG that addressing this short-coming of current road classification hierarchies should be a major objective when defining a nationally consistent road classification. Were any future national road classification to prove incapable of improving the consistent differentiation of local and State roads, then it would be clearly inadequate, failing a significant proportion of potential users. However, others propose that a complete distinction between State and local roads will never be achieved, stating:

“There is no absolutely rigorous method for classifying roads at the interface between classes”¹⁰

- 66 The RWG agrees that while a ‘perfect’ classification system may not be possible, improvements can still be made and recommends they liaise between State and local government road authorities in an attempt to agree upon more stringent definitions of local and State roads, incorporating diagrams, examples and decision trees to aid in interpretation. This is further discussed later.

Recommendation 2: *Refine the existing PSMA Road classification to enable better differentiation of local and State roads through liaison with relevant government representatives.*

Use of Additional Variables

- 67 The comparative analysis of road classifications revealed several variables that could be considered as having the potential to improve the existing PSMA classification by reducing the degree of subjectivity involved in classification. It is important to emphasise that these variables would be considered as additional measures, not as replacements to existing classification definitions. Furthermore, these variables could be incorporated into the classification definition or used in additional interpretation aids, such as guidelines or decision trees (which will be discussed later). It is not the intention of this report to recommend that mapping jurisdictions will need to assume responsibility for maintaining these variables, but only use them for the purpose of aiding road classification.

Traffic Volume

- 68 Nearly all classifications refer to traffic volume as a method to discern between some levels within the hierarchy. In the majority of cases, however, traffic volumes are considered only broadly and do not equate to quantifiable volume measures such as Average Annual Daily Traffic (AADT). Typically, traffic volume considerations are expressed in ambiguous terms such as ‘massive traffic movements’, which have a tendency to be applied inconsistently depending on the extent and scale at which the assessment is taking place. For example, a shire council may consider a regional road to carry massive traffic movements from their local perspective (relative to other roads within the shire which may only carry very limited localised traffic). However, from a State or national perspective, this volume of traffic would not be considered ‘massive’. This subjective interpretation of ambiguous terminology leads to inconsistency in road classification.
- 69 There are, however, examples where AADT traffic volume figures have been used to aid in classification. The most notable Australian example is the NSW RTA Road Classification Guidelines^{10,39}. This guideline identifies specific traffic volume figures, as well as other criteria, to provide assistance in differentiating road classification types, particularly State-controlled and regional roads. It is important to emphasise that these guidelines are an additional reference aid, not contained within the RTA road classification itself. Another example is applied by the Canadian TAC³¹. However, unlike in NSW, traffic volume ranges form part of the classification characteristics. Also, these AADT ranges are applied across all road classification levels, from local roads through to freeways.
- 70 In Australia, a criticism of AADT traffic volume figures as a determinant of road classification has been that the majority of local roads do not have individual traffic counts, unless there have been specific complaints

regarding traffic volumes or speed. Therefore, the argument has been that the lack of complete coverage of such figures means they should not be used^{41,44}. However, in both examples highlighted previously, where traffic volume has been used, it has only been as an additional measure, never referenced as a sole determinant for a particular road classification level. This degree of reliance would never be feasible given the sporadic coverage of available data on traffic volume. Nevertheless, the RWG recommends that specific traffic volume ranges, where available, be used as an additional variable because their discrete nature allows less subjective determination. Whether the inclusion of traffic volume be applied to the classification characteristics (i.e. TAC example) or as an additional guideline aid (i.e. NSW RTA example) warrants further investigation through consultation with relevant stakeholders.

Traffic Design Speed

- 71 In principle, the inclusion of speed considerations to a functional road classification appears logical. Road users have a certain expectation when travelling on local roads; there tends to be an acceptance that they are choosing a different trip and travel experience with respect to time, traffic volume and speed².
- 72 The issue of traffic speed, however, it is not as straight forward as one might expect. It is important to recognise the difference between design speed and posted (or operating) speed. Design speed is used as a basic parameter in determining the geometric standards for a road. The posted speed limit or operational speed is the speed limit which is set at the 85th percentile speed, that is, the speed below which 85 percent of motorists travel⁴⁵.
- 73 Discussion at RWG meetings in relation to including posted speed limit information has identified that there were reservations regarding the ability of obtaining reliable information on speed limits. In many cases, examples were highlighted where councils had been approached to provide mapping jurisdictions with speed limit information for segments of road. In many cases, however, the council had refused to provide this information because of fear of litigation in the event of an accident where the posted speed exceeded the design speed.
- 74 However, there may be potential for design speed, rather than posted speed limit information to be included as an additional variable to assist in the determination of a road type. Typically, the design speed is expressed in terms of a range (e.g. 80-130km/h) and is static compared to the posted limit because it is a geometric standards parameter, thus reducing litigation concerns. Furthermore, the consideration of design speed may be of more use within urban regions where, in general, differences in speed do segregate roads in accordance with their functional classification, such as local streets being low speed environments and roads of higher classification, with their emphasis on long distance travel, tend to be higher speed environments¹¹. It highlights the case for having a classification which divides roads by rural or urban regions, as was discussed earlier. There is some contention, however, that road users may not necessarily relate one message (speed limit) to also convey another message (function of road). Suggestions have been made that further study needs to be undertaken to confirm the effectiveness of these multiple messages¹².
- 75 In the US and Canada, both authorities responsible for highway management (the FHWA and TAC respectively) include a range of posted speeds as additional indicators of road type within the classification system^{29,31}. Furthermore, posted speed considerations are applied to all road types, from motorways to local roads. In Australia, the VIC and QLD mapping classification references speed broadly, but only for higher order roads^{22,24}. Austroads uses travel speed as an indicator to further categorise the road network³. Whether 'travel speed'

relates to the sign-posted speed limit or design speed needs to be clarified. Nevertheless there appears to be scope to include some speed component into road classification, at least with respect to higher order roads under the jurisdiction of Austroads members. Further investigation is required to assess the feasibility of speed considerations at the local level.

Travel Distance

- 76 The inclusion of travel distance as a variable to assist in the differentiation of road classification was not found to be very prevalent. It is based on the assumption that roads of higher classification cater for Statewide and regional traffic movements over relatively long distances, while lower order classifications cater for local traffic movements over shorter distances⁵. One might expect smaller, highly populated countries, like Japan and Great Britain, that have a greater density of road network, to potentially correlate travel distance with functional classification. However, this was not found to be the case.
- 77 Surprisingly, the US FHWA was the only authority that referenced travel distance or trip length as a determinant²⁹. Considering the same application of travel distance to Australia, it is apparent that in Australia there is greater variation in road network density and consequently the same correlation does not apply. Moreover, in Australia, many lengthy journeys in remote areas are on lower order roads⁴⁶. However, this correlation is likely to apply in urban regions in Australia and should be considered as an additional determinant, if the classification system adopted differentiates between rural and urban roads, as discussed earlier.
- 78 The RWG recommends, however, that considerations of travel distance must, if possible, relate to discrete ranges of journey distances. Or, at least, it should make the distinction, as is the case in the US example, where trip length must be indicative of 'substantial Statewide or interstate travel'²⁹. This is necessary to avoid the undesirable alternative where subjective terminology such as 'long distance' is used, with inconsistent application a result.

Route Numbering

- 79 Road route numbers are assigned to segments of road generally relative to road type, to enable differentiation. Therefore, in essence route numbers alone define a road classification hierarchy based on function. Their limitation, however, is that they are typically only applied to higher order roads within the network. Nevertheless, there is potential for route numbers to have application within functional road classification hierarchies.

The best example of a route numbering system complementing a road classification hierarchy is in Great Britain, where they are classified as shown in Table 1.

TABLE 1- Great Britain Road Route Numbering System³⁵	
M Road	A multi-carriageway public road connecting important cities, always numbered with no addresses.
A Road	A public road, classified as an A road by the DfT, connecting areas of regional importance, always numbered, sometimes named, often with addresses.
B Road	A public road, classified as a B road by the DfT, connecting places of local significance, always numbered, sometimes named, often with addresses.
C Road	A public road not officially signed or marked, C roads are used as local authority designations for routes within their area.

- 80 All M, A and B roads are classified by the relevant road transport and traffic authorities, the HA and DfT. The benefit of this system, from a road classification perspective, is that it allows different jurisdictions to consistently classify higher order roads. For example, the Great Britain mapping authority the Ordnance Survey, simply applies the M, A and B classifications to their higher order roads depiction and is not involved in the decision making process³⁴. The result is a uniformity in classification of these roads across different disciplines, such as mapping and road administration, which is facilitated by having a definitive source.
- 81 There is potential for such a relationship to be fostered in Australia. In May 1997, Australian transport ministers agreed to principles for a national approach to a rural road route numbering system which was expected to take some ten years to be implemented across the country^{46,47}. Approaching this ten year mark, it is apparent that considerable work still needs to be done to have a truly national route numbering system in place. The alpha-numeric numbering has been completed in Tasmania, South Australia and Victoria^{46,47}. The remaining states and territories are still in the process of converting to the system. This system is based closely on the British model, where the letter prefix relates to the functional importance and standard of the route. The number is purely for navigation purposes.

TABLE 2- Australian Road Route Numbering System⁴⁷	
M Routes	These are divided carriageway roads, generally forming part of the main links between capital cities, or from a capital city to a key regional centre. All Freeways and Motorways should be designated as M Roads
A Routes	These would be expected to form the principal routes within regions that are not of M Road standard. They would be expected to form links between capital cities or provide the connections between key regional centres or between key centres and capital cities.
B Routes	These would be expected to form the primary connections between major regions not served by A Routes
C Routes	These are the other routes in the arterial network.

- 82 At present the limitation is that while there has been an in-principle agreement between the States that they will endeavour to update their network in accordance with the agreed standards, funding restrictions and conflicting priorities have meant that achieving a nation-wide system is still a way off. Speculating on a potential completion date is difficult because Austroads do not have the authority to enforce this agreement.
- 83 Nevertheless, there is potential for the route numbering system to aid a national road classification hierarchy, even though many route numbers are still to be posted. The RWG contends that if a definitive publication of nationally 'planned' and completed route numbers was released by an authoritative source, logically Austroads, could be adopted by all mapping jurisdictions and be applied to higher order roads within a national road classification, as is the case in Great Britain. Having one definitive source would enable a consistency in application which, over time, could be replicated on the ground as sign posts were gradually upgraded as resources allowed.

Population Measures

84 A major criticism of virtually all existing road classification hierarchies both nationally and internationally, is the proliferation of subjective terminology when relating a certain road type to a particular locality or population centre^{5,40, 41}. Broad terms such as ‘key towns’, ‘major centres’, or ‘significant geographic areas’ dominate guidelines to aid interpretation of classification levels. In practice though, such terms are often too vague and subjective and lead to inconsistent interpretation, particularly when applied locally. This was highlighted earlier with traffic volume interpretation, where councils perceive certain features to be ‘key’ or ‘major’ within their shire, that would not necessarily be considered so from a State or national perspective. The RWG suggests a possible remedy could be to attribute discrete, or a range of, population figures from ABS to define terms words like ‘key towns’. That way, terminology like ‘key’ could still be retained, however, it would be attributed against additional guidelines which relate it to more specific population sizes. A similar methodology to this is used in the NSW RTA Road Classification Guidelines^{10,39}, although population measures only feature to differentiate between small coastal holiday town numbers that fluctuate seasonally. The RWG recognises that while including some element of population measure does appear logical and straightforward, in practice the exercise is likely to be considerably more complicated.

Structural

- 85 Structural elements such as road width/lane count and surface type (sealed /unsealed) relate to the condition of the road. The Canadian mapping agencies’ (CTI) road classification is primarily structural in nature, classifying roads into classes based on surface type, seasonal ‘passability’, lane count and width³⁰. It is likely that a structural system was favoured over a functional one because of the extreme environmental conditions that prevail throughout Canada as well as the remoteness of the landscape.
- 86 This was not the only structural classification system that was identified. The Australian Defence Mapping Specification depicts roads according to a structural classification; the classification is based on a combination of factors, namely, surface type (hard paved/loose), width and weather type (all weather, fair/dry weather/ winter only)⁴⁸. Structural considerations are paramount in determining military vehicle accessibility under varying conditions. Attempts were made to compare international military mapping specifications to Australia’s. However, requests for this information were denied, which is likely because of current global sensitivity regarding border protection issues.
- 87 Nevertheless, the question of whether a national structural road classification could be superior to a functional hierarchy warrants discussion. The benefit of structural elements in a classification is that they represent quantifiable measures that can be applied consistently, with the possible exception of ‘weather type’ which is somewhat subjective. The problem with applying such a classification system to Australia is that there are numerous roads in remote areas that are structurally poor in parts: being unsealed, single lane and dry weather only. Even so, they are regionally significant from a functional perspective³, an example being the Kennedy Development Road in Queensland.
- 88 An alternative is to incorporate structural characteristics into a functional classification hierarchy to aid in the interpretation of roads. Purists of road classification hierarchies would argue that incorporating structural elements into a functional classification ignores the fundamental differences between the two classification types and is best avoided¹. There are, however, several examples of structural characteristics being included in a functional hierarchy, notably the PSMA²¹ and Canadian TAC³¹ classifications. Interestingly, these structural

variables tend to be used to further differentiate the lower order roads, specifically vehicle tracks where issues of weather type, road width and surface tend to vary considerably. However, vehicle tracks, due to their typical remoteness and infrequent use, are one of the most difficult road types for which reliable information is available. Therefore, attempting to obtain additional structural variables on these roads may prove exceedingly difficult⁴⁹. The inclusion of structural considerations, particularly for lower order roads in remote areas, again highlights the potential benefit in a rural/urban dichotomous classification. This could confine structural considerations to lower order roads in rural and remote areas where the importance of such would be greater.

Recommendation 3: *That additional variables of traffic volume, design speed, travel distance, route numbering, population measures and structural considerations, be investigated for possible inclusion as additional determinants of road classification type, either within the classification itself or in additional guidelines or decision trees.*

Additional Considerations

Clear Division of Responsibility for Higher Order Roads

- 89 A potential classification model that could be applied in Australia is one where all higher order roads (those above the local street level) could only be classified by the relevant authority, similar to the route numbering approach described previously which has proved successful in Great Britain. In the majority of cases this responsibility would fall on each State and Territory road transport and traffic authority. Whether Austroads could coordinate the application of this classification and supply incremental updates of higher order road classification, on a periodic basis, warrants consideration. Under this model, individual mapping authorities are not part of the decision-making process of classifying higher order roads. Instead, they simply adopt the classification as it is defined by the relevant road transport and traffic authority. The RWG acknowledges that some mapping authorities have more recently engaged in a similar relationship with their respective road transport and traffic authority, NSW LPI, and WA DLI being notable examples. The RWG believes this approach could be extended to become a national methodology which, would lead to a more consistent classification of these roads.

Recommendation 4: *To engage road traffic and transport authorities to investigate the feasibility of the periodic supply of coordinated higher order roads network classifications from road transport and traffic authorities.*

Classification Interpretation Aids

- 90 Many of the recommendations proposed above, that relate to the inclusion of additional variables, could be applied in various ways to improve the road classification decision process. Understandably, it is not practical to include too much information within the over-arching definitions within a classification hierarchy. There is scope, however, for supplementary documentation, in the form of guidelines and decision trees, to contain more specific instructions and examples, to reduce ambiguity and subjectivity.

Guidelines

- 91 The best example of additional guidelines being used effectively in road classification is the NSW RTA Road Classification Guidelines^{10,39}. These guidelines identify specific traffic volume figures, as well as other criteria, to assist in differentiating road classification types, particularly State-controlled and regional roads. These guidelines are also useful because they provide very descriptive and specific examples on how to classify problematic roads, as well as additional tests that either exclude from or include a road in a particular category. The RWG recommends that similar guidelines be developed for any future road classification hierarchy. Also, any adopted guidelines could be further enhanced by including diagrams to explain in more detail particular road functions, connections and associations.

Decision Trees

- 92 One criticism of additional guidelines, however, is that their detailed nature can sometimes overwhelm effective interpretation. There is potential that some guideline content, described previously, could best be communicated to users through decision tree diagrams. An example of this is illustrated in Figure 3. A major benefit of using decision trees is that they can further reduce ambiguity and subjectivity. The difficulty with them is achieving an

effective balance between complexity and effectiveness⁵⁰. The RWG recommends that decision tree diagrams be developed to aid interpretation of any future road classification hierarchy.

Recommendation 5: Additional guidelines be developed that contain decision-tree diagrams, supplementary instructions and examples that aid in the interpretation of road classification.

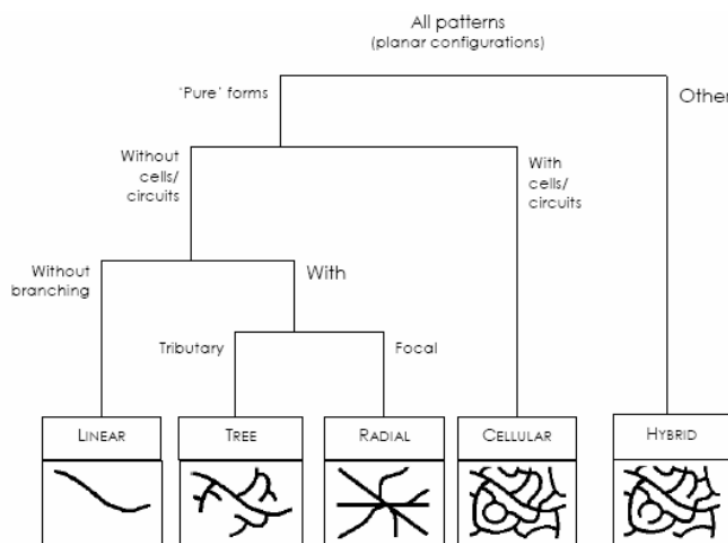


Figure 3 – Example of a decision tree defining road topology types (adapted from⁵).

Classification Complexity

- 93 Unfortunately, none of the classifications reviewed represented a true, nationally adopted and consistent road classification hierarchy. Interestingly, the majority of countries, like Australia, had developed concurrent road classifications, one applied by the mapping authority and another by the relevant road transport and traffic authority. However, the degree to which there was commonality between the two varied. It is uncertain whether these concurrent classifications exist because amalgamation into one definitive classification was found to be too difficult or possibly that it has never been considered. In practice, the research indicates, and others support the contention, that it is not possible for one definitive road classification hierarchy to be ‘all things to all people’^{1,11,10,39}. Inherently there will always be a degree of trade-off with respect to the objectives that the classification system is attempting to best satisfy.
- 94 The review of road hierarchies has also emphasised that they vary in complexity. A glance at the comparative Appendices A-C reveals the varying degree of classification complexity and detail in definitions. Some systems have as many as ten different categories, whereas others are more simplified, with all local roads bundled into one classification. Often, the more simplified classifications also have a ‘Local Road’ category, where the remaining unspecified lower order roads are grouped together. There are obvious benefits to having a simplified national classification system. This would make it easy for all other jurisdictions to adapt their local classification system to this kind of system, to depict roads in a nationally consistent manner.
- 95 The difficulty, however, is getting the balance right. Too simplistic a classification has little application. Too complex a classification becomes too prescriptive and rigid, making it unmanageable^{1,5,11}. Indeed, it appears that the PSMA classification may have the right balance. Although some contend that greater differentiation is

needed to distinguish between local and State-controlled roads so that these roads can be classified with greater precision and certainty⁴², however, others argue that: “*There is no absolutely rigorous method for classifying roads at the interface between classes*”^{10,39}.

- 96 Another identified risk of an overly simplistic classification is that while it may satisfy the objective, the resulting classification hierarchy could have very limited application other than for very broad, large scale use. This is primarily because the majority of roads in Australia, particularly in relation to geographic area covered, fall into the lower categories of local roads and vehicle tracks³; therefore, further differentiation between these roads is desirable to provide enhanced specific depiction. The PSMA classification is not too simplistic in this respect, in that it makes allowances for differentiation between lower order roads. For example, the PSMA classification has two ‘local road’ categories and two ‘vehicle track’ categories. The question is, however, whether further differentiation of these categories is necessary?
- 97 A significant proportion of ‘public’ roads reside in National Parks, State Forests and Indigenous Lands. Increasingly, information on these roads is being recorded with a greater degree of attribution by jurisdictions, to further differentiate roads into sub-categories to aid interpretation. A cursory comparison of some of these additional classifications reveals that while there is some commonality between jurisdictions and across States and Territories, there is by no means a standardised approach^{51,52,53,54}. It would be better if a standardised approach could be reached between jurisdictions, which could then be included into a national classification. Then there are roads which do not fall under any jurisdiction, such as roads in unincorporated areas and private vehicle tracks. Many of these roads have restricted access, permanently or periodically. Nevertheless these roads may still need to be considered under a national classifications system, particularly where they may be utilised for EM. In some cases, EM authorities have begun recording additional information relating to the condition of lower order roads in a separate attribute field, to simplify the road classification hierarchy⁵³.
- 98 Again, the issue of complexity needs to be considered and the core user-base determined, which then sets the priorities for defining the road classification hierarchy. Therefore, the RWG recommends that further liaison with the aforementioned bodies be undertaken to more accurately gauge their requirements with respect to the inclusion of more detailed, lower order road classification.

Recommendation 6: *To consult with National Parks, State Forests and Indigenous Lands authorities to gauge their requirements for attribution of lower order roads for possible inclusion into a national classification, or in a separate attribute field in such a classification.*

6. How best to implement a National Road Classification

“Road classification is a means to an end, not an end in itself. Successfully allocating agreed labels to each element in the road system involves so much effort and controversy that it is pointless and best avoided unless the labels are going to have some application.”¹

- 99 This quote highlights the opinion that irrespective of whatever eventual national road classification is agreed upon, the greatest challenge will undoubtedly be applying the classification system universally at a national level. Evidence of previous failed attempts at this is testimony to its difficulty. So too is the existence of so many concurrent road classifications, despite consensus on the benefits of a unified system. Unfortunately, the Australian government framework does not allow for the application of such a system to be legislated at the Commonwealth level, which is not the case in Japan. The logical path toward universal adoption in Australia, therefore, is through cooperative agreements between all States and Territories. This was the approach taken when developing the national route numbering system, which has had slow uptake as discussed earlier.
- 100 Another approach suggested is one where the RWG, through the ICSM, develops a model that primarily meets the needs of its mapping constituents. The hope would be that this system becomes universally adopted in mapping and, over time, its use then gradually extends to disciplines beyond which it was originally intended, much in the same way that the old NAASRA classification, which was initially used exclusively by road authorities, has since been applied more broadly by other disciplines⁵⁵. This technique of implementation, however, is somewhat slow and outdated. Previously, States, Territories and Commonwealth bodies rarely collaborated when it came to standardisation issues. Today, the emphasis has shifted towards greater national communication, information sharing and collaboration to achieve mutually beneficial outcomes.
- 101 Therefore, the RWG supports the cooperative agreement approach, and believes that over time a nationally consistent road classification hierarchy could become ubiquitous, particularly if the recommendations contained in this report are actioned. Furthermore, this research has identified that extensive collaboration is critical to engender the needed support for the process. The ICSM, through the RWG, has a significant role to play here, in engaging all interested parties. The RWG acknowledges that initially it had sought to target only a core group of key stakeholders, so as not to involve too many parties which could significantly impede progress. The RWG now hopes that with extended participation, progress can still be made towards this goal. Austroad, have the potential to be key participants, given their national role is to promote *“harmonisation, consistency and uniformity in road and related operations”⁵⁵*.

Recommendation 7: *To adopt a cooperative approach between all levels of government (to agree) to implement a mutually acceptable national road classification system.*

7. Appendix A - Australian & New Zealand Mapping Authorities Road Classification Comparison

Number of Road Classes	ACT		GA	NSW	NT			NZ	PSMA (applied in SA also)	QLD	TAS	VIC	WA
	Rural	Urban			Urban	Rural	Pastoral						
1	Class 1 - Those roads which form the principal avenue for communications between major regions of Australia, including direct connections between capital cities. Barton and Federal Highway which form the National Highway.	Class 6 - Those roads whose main function is to perform the principal avenue of communication for massive traffic movements.	Dual carriageway - Divided Highway, Freeway, Tollway, or other major roads with separated carriageways in opposite directions.	Motorway - A high traffic volume, high speed road, generally comprising dual carriageway and having full access control and grade separated intersections. It has no direct access from adjoining properties or side roads and all crossings are by means of overpasses or underpass bridges with traffic entering or leaving by means of ramps. Qualification: These roads may or may not be officially declared motorway, freeway or expressway.	6 - Urban Primary Arterial - Those roads whose main function is to perform as the principal arteries through traffic and freight movements across urban areas, provide access to major freight terminals/freight movement and access to major transport terminals, or which are extensions into urban areas of Class 2 or Class 3 roads.	1 - Rural National Highway - Those roads which form the principal avenue of communication between, and through, major regions of Australia. (eg. Direct connections between capital cities).	1 - Pastoral National Highway - Those roads which form the principal avenue of communication between, and through, major regions of Australia. (eg. Direct connections between capital cities).	Arterial - Having multi-lanes, capable of supporting high traffic volumes. Serves as a connecting route between major settlements.	301 - National or State Highway - Roads which are of importance in a national sense, and/or are a major interstate through route, and/or are principal connector roads between Capitals and/or major regions and/or key towns.	Freeways/Motorways - Urban Arterials that do not form part of Highway and are named as such the South East Freeway and Logan Motorway.	State Highway or AUSLINK Network - Roads which are of importance in a national sense, and/or are a major interstate through route, and/or are principal connector roads between Capitals and/or major regions and/or key towns. As well as those roads defined in the Highways and Jetties Act.	Freeway - Hard surface formation, high volume, high speed roads declared as 'Freeway', comprising dual carriageway and full access control and grade separated intersections; ie no direct access from adjoining properties or side roads and all crossings are by means of overpass or underpass bridges with traffic entering or leaving carriageways by means of ramps. Single carriageway sections forming part of declared freeways may be included within this category.	National Highway - Major connecting road between capital cities, Perth-Adelaide and Perth-Darwin. National Highway 1 and National Route 94.
2	Class 2 - Those roads, not being Class 1, whose main function is to form the principal avenue of communication for movements: Between capital city and adjoining States and their capital cities; or Between a capital city and key towns; or Between key towns.	Class 7 - Those roads, not being Class 6, whose main function is to supplement the Class 6 roads in providing for traffic movements or which distribute traffic to local street systems.	Principal Road - Highways, major through routes and major connecting roads.	PrimaryRoad - Roads that are of importance in a national sense, and/or are a major interstate through route, and/or are principal connector roads between Capitals and/or major regions and/or key towns. (Adapted from ICSM proposal) Qualification: Most of these roads are National or State Highways but there may be some exceptions.	7 - Urban - Sub arterial - Those roads not being Class 6 whose main function is to: complete the major road network across the metropolitan area and carry intra urban traffic and for commercial and industrial traffic; or serve as supplementary public transport corridors; or form part of a regularly spaced road network supplementary to the principal urban road network.	2 - Rural State Highway - Those roads, not being Class 1, whose main function is to form the principal or alternative avenue of communication for movements: between a State capital city and key towns which have state or national significance or which have significant national or state economic/social interaction; or between a State capital city and adjoining States and their capital cities; or between key towns which have significant regional economic/social interaction.	2 - Pastoral State Highway - Those roads, not being Class 1, whose main function is to form the principal or alternative avenue of communication for movements: between a State capital city and key towns which have state or national significance or which have significant national or state economic/social interaction; or between a State capital city and adjoining States and their capital cities; or between key towns which have significant regional economic/social interaction.	Minor Arterial - Generally 2 lanes, capable of supporting high traffic volumes. Serves as a connecting route between settlements.	302 - Arterial Road - Well maintained and widely used roads which are major connectors National Highways and/or State Highways, and/or major centres, and/or key towns, or have major tourist importance or which main function is to form the principle avenue of communication for metropolitan traffic movements.	Highways - As named but if also a Freeway than Freeway is used as higher classification.	Arterial Road (Major Arterial) - Roads which connect major centres and/or key towns or have major tourism or freight importance, or the function of which is to form the avenue of communication for metropolitan transport movements.	Highway - Hard surface roads which: Are of importance in a national sense, and/or Are of a major interstate through route, and/or Are principal connector roads between capitals and/or major regions and/or key towns.	Highway & Freeway - Major connecting roads between cities and towns and are the principle avenue for high volume traffic. Classification derives from Main Roads Road Number field with Prefix H.
3	Class 3 - Those roads, not being Class 1 or 2, whose main function is to form an avenue of communication for movements: Between important centres and the Class 1 and Class 2 roads and/or key towns; or Between important centres; or Of an arterial nature within a town in a rural area.	Class 8 - Those roads not being Class 6 or 7, whose main function is to provide access to abutting property.	Secondary road - Connecting roads that provide a connection between major through routes and/or major connecting roads, or connections between regional centres.	ArterialRoad - A road which is the major connector between Freeways, and/or National or State Highways, and/or major centres, and/or key towns, or have major tourist importance or which the main function is to form the principle avenue of travel for metropolitan traffic movements not catered for by roads of a higher functional status. (Adapted from ICSM proposal).	8 - Collector - Those roads which are neither Class 6 or 7 roads, whose main function serves the purpose of collecting and distributing traffic from local areas to the wider road network, including access to abutting properties.	3 - Rural State Arterial - Those roads, not being Class 1 or 2, whose main function is to form an avenue of communication for movements: between important centres and the Class 1 and Class 2 roads and / or key towns; or between important centres which have a significant economic, social, tourist or recreation role (eg. tourism and resource development).	3 - Pastoral State Arterial - Those roads, not being Class 1 or 2, whose main function is to form an avenue of communication for movements: between important centres and the Class 1 and Class 2 roads and / or key towns; or between important centres which have a significant economic, social, tourist or recreation role (eg. tourism and resource development).	Collector - Generally 2 lanes, capable of supporting medium traffic volumes. Serves as a feeder route onto an arterial road.	303 - SubArterial Road - Road, which acts as a connector between highways and/or arterial roads, or an alternate route for class 302 roads, or a principal avenue for massive traffic movements.	Secondary Roads - Urban Sub-Arterial, Main roads (MRD Class) and Development Roads.	Sub-Arterial Road (Arterial) - Roads which connect centres and towns, and/or have tourism or freight importance, or the main function of which is to form an important avenue for metropolitan transport movements.	Arterial - Well maintained and widely used hard surface formation roads which are major connectors between: - Freeways and/or National Highways, and/or Major centres, and/or key towns, or Have major tourist importance or Which main function is to form the principle avenue of communication for metropolitan traffic.	Main Road - Primary and Secondary roads which distribute traffic between highways and form a principal avenue for mass traffic movement. Generally 6m or over. Includes Main Roads Road Number with prefix M. Previously defined as MRWA, Type Main road and MSD class Primary and Secondary roads.
4	Class 4 - Those roads, not being of Class 1, 2 or 3, whose main function is to provide access to abutting property (including property within a town in a rural area). This class is further categorised into 3 sub-categories, Urban Residential 1, 2 and 3.	Class 9 - Those roads which provide almost exclusively for one activity or function and which cannot be assigned to Class 6, 7 or 8.	Minor road - All other roads which form part of the public roads system between Principal roads and Secondary roads.	SubArterialRoad - A road which acts as a connector between primary and/or arterial roads, or an alternate route for arterial roads, or the commonly used link between smaller localities or a principal avenue for massive traffic movements not catered for by roads of a higher functional status. (Adapted from ICSM proposal).	9 - Local - Those roads which provide almost exclusively for one activity (i.e. recreational, mining or forestry) or function, and which cannot be assigned to Classes 6, 7 or 8.	4 - Rural Secondary - Those roads which are neither Class 1, 2 or 3 roads, whose main function serves the purpose of collecting and distributing traffic from local areas to the wider road network, including access to abutting properties.	4 - Pastoral Secondary - Those roads which are neither Class 1, 2 or 3 roads, whose main function serves the purpose of collecting and distributing traffic from local areas to the wider road network, including access to abutting properties.	Local - Used by local traffic only. Does not serve as a connecting route.	304 - Collector Road - Road acting to provide for traffic movement (connects class 303 to class 305) or to distribute traffic to local street systems.	Local Connector Roads - Urban connector roads of local roads to urban arterial and main roads but also rural connector roads that are not considered arterial but connect settlements to secondary roads and highways.	Collector Road (feeder) - Commonly used roads that service urban networks, and/or rural communities, and/or resource areas. Normally connects access roads to higher classification roads.	Sub-Arterial - Hard surface formation road, which acts as: a connector between highways and/or arterial roads, or An alternate route for class 2 roads, or A principal avenue for massive traffic movements, movements, not catered for by freeways.	Minor Road - Generally distributing traffic to main roads. Includes Roads defined by Main Roads Number field with No Prefix. Previously defined as MRWA type local road and MSD class Minor arterial and Minor road. Includes Laneways, Private Roads and Restricted Roads. Minor roads could also include CALM restricted roads such as Management access or Disease risk. Includes slip roads, parking bays and connecting approach roads.
5	Class 5 - Those roads which provide almost exclusively for one activity or function which cannot be assigned to Classes 1, 2, 3 or 4		Vehicle tracks - Public or private roadways of minimum or no construction which are not necessarily maintained.	DistributorRoad - A road which provides for major traffic movement between roads of a higher order or to distribute traffic to local street systems. (Adapted from ICSM proposal).	5 - Rural Local - Those roads which provide almost exclusively for one activity or function, and which cannot be assigned to Classes 1, 2, 3, or 4 (e.g. access to national parks, dam access, mining, and forestry roads).	5 - Pastoral Local - Those roads which provide almost exclusively for one activity or function, and which cannot be assigned to Classes 1, 2, 3, or 4 (e.g. access to national parks, dam access, mining, and forestry roads).		305 - Local Road - Road providing property access.	Street/Local - Only provides property access.	Local Road (Access) - Public or private road providing access to local properties, resources, facilities, or minor tourism destinations.	Collector Road - Hard surface or improved, loose surface formation road acting to: Provide for traffic movement (connects class 3 to class 5) or To distribute traffic to local street systems.	Track - An unimproved vehicular road of minimal construction connecting other roads or leading to a feature e.g. dams, lookouts. Not to be used for bike trails, walk trails, bridle trails, dog tracks, or firebreaks / clearings along fences. Tracks could also include CALM restricted tracks such as Management access or Disease risk. Unnamed tracks outside the cadastral road reserve are defined as tracks. Race tracks (3023) will be deleted as it will be a TRP cultural feature. Named tracks within a legal road reserve is classed as a local road.	
6			LocalRoad - A sealed or improved unsealed road (not a vehicular track or urban service lane) providing property access.					306 - Track - 2 wheel drive - Unimproved roads which are generally only passable in two wheel drive vehicles during fair weather and are used predominantly by local traffic.	Private or Restricted Roads*		Local Road - Hard surface or improved, loose-surface formation road providing property access.	Not Applicable - Not applicable / Special purpose feature e.g. Bus Access Station, Roundabout, Driveway/Access Road and Mail. (Excludes Access way (A)) as it has the same attributes to at least one of the road segments it joins.	
7			UrbanServiceLane - A road in an urban environment that does not service a building frontage and only has one traffic lane. Generally these are service lanes to access the back of a property and they are not utilised for a postal address.					307 - Track - 4 wheel drive - Unimproved roads which are generally only passable with four wheel drive vehicles.	4WD and Tracks*		Track 2 Wheel Drive - Unimproved roads which are generally only passable in two wheel drive vehicles during fair weather and are used predominantly by local traffic. Also included are driveways regardless of construction.	Connector - Line representing the continuation of a named road within a legal road reserve from where the physically constructed road ends. Also the continuation of a named road through a roundabout.	
8			Track-Vehicular - An unimproved road, the construction of which is minimal. Also included are driveways, regardless of construction. Qualification: These roads are generally only passable in two-wheel drive vehicles during fair weather and are used predominantly by local traffic. If the road's surface is attributed as Unsealed: Four-Wheel Drive then the road is only suitable for Four-Wheel Drive type vehicles. Roads classified as Track-Vehicular are a subset of the RoadSegment subtype VehicularTrack. The difference being VehicularTrack is a classification of road physical form, whereas Track-Vehicular is part of a classification based on highest function. eg. A VehicularTrack may be functionally a Sub-arterial road.					308 - Undetermined - Road type unknown or undetermined. May also include: Bicycle tracks, Pedestrian walkways, walking tracks with emergency vehicle access.	Bikeway/Walkway/Mails*		Track 4 Wheel Drive - Unimproved roads which are generally only passable with four wheel drive vehicles.	Unsurveyed Unconstructed - Proposed unsurveyed unconstructed road, sourced from land developer sketch.	
9			Path - A track which is not capable of and/or not permitted to carry vehicular traffic. Generally for use by pedestrians, horse riders and/or cyclists. Qualification: This is theoretically a replication of RoadSegment class subtype Pathway.					309 - Dismantled - A Road no longer in use that has become untrafficable.	Construction Lines - used for connection through roundabouts.		Unknown - The road is depicted but the road class has not been defined nor determined.	Surveyed Unconstructed - Proposed roads from cadastral framework sourced from lodged survey documents. Also used for cut-de-sec within the legal road reserve to show the legal name extent.	
10											Proposed - Road centreline alignments have been received from plans of subdivision or Vicroads and are yet to be constructed or construction completed.	Closed Road - Road identified as being closed, notification via Dept of Planning & Infrastructure. Not trafficable.	
11											Walking Track - A pathway designed for traffic on foot.		
12											Bicycle Track - A pathway allowing bicycle traffic in the main. This is not a shared road way with vehicular traffic.		

No additional information available

8. APPENDIX B – Australian & New Zealand Road Transport and Traffic Authority Road Classification Comparison

	NAASRA*		NSW	NZ	QLD	VIC
	Rural	Urban				
1	Class 1 - Those roads which form the principal avenue for communications between major regions of Australia, including direct connections between capital cities.	Class 6 - Those roads whose main function is to perform the principal avenue of communication for massive traffic movements.	State Roads (Freeways and Primary Arterials) - The State Road network (including the National Highways) is formed by the primary network of principal traffic carrying and linking routes for the movement of people and goods within the urban centres of Sydney, Newcastle, Wollongong and Central Coast, and throughout the State.	National Routes - Motorways, expressways and major two-lane roads which: Form a nationally important strategic road network; Are significant elements in the national economy; Have the highest degree of access standard and control, and provide a high level of user service at all times.	National Highways - The Queensland National Highway network comprises the State's major corridors linking the State's provincial cities and interstate capitals to Brisbane. It is the primary road set within the State's road network. National Highways are owned by the State but funded by the Commonwealth as they have national as well as State significance.	Freeways- provides a principal route for the movement of people and goods: between major regions of the State; or between major centres of population or between major metropolitan activity centres; or to major transport terminals; or across or around cities; or is a major route for public transport services; or has State-wide economic or tourism significance; or provides necessary connections between arterial roads
2	Class 2 - Those roads, not being Class 1, whose main function is to form the principal avenue of communication for movements: Between capital city and adjoining States and their capital cities; or Between a capital city and key towns; or Between key towns.	Class 7 - Those roads, not being Class 6, whose main function is to supplement the Class 6 roads in providing for traffic movements or which distribute traffic to local street systems.	Regional Roads (Secondary or Sub Arterials) - Regional Roads comprise the secondary network which together with State Roads provide for travel between smaller towns and districts and perform a sub arterial function within major urban centres.	Primary (Regional) Arterials - Major roads which: Form strategic links between regions, or within regions and between districts; Are significant elements in the regional economy, and have some access controls and standards for permitted activities, which are determined mainly on the basis of strategic function and traffic volume.	State Strategic Roads - The Strategic Road network complements the National Highways in the primary movement of people and goods throughout the State. It comprises State declared highways and developmental roads linking major regions within the State, and interstate regions with regions in Queensland.	Arterial Road - Freeways- provides a principal route for the movement of people and goods: between major regions of the State; or between major centres of population or between major metropolitan activity centres; or to major transport terminals; or across or around cities; or is a major route for public transport services; or has State-wide economic or tourism significance; or provides necessary connections between arterial roads
3	Class 3 - Those roads, not being Class 1 or 2, whose main function is to form an avenue of communication for movements: Between important centres and the Class 1 and Class 2 roads and/or key towns; or communication for movements: Between important centres and the Class 1 and Class 2 roads and/or key towns; or Between important centres; or of an arterial nature within a town in a rural area.	Class 8 - Those roads not being Class 6 or 7, whose main function is to provide access to abutting property.	Local Roads (Collector and Local Access roads) - Comprise all other council managed roads, that is, those that are not State Roads or Regional Roads. Councils manage Local Roads with the works being funded from their own resources, Federal sources and minor assistance from the State.	Secondary (District) Arterials - Roads which: Form strategic links within, or between, districts; Are significant elements in the local economy and often also serve as local roads. Access standards for district arterial roads are determined by the careful consideration of form (the physical alignment of the road); function (the present and future role of the road) and traffic volumes.	Regional Roads - The Regional Road network, together with the National Highway and State Strategic road networks, caters for movements linking areas of economic importance within the region to one another and to economic areas in adjacent regions. This network promotes future industry establishment and development in the region and provides a corridor for trade movements external to the region.	
4	Class 4 - Those roads, not being of Class 1, 2 or 3, whose main function is to provide access to abutting property (including property within a town in a rural area).	Class 9 - Those roads which provide almost exclusively for one activity or function and which cannot be assigned to Class 6, 7 or 8.		Collector Routes - Locally preferred routes between, or within, areas of population or commercial activity which: Complement district arterials but have property access as a higher priority, and have standards suitable for the safe operational requirements of the traffic volume on each section.	District Roads - Are less significant for State and national movements and serve a more localised function. District Roads generally provide links within a local government area, and perform the important functions of feeding the national, state and regional system, and distributing traffic from that system to the local road network. The Department of Main Roads has management and funding responsibility for some 14 000 kilometres of District Roads that would generally be the responsibility of councils in other jurisdictions.	
5	Class 5 - Those roads which provide almost exclusively for one activity or function which cannot be assigned to Classes 1, 2, 3 or 4.			Local Roads - All other roads. The standards for these roads are those considered appropriate by the road controlling authority for local traffic operation and land access requirements.	Local Government Roads - Comprise all roads controlled by local governments or Aboriginal and Torres Strait Islander community councils.	

* The NAASRA Classification is applied in ACT, NT, SA, TAS & WA.

9. Appendix C - International Road Classifications of Mapping and Road Transport & Traffic Authorities

Number Of Road Classes	USGS	US FHWA		Canada CTI		Canada TAC		Japan GSI	Japan MLIT	Great Britain Ordnance Survey	Great Britain - DfT, HA	
		Rural	Urban	Rural	Urban	Rural	Urban				Rural	Urban
1	Class 1 - Hard-surface highways including Interstate and U.S. numbered highways (including alternates), primary State routes, and all controlled access highways.	A1 Rural Principal Arterial - Serve corridor movements having trip length and travel density characteristics indicative of substantial state-wide or interstate travel. Connect all or nearly all urban areas with 50,000 and over population and the majority of urban areas with 25,000 and over population. Provide an integrated network of continuous routes.	Urban Principal Arterial - Serve major activity centres, highest volume corridors, and longest trip demands. Carry high proportion of total urban travel on minimum of mileage; Interconnect and provide continuity for major rural corridors to accommodate trips entering and leaving urban areas and movements through the urban area; Serve demand for intra-area travel as between the central business district and outlying residential areas.	A1 # 201 - A hard surface (concrete, asphalt or tar/aggregate), all season road having more than 2 lanes with median.	Rural Freeways - Traffic movement is for optimum mobility; No Land service access; Traffic volume: > 8000 AADT; Freeflow; Design speed 100-130 km/h; Average running speed 70-110km/h; Free flow conditions; Normal connections - collectors, arterials and freeways.	Major Arterials - Traffic movement is the primary consideration; Rigid access control; Traffic volume: > 10000 AADT; Uninterrupted Flow; Design speed 80-100 km/h; Average running speed 60-80km/h; Normal connections - collectors, arterials and freeways.	Four lanes or more - Symbolic Road 13m-25m in width.	National Expressways - As defined by the National Expressway Law.	Motorway - A multi-carriageway public road connecting important cities, always numbered with no addresses.	Trunk Rural - A system of strategic routes of national importance that cater for the through movement of long distance traffic. The network in Great Britain now comprises: About 3,400 kilometres of motorway in 2003 - "M" roads or those sections of trunk roads developed to motorway standards and where the letter "M" is added to that part of the road e.g. A1(M) - and all are coloured blue on road atlases; About 9,300 kilometres of "A" class roads - all trunk "A" roads are coloured green on road atlases.	Trunk Urban - A system of strategic routes of national importance that cater for the through movement of long distance traffic. The network in Great Britain now comprises: About 3,400 kilometres of motorway in 2003 - "M" roads or those sections of trunk roads developed to motorway standards and where the letter "M" is added to that part of the road e.g. A1(M) - and all are coloured blue on road atlases; About 9,300 kilometres of "A" class roads - all trunk "A" roads are coloured green on road atlases.	
2	Class 2 - Hard-surface highways including secondary State routes, primary county routes, and other highways that connect principal cities and towns, and link these places with the primary highway system.	A2 Primary Road Without Limited Access - This category includes nationally and regionally important highways that do not have limited access as required by category A1. It consists mainly of US highways, but may include some state highways and county highways that connect cities and larger towns. A road in this category must be hard-surface (concrete or asphalt), it has intersections with other roads, may be divided or undivided, and have multi-lane or single-lane characteristics.	Rural Minor Arterial - Connect cities and larger towns (and other major destinations such as resorts capable of attracting travel over long distances) and form an integrated network providing interstate and intercounty service. Spaced at intervals so that all developed areas are within a reasonable distance of an arterial. Provide service to corridors with trip lengths and travel density greater than those served by rural collectors and local roads and with relatively high travel speeds and minimum interference to through movement.	A# 202 - A hard surface (concrete, asphalt or tar/aggregate), all season road having more than 2 lanes without median.	Rural Arterial - Traffic movement is the primary service function; Land service access secondary consideration; Traffic volume: < 12000 AADT; Uninterrupted flow; Design speed 80-130 km/h; Average running speed 60-100km/h; Free flow conditions; Normal connections - collectors, arterials and freeways.	Minor Arterials - Traffic movement is the primary consideration; Rigid access control; Traffic volume: 5000-20000 AADT; Uninterrupted Flow; Design speed 70 km/h; Average running speed 50-60km/h; Normal connections - collectors, arterials and freeways.	Double lanes - Symbolic Road 5.5m-13m in width.	National highways (Article 5 in Road Law) - These roads are the main transportation networks between main cities, such as the prefectural capitals and important cities. These roads are designated by Cabinet Order.	A Road - A public road, classified as an A road by the DfT, connecting areas of regional importance, always numbered, sometimes named, often with addresses.	A Road (Principal Rural) - A second-tier road system of importance, acting as regional and district distributor routes and complementing the trunk road network. The network is almost entirely made up of 37,300 kilometres of "A" class roads, which are coloured red on road atlases unless they are part of the Primary Route Network where they are green.	A Road (Principal Urban) - A second-tier road system of importance, acting as regional and district distributor routes and complementing the trunk road network. The network is almost entirely made up of 37,300 kilometres of "A" class roads, which are coloured red on road atlases unless they are part of the Primary Route Network where they are green.	
3	Class 3 - Hard-surface roads not included in a higher class and improved, loose-surface roads passable in all kinds of weather. These roads are adjuncts to the primary and secondary highway systems. Also included are important private roads such as main logging or industrial roads which serve as connecting links to the regular road network.	A3 Secondary and Connecting Road - This category includes mostly state highways, but may include some county highways that connect smaller towns, subdivisions, and neighbourhoods. The roads in this category generally are smaller than roads in Category A2, must be hard-surface (concrete or asphalt), and are usually undivided with single-lane characteristics. These roads usually have a local name along with a route number and intersect with many other roads and driveways.	Rural Major Collectors - Provide service to any county seat, larger towns, and other county destinations such as consolidated schools, parks, or important mining and agricultural areas not served by an arterial. Connect these places with nearby larger towns and cities or with arterial routes; Serve the most important intracounty travel corridors.	B # 203 - A hard surface (concrete, asphalt or tar/aggregate), all season road with 2 lanes.	Rural Collector - Traffic movement and land access of equal importance; Traffic Volume: < 5000 AADT; Interrupted flow; Design speed 60-110km/h; Average running speed 50-90 km/h; Normal connections - local collectors and arterials.	Urban Collectors Residential - Traffic movement and land access of equal importance; Traffic volume: < 5000 AADT; Interrupted Flow; Design speed 60 km/h; Average running speed 50-60km/h; Normal connections: local, collectors and arterials.	Single lane - Symbolic Road 3m-5.5m in width.	Prefectural roads (Article 7 in Road Law) - These roads are the regional transportation networks. These roads are designated by Prefectural Governors.	B Road - A public road, classified as a B road by the DfT, connecting places of local significance, always numbered, sometimes named, often with addresses.	B Roads - Rural - Minor Roads (local routes of importance) outside urban areas and have a population of less than 10,000, and are all maintained by the local authorities.	B Roads - Urban - Urban Minor Roads (local routes of importance) giving access to industrial, commercial and residential sectors and are all maintained by the local authorities.	
4	Class 4 - Unimproved roads which are generally passable only in fair weather and used mostly for local traffic. Also included are driveways, regardless of construction	A4 Local, Neighborhood, and Rural Road - A road in this category is used for local traffic and usually has a single lane of traffic in each direction. In an urban area, this is a neighborhood road and street that is not a thoroughfare belonging in categories A2 or A3. In a rural area, this is a short distance road connecting the smallest towns; the road may or may not have a state or county route number. Scenic park roads, unimproved or unpaved roads, and industrial roads are included in this category. Most roads in the Nation are classified as A4 roads.	Rural Minor Collectors - Are spaced at intervals to collect traffic from local roads and bring all developed areas within reasonable distance of a collector. Provide service to smaller communities not served by a higher class facility. Connect locally important traffic generators with rural hinterlands.	C# 204 - A hard surface (concrete, asphalt or tar/aggregate), all season road with less than 2 lanes.	Rural Local - Traffic movement secondary consideration; Land service access primary consideration; Traffic volume: < 1000 AADT; Interrupted flow; Design speed 50-110km/h; Average running speed 50-90 km/h; Normal connections - local collectors.	Urban Collectors Industrial/Commercial - Traffic movement and land access of equal importance; Traffic volume: 1000-12000 AADT; Interrupted Flow; Design speed 60 km/h; Average running speed 60km/h; Normal connections: local, collectors and arterials.	Road 1.5m-3m in width.	Municipal roads (Article 8 in Road Law) - These roads are the local transportation networks. These roads are designated by Mayors.	Minor Road - A public road without a DfT classification of Motorway, A or B that connects the roads defined below to B roads and higher classification roads. In urban areas usually named, often with addresses. In rural areas sometimes named and sometimes with addresses.	C Roads - Rural - Local roads outside urban areas and have a population of less than 10,000, and are all maintained by the local authorities. Rarely Signposted.	C Roads - Urban - Local roads giving access to industrial, commercial and residential sectors and are all maintained by the local authorities. Rarely Signposted.	
5	Class 5 - Unimproved roads passable only with 4-wheel-drive vehicles	A5 Vehicular Trail - A road in this category is usable only by four-wheel drive vehicles, is usually a one-lane dirt trail, and is found almost exclusively in very rural areas. Sometimes the road is called a fire road or logging road and may include an abandoned railroad grade where the tracks have been removed. Minor, unpaved roads usable by ordinary cars and trucks belong in category A4, not A5.	Rural Locals - Provide access to adjacent land; Serve travel over relatively short distances.	D# 205 - A loose surface (gravel or stone), all season road with 2 or more lanes.	Urban Local Residential - Traffic movement secondary consideration; Traffic volume: <1000 AADT; Interrupted Flow; Design speed 60 km/h; Average running speed 40-50km/h; Normal connections: other local and collectors.	Foot path - Road less than 1.5m.	Local Street - A public road that provides access to land and/or houses, usually named with addresses. Generally not intended for through traffic.	Alley - A road without access restrictions that provides alternate/secondary vehicular access to land or houses. They may be named but are usually without addresses. They are usually not intended for through traffic though they may be accessible from more than one location. Typical examples are those that run behind rows of houses. Roads that lead to areas of metalised surface for parking or to blocks of garages (often within housing estates) are not captured as alleys, unless they also provide vehicular access to land or buildings other than blocks of garages. Currently coverage is limited to roads formerly described as "Private" in previous Ordnance Survey road products but reclassified following ground visits				
6		A6 Road with Special Characteristics - This category includes roads, portions of a road, intersections of a road, or the ends of a road that are parts of the vehicular highway system and have separately identifiable characteristics		E# 206 - A loose surface (gravel or stone), all season road with less than 2 lanes.	Urban Local Industrial/Commercial - Traffic movement secondary consideration; Traffic volume: <3000 AADT; Interrupted Flow; Design speed 60 km/h; Average running speed 50km/h; Normal connections: other local and collectors.			Private Road Publicly Accessible - A privately maintained road or a road within a property boundary where access by the public is considered usual for at least some part of the day. For example a road within a hospital, sports centre or school. They may extend through a site if more than one entrance exists. If only one entrance exists they are normally created to extend to the principal building within a single site or the boundary of the last property served for features accessing more than one addressed or otherwise identifiable property. They may be captured outside this definition if required to provide connectivity to a track or path.				
7		A7 Road as Other Thoroughfare - A road in this category is not part of the vehicular highway system. It is used by bicyclists or pedestrians, and is typically inaccessible to mainstream motor traffic except for private-owner and service vehicles. This category includes foot and hiking trails located on park and forest land, as well as stairs or walkways that follow a road right-of-way and have names similar to road names.		F# 207 - A loose surface (loam, clay or sand) road, on a limited foundation, suitable during dry weather conditions. Farm Lane/Laneway. A private road leading to a farm or estate.					Private Road - Restricted Access - A privately maintained road or a road within a property boundary where access by the public is restricted by physical (e.g. gate) or administrative (e.g. sign) means or is not considered usual. For example roads within a military base, an oil refinery, within a private residential garden or leading to two private properties. Such roads are captured only where they exceed 100m in length or serve more than one addressed or otherwise identifiable separate property. Roads are normally created to extend to the principal building within a single site or the boundary of the last property served for roads serving multiple properties. Two exceptions to this exist: Where a track or path exists that the road is connected to the road must be extended to that point or where roads within a private residential garden extend for more than 100m from the property boundary.			
8				Street# 208 - A hard or loose surface public road in a residential, cottage or commercial area, usually having buildings on one or both sides.								
9				G# 209 - Vehicle Track - A road with little or no improvement, sufficiently wide for four wheel vehicles; includes a road of higher classification that has been allowed to deteriorate Winter Road: A road usable only in the winter because it often passes over lakes and other wetlands.						Pedestrianised Street - Roads that have been altered for use principally by pedestrians but may provide some access for certain types of vehicle.		

- Mapping Authorities
- Road Transport & Traffic Authorities

10 . Appendix D - Comparative Benefits/Shortcomings of the Road Classification Hierarchies

	Mapping Authorities													Traffic Authorities														
	Australian & NZ						International							Australian & NZ				International										
	ACT	GA	NSW	NT	NZ	PSMA	QLD	SA	TAS	VIC	WA	US	Canada	Japan	GB	ACT	NSW	NT	NZ	QLD	SA	TAS	VIC	WA	US	Canada	Japan	GB
Benefits																												
Distinction between urban and rural road regions.	✓			✓												✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Simple number of classification types.		✓			✓			✓			✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Many other road authorities have adopted the classification, making for consistency in representation.	✓			✓												✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Descriptive name assigned to each class, such as 'Secondary Road' assisting interpretation by users.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Limited number of classification levels makes it easier to amalgamate multiple different systems into it.	✓			✓							✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Good differentiation of local road types.			✓			✓		✓		✓				✓								✓						
Very descriptive definitions, particularly for contentious middle and lower order roads, reducing degree of subjectivity.									✓	✓	✓			✓														
Introduces considerations of traffic speed to classify Motorways, to reduce ambiguity.			✓																							✓		
Definitions reinforce linkages with ICSM standards.			✓																									
Introduces considerations of road design (both maintenance and 'passability').											✓	✓		✓												✓		
Includes Proposed Road as a discrete category type with adequate definition.																												
Has business rules that include further definition examples and diagrams to aid in interpretation of roads.										✓						✓												
Introduces route number variable to assist in interpretation of highest order roads.											✓																	
Includes considerations of population sizes for the highest order urban class to aid interpretation and reduce ambiguity.																									✓			
Includes considerations of trip lengths between rural collectors and minor arterials to aid interpretation.																									✓			
Does have additional category of Vehicle Track to discern functions relevant for National Park, State forest or EM.						✓		✓		✓	✓		✓	✓														
Includes considerations of traffic volume and flow characteristics to aid in interpretation and reduce ambiguity.																✓		✓								✓		
Uses less ambiguous terminology in favour of more quantifiable measures, such as traffic volume and design speed.																		✓								✓		
Is based on considerations of road width to classify between all road types.														✓														
Definitions assigned to roads classification linked to Nation wide Road Law.																											✓	
Introduces considerations of shared zones between pedestrians and vehicles.														✓														
Shortcomings																												
Lack of direction on how urban and rural divide is determined.	✓			✓												✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
No distinction between urban and rural road regions.		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Uses subjective terminology, 'major centre' , 'high traffic volume' (not quantifiable).	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Greater distinction needed between designating State roads and local council roads.	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
No additional category of Vehicle Track to discern different functions relevant for National Park, State forest or EM.	✓	✓	✓	✓	✓		✓				✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Too few classification types makes it difficult to combine with more complex classification types.		✓		✓					✓		✓					✓		✓	✓	✓	✓	✓	✓	✓		✓		
Collective name not assigned to each class, such as 'local road,' complicating interpretation by users.	✓										✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Introduces structural variables, but not across all classification types.		✓	✓		✓	✓		✓		✓																		
Includes categories that may be considered beyond basic trafficable road definition, such as Path, Undetermined etc.			✓			✓	✓	✓		✓	✓			✓														
Some contend quantifiable measures are too inflexible and detailed to be applied by all local jurisdictions.																										✓		

11. Appendix E – PSMA Hierarchy Conversion Summary Table

New South Wales		
Transport Hierarchy Code	301	FUNCTIONHI in(1,2)
	302	FUNCTIONHI =3
	303	FUNCTIONHI =4
	304	FUNCTIONHI =5
	305	FUNCTIONHI in(6,7)
	306	FUNCTIONHI =8
	307	SURFACE=3,4 (4WD TRACKS)
	308	BLANK, or NULL
	400	FUNCTIONHI =9

Tasmania		
Transport Hierarchy Code	301	road_segment.road_class = 1
	302	road_segment.road_class = 2
	303	road_segment.road_class = 3
	304	
	305	road_segment.road_class in (4,5)
	306	road_segment.road_class = 6
	307	road_segment.road_class = 7
	308	Otherwise

Western Australia		
Transport Hierarchy Code	301	MRWA_TYPE = 'H' OR MSD_CLASS in ('FW','PM','HF','NF','NH')
	302	MSD_CLASS in ('SC','MN')
	303	MSD_CLASS = 'MA'
	304	(MRWA_TYPE = 'M' OR MSD_CLASS = 'M') MRWA_TYPE = 'L' OR
	305	(MRWA_TYPE = 'L' & MSD_CLASS = 'M')
	306	MSD_CLASS = 'TR'
	307	
	308	Otherwise
	400	MSD_CLASS = 'ML'

Other Territories (Cocos and Christmas Islands)		
Transport Hierarchy Code	301	Feature_Code = 301
	302	Feature_Code = 302
	303	Feature_Code = 303
	304	Feature_Code = 304
	305	Feature_Code = 305
	306	Feature_Code = 306
	307	Feature_Code = 307
	308	Feature_Code = 308
	400	Feature_Code = 400

Australian Capital Territory		
Transport Hierarchy Code	301	HIERARCHY in (1)
	302	HIERARCHY in (2,6)
	303	Not used
	304	HIERARCHY in (3,7,8A)
	305	HIERARCHY in (8B,8C)
	306	HIERARCHY in (4)
	307	Not used
	308	HIERARCHY in (5,9)

Victoria		
Transport Hierarchy Code	301	Road.class_code in (0,1)
	302	Road.class_code = 2
	303	Road.class_code = 3
	304	Road.class_code = 4
	305	Road.class_code = 5
	306	Road.class_code = 6
	307	Road.class_code = 7
	308	Otherwise
	400	Road.class_code in (11,12)

Northern Territory		
Transport Hierarchy Code	301	Roadclin.category in ('4','HIGHWAY')
	302	Roadclin.category = '3'
	303	Roadclin.category in ('2','6','SECONDARY')
	304	
	305	Roadclin.category in ('5','1')
	306	Roadclin.category = 'TRACK'

South Australia		
Transport Hierarchy Code		Only use FEATCOD if CLASS is null
	301	CLASS= HWY
	302	CLASS= ART or 2
	303	CLASS= SUBA or 3
	304	CLASS= COLL or or CLASS=4 or FEATCOD in(2035,2041)
	305	CLASS=LOCL or FEATCOD in(2008,2016,2043,2221)
	306	CLASS= TRK2 or FEATCOD in(2009,2013,2017)
	307	TRK4
	308	Otherwise
	400	FEATCOD in(2034,2045,2129)

Queensland		
Transport Hierarchy Code	301	Street_Data.ROADTYPE in (1,2)
	302	
	303	Street_Data.ROADTYPE = 3
	304	Street_Data.ROADTYPE = 4
	305	Street_Data.ROADTYPE = 5
	306	Street_Data.ROADTYPE in (6,8)
	307	Street_Data.ROADTYPE = 7
	308	Otherwise

Other Territories (Jervis Bay)		
Transport Hierarchy Code	301	FUNCTIONHI in(1,2)
	302	FUNCTIONHI =3
	303	FUNCTIONHI =4
	304	FUNCTIONHI =5
	305	FUNCTIONHI in(6,7)
	306	FUNCTIONHI =8
	307	SURFACE=3,4 (4WD TRACKS)
	308	BLANK, or NULL
	400	FUNCTIONHI =9

12. Acknowledgments

The ICSM acknowledges the assistance provided by officers of the following agencies:

MAPPING AUTHORITIES

- ACT Planning and Land Authority (ACTPLA)
- Department of Defence (DoD)
- Geoscience Australia (GA)
- Land Information New Zealand (LINZ)
- NSW Land Property & Information (LPI)
- NT Department of Planning & Infrastructure (DPI)
- PSMA Australia Limited
- QLD Department of Natural Resources & Water (NRW)
- SA Department of Environment & Heritage (DEH)
- Tasmanian Department of Primary Industries, Water and Environment (DPIWE)
- Vic Department of Sustainability and Environment (DSE)
- WA Department of Land Information (DLI)

INTERNATIONAL MAPPING AUTHORITIES

- Division of Natural Resources Canada (DNRC)
- Geological Survey Institute (GSI) of Japan
- Ordnance Survey (OS) of Great Britain
- United States Geological Survey (USGS)

OTHER NATIONAL AUTHORITIES/CORPORATIONS

- Austroads
- Australian Bureau of Statistic (ABS)
- Australian Local Government Associations (ALGA)
- Department of Transport & Regional Services (DOTARS)
- Land Transport NZ
- Main Roads Western Australia
- NSW Roads and Traffic Authority (RTA)
- QLD Main Roads (QMR)
- Roads ACT
- Tasmanian Department of Infrastructure, Energy & Resources (DIER)
- Transport Agency Surveying And Mapping (TASAM)
- Transport SA
- VicRoads

OTHER INTERNATIONAL AUTHORITIES/CORPORATIONS

- Department for Transport (DfT) Great Britain
- Highway Agency (HA) of Great Britain
- Ministry of Land, Infrastructure and Transport (MLIT) of Japan
- Transportation Association of Canada (TAC)
- US Federal Highway Administration Department (FHWA)

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