RISSB Product Proposal (and Prioritisation)

Primary information	
Type of product being suggested:	Code of Practice
Title of product being suggested:	Grade Separation for Light Rail Systems
Date of suggestion:	13/02/2019
Reason for suggestion:	Opportunity in the industry for harmonisation
Railway discipline area:	Infrastructure

Scope:

This document would consolidate current best practice techniques for safely segregating light rail vehicles (LRVs) from their surrounds. The document would focus on the engineering controls light rail system operators may choose to safely define boundaries between light rail systems and other urban environment users.

The document subject matter shall describe devices light rail system operators may choose to employ to mitigate risk of collision between light rail vehicles and people as well as risks associated with fixed assets of the light rail system.

The document is targeted towards light rail system owners, network controllers, operators, light rail system designers, roads authorities and other bodies responsible for the urban environment in which light rail systems are found.

At a minimum, the document would cover:

- Definitions relevant to the subject matter: (including but not limited to; Light Rail Systems, Grade Separation, Mixed transport environments, vehicle swept path).
    - Whilst out of scope for this document, for completeness, the interface between light rail and roads from a traffic signalling perspective is to be defined.
- Description of possible hazards associated with light rail systems in urban environments (for example: bicycles and rail tracks, turnouts, LRV to vehicle collisions, LRV to pedestrian/cyclist collisions).
- Guidance to risk based methodologies for determining likelihood of the above hazards eventuating.
- Reference to existing Light Rail system integration documentation.
- Reference to existing road design specifications/standards.
    - Whilst out of scope for this document, reference is to be made to any relevant documentation covering the design of traffic signals for mixed light rail and road use.
- Examples from world's best practice as to methodologies of defining the LRV swept path which may include, but not be limited to:
    - Full grade separation (barriers between grades),
    - Line marking/painting of swept LRV path,
    - Methods of deploying contrasting urban landscaping (concrete/asphalting/cobblestones of danger zones, varying vegetation types),
    - Additional visible/warning systems for pedestrians/cyclists at path crossing locations,
    - Methods of safe grade separation in high pedestrian areas (shared zones, at LRV stops),
    - Methods of separating Light Rail assets from pedestrians/cyclists, eg: moving turnouts.

Out of scope for this document includes: heavy rail systems, automated rail systems, monorails, at grade crossings between heavy rail and light rail, cane railways, the usage of road vehicle signals for signalling

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LRV movements. The document will not quantify the expected benefits/shortcomings of examples as this is application specific.

The document will not cover which authority is responsible for maintenance of any grade separation techniques as this is specific to the application of any interface agreements in place.

Objective:

This Code of Practice will consolidate local and world best practice to define passive and active controls for safely separating light rail vehicles from other users of the urban environment.

Hazard identification:

1	Motor Vehicle – Light Rail Vehicle collisions	6	
2	Pedestrian – Light Rail Vehicle collisions	7	
3	Bicycle – Light Rail Vehicle collisions	8	
4	Risks associated with fixed assets of the light rail system.	9	
5		10	

Benefits:

Safety

The application of this Code of Practice is specific to each organisation, however the Code of Practice will provide example based tools that light rail system operators may choose to specify to reduce safety risks so far as is reasonably practicable of LRV to non-LRV collisions. In cases where an asset is upgraded to include features of the Code of Practice, then light rail system operators will have usable data to assess the scope and justify further safety enhancements on their network.

Interoperability[i] / harmonisation[ii]

The Code of Practice may be used for any new or modified light rail system. It would consolidate existing knowledge for all industry users and provide a reference for harmonisation between urban landscape design amongst users of this document.

Financial

This Code of Practice shall provide a range of options for mitigating safety risks, as the Code of Practice is price agnostic, the application of the solutions offered in this document are the responsibility of the user. This document will provide those engaged with light rail systems a range of options to adopt into their network.

Environmental

The document shall provide a range of options that have varying degrees of carbon impact to implement. By providing a range of options for grade separation of light rail systems, users of this product may make better informed environmental impact studies for changes to their light rail network.

Impacts:

Adoption of this code of practise is voluntary, and coupled with the long life span of existing infrastructure and legacy systems, implementation of this product would be a staged approach, and apply to new or modified assets. Additionally, due to few light rail systems currently in operation in

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Australia and NZ, expertise required to develop and/or validate this Code of Practice may be difficult to resource from within Australasia.

i ***Interoperability*** is the ability of a process, system or a product to work with other process, systems or products (aka compatible systems through managed interfaces).

ii ***Harmonisation*** - the act of bringing into agreement so as to work effectively together (aka uniformity of systems).

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Other items to aid RISSB project planning

Structure:

Possible contents page based on Scope defined above:

- Definitions relevant to the subject matter
- Description of possible hazards associated with light rail systems in urban environments
- Guidance and reference to risk based methodologies for determining likelihood of the above hazards eventuating.
- Reference to existing Light Rail system integration documentation
- Reference to existing road design specifications/standards.
- Examples from world's best practice as to methodologies of defining the LRV swept path and light rail system assets.

Reference / source materials:

#	Reference / source material	Available from
1	New RISSB product: "Light Rail Urban Design Safety Guideline"	RISSB
2	AustRoads Publication: "Guide to Traffic Management"	AustRoads
3	AS1742.7 - Manual of Uniform Traffic Control Devices Part 7: Railway Crossings	SAI Global
4		
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Assumptions:

No specific assumptions apply to this product.

Constraints:

No additional constraints in addition to section above: 'Impacts'.

Australian Standards considerations: (only applies if proposed product is to be a Standard)

Does proposed Standard duplicate an existing Australian Standard *(Where such duplication occurs, justification or explanation shall be included in the standard)*	~~*yes*~~ */ no*
(if yes – please list)	
Will proposed Standard be developed for conformance assessment purposes? *(relates only to inspection and testing activities subject external certification)*	~~*yes*~~ */ no*
(if yes – please detail expected certification activities)	
Are there are any International Standards on the same subject	~~*yes*~~ */ no*
(if yes – could Int.std.be adopted or used as a basis for this development	*yes / no*
(if no – please provide reasons) Application of methods defined in this product are specific to associated A/NZ standards.	

Expected effort required at key stages:

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Activity	# Days
The Author's research into the reference / source materials.	20
The Author's further (if required) development of draft headings for the document (including any work that may be required on the scope, purpose and hazard references).	5
The Author's production of the draft content building on the above.	30
The Author's production of a further draft based on Development Group comments on the above.	5
The Author's development of the 'post public consultation' draft based on the guidance of the Development Group in addressing public comments.	10
Independent validation[iii] (applies only to standards).	N/A
The Author's finalisation of the product incorporating Development Group's validation comments.	10

[iii] Independent validation is to:

1. Check that clauses relate to the identified hazards
2. Check that the standard is of comparable quality to other similar domestic / international standards
3. Check that the standard is fit for the Australian railway (and is therefore nationally applicable)
4. Provide a recommendation for any deficiencies from the above