

MRTS206

Provision of Variable Speed Limit and Lane Control Signs

Appendix A

Appendix A

Allocation of functionality between TMS and site controller

Functional allocation is derived from Appendices B and H of the Main Roads VSL Concept of Operations document.

| Concept of Operations Appendix B - General principles | | | | |
|---|--|----------------|-----------------|---|
| Design Principle | Description | Responsibility | | Comments |
| | | TMS | Site controller | |
| 1 | Conflicting speed recommendation from algorithms | Y | | |
| 2 | Future development of algorithms, addition or replacement of algorithms | Y | | |
| 3 | Max/Min Speed limit | Y | Y | Permissible frame, STREAMS cannot override max/min speeds which are programmed into the Site Controller |
| 4 | Speed limit minimum increment, 10 or 20 km/h | Y | | |
| 5 | Automatic functionality, speed change from 60 to 110 km/h (where applicable) | Y | Y | Permissible frames |
| 6 | Buffer Speed, speed changes greater than 20 km/h | Y | | |
| 7 | Buffer Distance, at least 300 m in accordance with MUTCD | Y | | |
| 8 | Transitions, change of lane status and/or speeds | Y | | |
| 9 | Flashing annulus | | Y | If speed is other than default (maximum) speed limit then flash inner rings of annulus |
| 10 | 20 km/h speed limit lowering | Y | | |
| 11 | 20 km/h speed limit raising | Y | | |
| 12 | Speed limit at start of VSL zone | Y | | |
| 13 | Smoothing | Y | | |
| 14 | Smoothing | Y | | |
| 15 | Smoothing | Y | | |
| 16 | Smoothing | Y | | |
| 17 | Smoothing | Y | | |
| 18 | Min Length of Target Speed Limit Changes | Y | | |

| Concept of Operations Appendix B - General principles | | | | |
|---|---|----------------|-----------------|---|
| Design Principle | Description | Responsibility | | Comments |
| | | TMS | Site controller | |
| 19 | Manual Override Lane Control | Y | | PHCS not to inadvertently override lane control |
| 20 | Flashing Red Cross Before Solid Red Cross | Y | | STREAMS will request flashing cross THEN after x seconds, request solid cross. Sign protocol development required |
| 21 | Lane closures for multiple lanes | Y | | |
| 22 | Default lane closure length | Y | | |
| 23 | Minimum lane closure length | Y | | |
| 24 | System prompt for lane closure, lane closure length | Y | | |
| 25 | Lane closure across entrance or exit ramps | Y | | Separate site controllers required for ramp and mainline |
| 26 | Speed limit during lane closures | Y | Y | Permissible frames |
| 27 | Incidence clearing and lane reopening | Y | | |
| 28 | Re-opening lanes | Y | | |
| 29 | Manual override over a number of signs, by operator | Y | Y | Permissible frame combinations |
| 30 | Changes by time of day, Manual override | Y | | |
| 31 | Manual override speeds | Y | | |
| 32 | Responsibility associated with manual override | Y | | Note also responsibility when using PHCS |
| 33 | Power of the manual operator override | Y | | |
| 34 | Manual override operator timeout | Y | | |
| 35 | Shift changes while manual overrides are activated | Y | | |
| 36 | User interface, prompts and manual overrides | Y | | |
| 37 | Switched on | Y | Y | |
| 38 | Manage different directions separately | Y | | |
| 39 | Appropriate sign displays for safety | | Y | Permissible frame combinations |
| 40 | Confirmation that sign display has | Y | Y | Sign protocol |

| Concept of Operations Appendix B - General principles | | | | |
|---|--|----------------|-----------------------------|-----------------------------------|
| Design Principle | Description | Responsibility | | Comments |
| | | TMS | Site controller | |
| | changed | | | |
| 41 | Generic plans for incident management | Y | | |
| 42 | Sign interlocking, mainline/entrance ramp | Y | | Ramp signs to have own controller |
| 43 | Queuing object | Y | | |
| 44 | Auditing email account | Y | | |
| 45 | Calibration, fine tuning of algorithms | Y | | |
| 46 | Management of parameters | Y | | |
| 47 | Interaction with STREAMS incident management system (SIMS) | Y | | |
| 48 | Differential Lane Speeds | n/a | Possible future (by others) | Permissible frame combinations |
| 49 | Sign spacing | Y | | |
| 50 | Optimum location beyond on ramp taper | Y | | |
| 51 | Unobstructed viewing distance | Y | | |
| 52 | Default speed limit (when VSL system is not available) | n/a | n/a | Static signs |

| Concept of Operations Appendix H - Fault Management | | | | |
|---|--|----------------|-----------------|---|
| Design Principle | Description | Responsibility | | Comments |
| | | TMS | Site controller | |
| 1 | VSL/LCS displays incorrect symbol | | Y | |
| 2 | Inability to determine VSL/LCS display | | Y | Watchdog timer |
| 3 | System operator alert | | Y | Protocol to allow |
| 4 | Failure of pole mounted VSL at VSL zone entry | Y | Y | Solution will now be through the hardware (Previously in STREAMS) |
| 5 | Failure of pole mounted VSL where upstream VSL site displays same speed | Y | | |
| 6 | Failure of pole mounted VSL where upstream VSL site displays slower speed than the faulty site | Y | | |

| Concept of Operations Appendix H - Fault Management | | | | |
|---|--|----------------|-----------------|---|
| Design Principle | Description | Responsibility | | Comments |
| | | TMS | Site controller | |
| 7 | Failure of pole mounted VSL where upstream VSL site displays faster speed than the faulty site | Y | | |
| 8 | Failure of gantry mounted VSL signs (at VSL zone entry) | Y | Y | Solution now to be through hardware (site controller) |
| 9 | Failure of gantry mounted VSL signs where upstream VSL site displays same speed | Y | | |
| 10 | Failure of gantry mounted VSL signs where upstream VSL site displays slower speed | Y | | |
| 11 | Failure of gantry mounted VSL signs where upstream VSL site displays faster speed than faulty site | Y | | |
| 12 | Maximum uptime without communications | Y | Y | Set in STREAMS |
| 13 | Power recover delay time | | Y | Hardware waits for instruction from STREAMS |
| 14 | Sign display minimum downtime | | Y | |
| 15 | Maximum rollback | Y | | |
| 16 | Non-consecutive faulty sites | Y | | |
| 17 | Rollback onto upstream motorways | Y | | |
| 18 | Rollback scheme for lane closure | Y | | |
| 19 | Rollback scheme for lane closure zone | Y | | |
| 20 | Failure of interlocked signs, mainline entry ramp | Y | | |