MM-ALR Maintenance Activities
ERIC Assessment

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1. Usage of this Report

This paper provides a demonstration of the measures that can be taken to reduce the hazards and risks associated with the implementation of maintenance and inspection activities. Whilst this assessment is considered to be generic it has been based on the M1 Junction 28 – 31, as a sample scheme, to define equipment quantities and to ensure all maintenance aspects likely to be encountered in practice have been accounted for.

This assessment has been undertaken to support the assertion that the MM-ALR Road Worker's Safety Objective can be achieved (MM-ALR Generic Safety Report and Demonstration of meeting Safety Objectives Report).

A major factor in the risk exposure to the road worker is undertaking maintenance and inspection activities. It is considered that the implementation of temporary traffic management to enable maintenance to be undertaken presents the road worker with the most significant risks (especially in crossing the carriageway). Reducing the need to undertake maintenance or reducing the number of occasions maintenance is required will directly impact on the need to undertake temporary traffic management. This assessment uses the principle of Eliminate, Reduce, Isolate, and Control (ERIC) to consider how maintenance and inspection activities can be eliminated or reduced or undertaken in combination with other maintenance activities thereby reducing the overall risk exposure to road workers.

This report may be used by scheme designers in conjunction with maintenance service providers as guidance regarding potential methods for optimising maintenance activities within an MM-ALR scheme and options for reducing maintenance requirements.

However, the designer should test any conclusions to be sure that they hold for the specifics of their scheme, and must undertake their own assessment and demonstrate that they have managed the risks for their scheme.

2. Introduction

Managed motorways introduces a variety of electronic equipment to a stretch of motorway requiring regular maintenance in order to remain operational. The Managed Motorways All Lanes Running (MM-ALR) design features the permanent conversion of the hard shoulder into a running lane; refuge areas at nominal 2.5km intervals; and no maintenance access bays, which also affects the way that civil infrastructure is maintained.

Designers have a statutory duty through the Construction (Design and Management) Regulations 2007 to reduce health, safety and welfare risks for, amongst other things, the maintenance of completed highway schemes. The MM-ALR design may result in a need for maintenance activities to be undertaken in a different way or require the management of the risk exposure of the maintenance contractor to be changed.

3. **Approach**

This paper records the results of an ERIC (Eliminate, Reduce, Isolate, Control) assessment performed on the M1 J28-31 as a sample scheme taking equipment quantities and high level scheme aspects as they were envisaged in February/March 2012. The assessment identifies the maintenance activities that are likely to be undertaken within the MM-ALR scheme (not limited to those associated with technology or electrical equipment), specifying how frequently they occur, how they are currently performed and how they would be performed in a MM-ALR environment so that appropriate mitigation measures can be identified and the risks managed in accordance with the principle of As Low As Reasonably Practicable (ALARP).

This work has been completed in three stages:

- Stage 1 - Identify maintenance activities and associated information.

- Stage 2 – Perform ERIC (Eliminate, Reduce, Isolate and Control) assessment

- Stage 3 – Review ERIC assessment with designers to inform MM-ALR design, operations and maintenance regime

4. **Stage 1 - Maintenance Activities**

In order to establish the impact that the MM-ALR design would have on maintenance activities we first identifiedthe maintenance activities required to be performed on the network, how frequently they occur, how they are currently performed, and how they would be performed in a MM-ALR environment. This was done by reviewing The Highways Agency Routine and Winter Service Code (RWSC), Version 5.10 amendment number 3 (dated July 2009) and The Technology Management & Maintenance Manual (TMMM), Version 1 (dated March 2011).

In addition to these documents the new Asset Maintenance and Operational Requirements, Version 1.1 (dated April 2011) was also reviewed, as MM-ALR will be affected by the different operational requirements and also will itself generate some specific requirements.

5. **Stage 2 - ERIC Assessment**

Following the collation of maintenance activities, an ERIC assessment was carried out for each item, so that appropriate mitigation measure(s) could be identified and the risks managed in accordance with the principle of As Low As Reasonably Practicable (ALARP).

The following basic questions were asked for the ERIC assessment for each item:
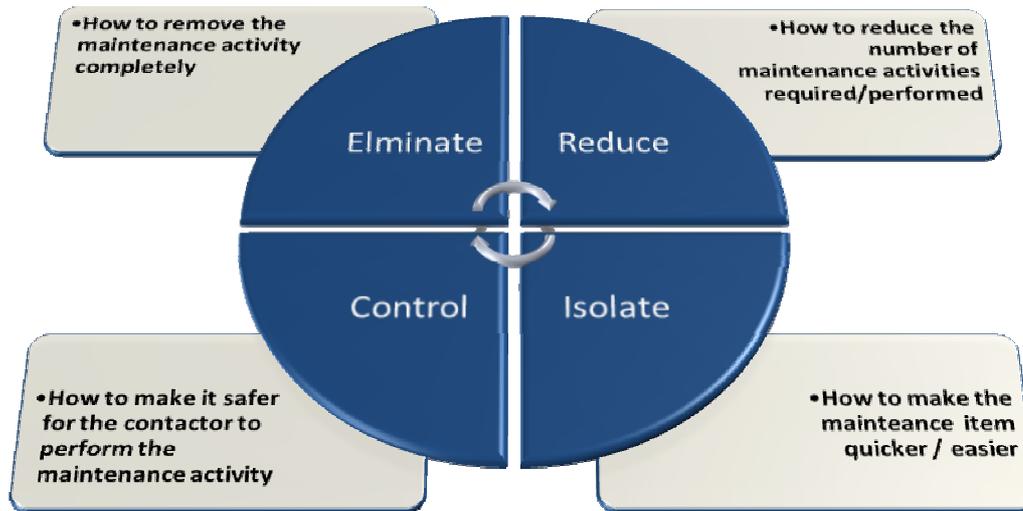
6. Stage 3 – Review and Usage of ERIC Assessment

The results of the ERIC assessment were analysed and summarised into specific strategies and maintenance requirements. These were then integrated into section 6 of the 'Managed Motorways All Lanes Running Concept of Operations' document as guidance for scheme designers and maintenance services providers on how to reduce maintenance activities requirements.

The ERIC assessment was used to inform a sensitivity assessment based around the road worker risk and maintenance hazards within the hazard log.

The ERIC assessment was also used to suggest changes to 'The Technology Management & Maintenance Manual' (TMMM) and 'Asset Maintenance and Operational Requirements' (AMOR) documents to make them more explicit for MM-ALR schemes.

7. ERIC Assessment Suggestions

The following table provides a summary of the twenty-two suggested ERIC approaches and the maintenance activities each relates to.

Item	Description
ELIMINATE	
E-COMBINE	The maintenance activity is combined with other maintenance activities
E-ELIMINATE	Stop doing the maintenance activity
E-REMOTE_DI	Use technology to remotely diagnose/fix the problem
E-REPLACE	Replace the item with items that do not need maintenance
REDUCE	
R-EXTEND	The interval of this maintenance activity could be extended.
R-INC_MTBF	Increase the Mean Time Between Failure (MTBF) of equipment items.
R-INC_TTF	Relax the 'Time to Fix' requirement - Allowing the items to remain in a failed state for longer
R-LOW_MAINT	Use items that are low maintenance
R-NONE	The occurrence rate of the activity cannot be reduced as it a contractual / safety / design requirement
R-REMOTE_DI	Use technology to remotely identify the problem prior to site visit so the item can be fixed first time.
R-REMOVE	Remove items that are not required

Item	Description
R-TOLERANCE	Reduce the failure criteria of the item
ISOLATE	
I-ACC_EQUIP	Review equipment designs to prioritise ease of maintenance
I-EASY_REPLACE	Utilise 'quick replace' items to make replacements easier and quicker
I-HARD_SURF	Putting 'hardened surface' fully to back of barrier
I-OFF_NET	Move / install items off the network so they can be easily accessed without the need for traffic management.
I-SHARE_TM	Maintenance activity can be scheduled to use TM in place for other maintenance activities
CONTROL	
C-ACC_BAY	Utilise maintenance access bays / off network access
C-ACC_GANT*	Utilise accessible gantries
C-ACC_LOW	Utilise systems that allow access to equipment at roadside from Lanes 1 and or 2
C-ACC_WALK	Utilise verge and bridge walk ways so access is available for the whole link
C-SPEED	Set a reduced speed limit to facilitate the maintenance activity

*The use of accessible gantries is included for completeness, but is not included as a recommendation for any of the activities due to the Highways Agency policy on the use of accessible gantries.

8.   ERIC Assessment - Results

The following tables contain the high level details of the maintenance activities that will be affected by the MM-ALR design and the ERIC assessment that has been conducted for each item. The approaches as listed in section 7 that are relevant for each item are marked with an X in the tables, with explanatory text below.

ID:	1
Maintenance Activity Area:	Identification or verification Period and Hazard Mitigation Period
Maintenance Item:	All items on trafficked carriageways, restraint systems and obstructed signs.
Maintenance Activity:	Single Driver/Inspector - SAFETY PATROL
Frequency:	1 per day Estimated 1 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: Activity: 1 person driver/inspector travelling in L2 at traffic speed
Equivalent MM-ALR TM / Activity:	Lanes Closed: Activity: 1 person driver/inspector travelling in L2 at traffic speed
Comments:	This activity is to identify any defects on the network that require maintenance acitivities

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X								X												

Options Explained:

There is no change in safety / TM / cost for this activity within a MM2 environment
E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place

Recommendations:

The activity will continue as normal as it is not impacted by a MM2 implementation.

ID:	2
Maintenance Activity Area:	Identification or verification Period and Hazard Mitigation Period
Maintenance Item:	All items on trafficked carriageways, restraint systems and obstructed signs.
Maintenance Activity:	Two person team - SAFETY INSPECTION
Frequency:	1 per week Estimated 52 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: Activity: 2 person inspection team driving at slow speed on the hard shoulder.
Equivalent MM-ALR TM / Activity:	Lanes Closed: Activity: Cannot be completed in same way due to no HS
Comments:	This activity is to provide a more detailed survey of the network to identify any defects that require maintenance acitivities

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X								X												

Options Explained:

As there is no hard shoulder this maintenance activity would have to be performed in a live lane, but due to travelling at below traffic speed (30-40 mph) there would be an increased safety risk and this activity may not be able to be performed in the way.
Using technology (CCTV) to provide this function is not considered feasible as it could not provide the full coverage of the network assets that is required. CCTV will not be able to see some areas and will only provide a single viewpoint for most items.
E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place, specifically single driver/inspector safety patrol.

Recommendations:

1. E-COMBINE - This activity could be combined with 'Single Driver/Inspector - SAFETY PATROL'.
A 2 personal safety patrol travelling at near traffic speed every day could provide the same level of coverage as once a week safety inspection travelling at reduced speed (this may have to be risked assessed)

ID:	3
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	AMI
Maintenance Activity:	Any Other Fault (Not at height or cabinets)
Frequency:	0.00551 per week Estimated 17 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X			X	X		X	X	X			

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on AMI to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_MTBF - Increase the mean time between fail of AMIs will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving AMIs in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on AMI to remotely identify faults allowing AMI to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-OFF-NET - The equipment cabinets could be installed where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on AMI to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving AMIs in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Further improvements in "easy replace" AMI with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The equipment cabinets could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

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ID:	4
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	AMI
Maintenance Activity:	Faults requiring access to equipment at height
Frequency:	0.00335 per week Estimated 11 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + 1-3 Lanes depending on item location Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1&2 - L3&4 depending on item location Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E-REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X		X	X	X			X		X	X	

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on AMI to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_MTBF - Increasing the mean time between fail of AMIs will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving AMIs in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

R-REMOTE_DI - Remote diagnostics can be used on AMI to remotely identify faults allowing AMI to be fixed in less visits/TM

R-TOLLERANCE - Increase the failure criteria (QTY of LEDs not working etc...) will extend the time before the AMI requires repair.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Further improvements in "easy replace" AMI with reduce the amount of time performing the maintenance activity.

C-ACC_GANT - Utilising accessible gantries will remove the requirement for use of high access vehicles (cherry pickers etc...) A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

C-ACC_LOW - Utilising gantries that allow AMI's to be maintained from above lane 1 and 2 (using rails etc..) will reduce the requirement for working at height over lane 3 and 4. This simplifies the TM and removes need to close Lane 4 on opposite carriageway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on AMI to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving AMIs in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Further improvements in "easy replace" AMI with reduce the amount of time performing the maintenance activity.

ID:	5
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	AMI
Maintenance Activity:	Faults requiring an out station replacement
Frequency:	0 per week Estimated 0 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X		X	X	X		X	X	X			

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on AMI outstations to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_MTBF - Increasing the mean time between fail of AMI outstations will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving AMI outstations in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other TM

R-REMOTE_DI - Remote diagnostics can be used on AMI outstations to remotely identify faults allowing AMI to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace AMI outstation components with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The equipment cabinets could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on AMI to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving AMIs in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Further improvements in "easy replace" AMI with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The equipment cabinets could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

ID:	6
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	AMI
Maintenance Activity:	Statutory Electrical testing (2 types currently on network: LED + incandescent) (bulb/lamp checks annually with electrical test OR reactive issues when reported)
Frequency:	1 per Year Estimated 15 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + 1-3 Lanes depending on item location Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1&2 - L3&4 depending on item location Activity:
Comments:	This activity requires End to End testing of the cabling, so access to both the equipment cabinet and AMI is requied.

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X								X				X		X	X	

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place on that AMI/gantry

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

C-ACC-GANT - Having accessible gantries will remove the requirement to use vehicles that allow access at heights.

C-ACC_LOW - Utilising systems that allows access to the AMI from roadside will remove the requirement to use vehicles that allow access at heights.

Recommendations:

1. E-ELIMINATE / R-EXTEND - The statutory requirement for this maintenance activity should be challenged to confirm if this is valid for roadside equipment. This could result it the requirement being removed or the time period between inspections been extended.
Note: This would have wider impact to all roadside equipment that has this requirement (both for MM and none MM roads)

2. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

3. I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

ID:	7
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	ANPR
Maintenance Activity:	All Faults
Frequency:	10% per year Estimated 1 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + 1-3 Lanes depending on item location Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1&2 - L3&4 depending on item location Activity:
Comments:	ANPR camera can be bridge or gantry mounted. Gantry mounted ANPR cameras will need TM on main carriageway. Bridge mounted may need TM on bridge

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X		X	X	X		X			X	X		X	X		X	X	

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on ANPR to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_MTBF - Work to increase the mean time between fail of ANPR will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving ANPR in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

R-REMOTE_DI - Remote diagnostics can be used on ANPR to remotely identify faults allowing AMI to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace ANPR component with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The ANPR could be installed off network or where off network access if available so this maintenance activity does not require any TM on the motorway, e.g. only install on over bridges and never on gantries, MS4 or roadside columns/masts.

C-ACC-GANT - Having accessible gantries will remove the requirement to use vehicles that allow access at heights.

C-ACC_LOW - Utilising systems that allows access to the ANPR from roadside will remove the requirement to use vehicles that allow access at heights.

Recommendations:

I-OFF-NET - The ANPR could be installed off network or where off network access if available so this maintenance activity does not require any TM on the motorway, e.g. only install on over bridges and never on gantries, MS4 or roadside columns/masts.

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	8
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	ANPR
Maintenance Activity:	Lense Cleaning
Frequency:	2 per Year Estimated 2 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + 1-3 Lanes depending on item location Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1&2 - L3&4 depending on item location Activity:
Comments:	ANPR camera can be bridge or gantry mounted. Gantry mounted ANPR cameras will need TM on main carriageway. Bridge mounted may need TM on bridge

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X			X					X			X	X		X	X	

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place on or near the ANPR

R-EXTEND - The time between lens cleaning could be extended to reduce the number of visits required. Additionally, some ANPR cameras may get dirty quicker than others, so an as required maintenance activity could be introduced.

R-LOW_MAINT - The ANPR cameras could be fitted with self cleaning lenses

I_ACC-EQUIP - The ANPR cameras should be installed so that they are easily accessible and maintenance can happen quickly and easily

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-OFF-NET - The ANPR could be installed off network or where off network access if available so this maintenance activity does not require any TM on the motorway, e.g. only install on over bridges and never on gantries, MS4 or roadside columns/masts.

C-ACC-GANT - Having accessible gantries will remove the requirement to use vehicles that allow access at heights.

C-ACC_LOW - Utilising systems that allows access to the ANPR from roadside will remove the requirement to use vehicles that allow access at heights.

Recommendations:

1. E-OFF_NET - Relocating the ANPR off network will remove any requirement for TM to be installed on the motorway to perform this activity

2. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

3. R-EXTEND - Reviewing the cleaning requirements for ANPR cameras may result in the period between clean is extended

ID:	9
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	ANPR
Maintenance Activity:	Statutory Electrical testing
Frequency:	1 per Year Estimated 1 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + 1-3 Lanes depending on item location Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1&2 - L3&4 depending on item location Activity:
Comments:	ANPR camera can be bridge or gantry mounted. Gantry mounted ANPR cameras will need TM on main carriageway. Bridge mounted may need TM on bridge

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X								X			X	X		X	X	

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place on or near the ANPR camera

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

C-ACC-GANT - Having accessible gantries will remove the requirement to use vehicles that allow access at heights.

C-ACC_LOW - Utilising systems that allows access to the ANPR from roadside will remove the requirement to use vehicles that allow access at heights.

I_OFF-NET - The ANPR could be installed/relocated off network so this maintenance activity does not require any TM on the motorway

Recommendations:

1. E-ELIMINATE / R-EXTEND - The statutory requirement for this maintenance activity should be challenged to confirm if this is valid for roadside equipment. This could result it the requirement being removed or the time period between inspections been extended.
Note: This would have wider impact to all roadside equipment that has this requirement (both for MM and none MM roads)

2. E-OFF_NET - Relocating the ANPR off network will remove any requirement for TM to be installed on the motorway to perform this activity

3. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

ID:	10
Maintenance Activity Area:	Geotechnical Assets
Maintenance Item:	Assess and record condition of Geotechnical asset (DMRB)
Maintenance Activity:	Annual Inspection
Frequency:	1 per year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: Activity: walking on the verge
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X						X						X				

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place on or near the assets

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

R-REMOVE - Certain assets may no longer be required and could be removed. Resulting in less assets to inspect.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

1. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

ID:	11
Maintenance Activity Area:	Geotechnical Assets
Maintenance Item:	Assess and record condition of Geotechnical asset (DMRB)
Maintenance Activity:	Principal Inspection
Frequency:	1 per 5 years (20% per year) Estimated 12 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity: walking on the verge
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X												X				

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place on or near the assets

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

1. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

ID:	12
Maintenance Activity Area:	Drainage
Maintenance Item:	Balancing Ponds
Maintenance Activity:	Drainage Maintenance
Frequency:	1 per 5 years 20% each year Estimated 2 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X								X				X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.
R-EXTEND - The time between inspection could be extended to reduce the number of visits required.
I-ACC_EQUIP - Consider negotiating access rights from off the network with adjacent land owners
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.
I-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	13
Maintenance Activity Area:	Road Restraint Systems
Maintenance Item:	Barrier
Maintenance Activity:	Detailed inspection (Verge)
Frequency:	1 per 2 years Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X						X			X			X				

Options Explained:

R-COMBINE - Verge barrier inspections can be performed when every any TM is put in place that allows safe access to it

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

R-REMOVE - Additional barriers that are not required could be removed to reduce the amount of maintenance that is required.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Using quick / easy replace barriers will reduce the time spent replacing/fixing barrier if maintenance is required.

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	14
Maintenance Activity Area:	Road Restraint Systems
Maintenance Item:	Barrier
Maintenance Activity:	Detailed inspection (Central Reserve)
Frequency:	1 per 2 years Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	All central reserve steel RRS will require TTM to close the outer lanes usually in both directions

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X			X	X			X			X			X			X				

Options Explained:

E-REPLACE - Barriers could be replaced with barriers (concrete) that do not require maintenance

E-COMBINE - Barrier inspections can be performed when every any TM is put in place that allows safe access to it

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

R-REMOVE - Additional barriers that are not required could be removed to reduce the amount of maintenance that is required.

R-LOW_MAINTENANCE - Using low maintenance barriers (e.g. concrete) would result in less frequent inspection requirements

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Using quick / easy replace barriers will reduce the time spent replacing/fixing barrier if maintenance is required.

Recommendations:

E-REPLACE - Barriers could be replaced with barriers (concrete) that do not require maintenance

ID:	15
Maintenance Activity Area:	Structures
Maintenance Item:	Bridges
Maintenance Activity:	Routine Bridge Maintenance
Frequency:	1 per year Estimated 30 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X									X			X				X

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

I_EASY_REPLACE incorporate components that can be replaced more quickly and easily for those items that require most frequent attention.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

C-ACC_WALK - Installing accessible walkways giving access to the whole link (i.e. around/under bridges etc..) will result in the maintainer not having to enter the motorway TM area to access the next part of the link to perform the maintenance activity

Recommendations:

The AMOR introduces a risk based assessment so the recommendation would be to:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

Also,

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	16
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	CCTV
Maintenance Activity:	CCTV Equipment Failure
Frequency:	0.003 per week Estimated 4 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
						X	X						X	X		X	X	X			

Options Explained:

R-INC_MTBF - Increase the mean time between fail of CCTV will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving CCTV in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace CCTV component with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The CCTV could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

I-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-OFF-NET - The CCTV could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

R-INC_TTF - Increasing the time to fix (Leaving in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

HIGHWAYS AGENCY

ID:	17
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	CCTV
Maintenance Activity:	Statutory mechanical testing
Frequency:	1 per Quarter Estimated 84 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X								X			X	X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place by the equipment item.

E-ELIMINATE / R-EXTEND -The requirement for statutory mechanical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I_OFF-NET - The item could be located where off network access is a available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - Having a maintenance access area could mean that maintenance does not require any TM

Recommendations:

E-ELIMINATE / R-EXTEND -The requirement for statutory mechanical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I_OFF-NET - The item could be located where off network access is a available so this maintenance activity does not require any TM on the motorway

ID:	18
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	CCTV Masts
Maintenance Activity:	CCTV Mast Ancillary Equipment Failure
Frequency:	0.002 per week Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
						X	X						X	X		X	X	X		X	

Options Explained:

R-INC_MTBF - Increase the mean time between fail of CCTV ancillary equipment will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace CCTV component with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The CCTV could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

I-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

C-ACC_LOW - Utilising systems that allows access to the CCTV from roadside will remove the requirement to use vehicles that allow access at heights.

Recommendations:

I-OFF-NET - The CCTV could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

R-INC_TTF - Increasing the time to fix (Leaving in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

HIGHWAYS AGENCY

ID:	19
Maintenance Activity Area:	Drainage
Maintenance Item:	Ditches
Maintenance Activity:	Drainage Maintenance
Frequency:	2 per year Estimated 24 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X												X				

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.
R-EXTEND - The time between inspection could be extended to reduce the number of visits required.
I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.

ID:	20
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	Environmental Sensor Stations (ESS)
Maintenance Activity:	All Faults
Frequency:	1 per year Estimated 1 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
						X	X						X	X		X	X	X			

Options Explained:

R-INC_MTBF - Increase the mean time between fail of ESS will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving ESS in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace ES component with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The ESS could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

I-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-OFF-NET - The ESS could be installed where off network access if available so this maintenance activity does not require any TM on the motorway (I.e. Within an ERA)

ID:	21
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	Environmental Sensor Stations (ESS)
Maintenance Activity:	Statutory Electrical testing
Frequency:	1 per Year Estimated 1 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X								X			X	X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place by the equipment item.

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I_OFF-NET - The ESS equipment could be located where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - Having a maintenance access area could mean that maintenance does not require any TM

Recommendations:

1. E-ELIMINATE / R-EXTEND - The statutory requirement for this maintenance activity should be challenged to confirm if this is valid for roadside equipment. This could result it the requirement being removed or the time period between inspections been extended.
Note: This would have wider impact to all roadside equipment that has this requirement (both for MM and none MM roads)

2. E-OFF_NET - Relocating the ESS off network will remove any requirement for TM to be installed on the motorway to perform this activity

3. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

ID:	22
Maintenance Activity Area:	Fences, Walls, Screens, and Environmental Barriers
Maintenance Item:	Fences, Walls, Screens, and Environmental Barriers
Maintenance Activity:	Long stop condition - Integrity
Frequency:	2 per Year Estimated 2 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: Activity: Walking on the verge
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity: walking on the verge
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
					X			X					X	X			X				

Options Explained:

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.
R-LOW_MAINTENANCE - Using low maintenance items would result in less frequent inspection requirements
I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to fences and panels etc.. will provide quick and easy access to perform this activity.
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	23
Maintenance Activity Area:	Fences, Walls, Screens, and Environmental Barriers
Maintenance Item:	Fences, Walls, Screens, and Environmental Barriers
Maintenance Activity:	Long stop condition - structural condition
Frequency:	1 per 2 Years Estimated 1 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: Activity: Walking on the verge
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity: walking on the verge
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
					X			X					X	X			X				

Options Explained:

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.
R-LOW_MAINTENANCE - Using low maintenance items would result in less frequent inspection requirements
I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to fences and panels etc.. will provide quick and easy access to perform this activity.
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.
I-EASY_REPLACE - Using quick / easy replace module equipment will reduce the time spent replacing/fixing the item

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	24
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	Fog Sensors
Maintenance Activity:	All Faults
Frequency:	1 per year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
						X	X				X		X	X		X	X	X			

Options Explained:

R-INC_MTBF - Increase the mean time between fail of Fog Sensors will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving Fog Sensors in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOVE - Removing fog sensors that are not required will remove the requirement for this maintenance activity

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

I-OFF-NET - The fog sensor could be installed away from carriageway edge where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

R-REMOVE - Removing fog sensors that are not required will remove the requirement for this maintenance activity

Note: That TMD should have protocols in place to check CCTV and set signals accordingly

ID:	25
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	Fog Sensors
Maintenance Activity:	Statutory Electrical testing
Frequency:	1 per Quarter Estimated 24 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X						X		X			X	X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place by the equipment item.

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

R_REMOVE - Remove fog sensors that are no longer required as operational mitigation may be available

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I_OFF-NET - The Fog Sensor equipment could be installed/relocated off network so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - Having a maintenance access area could mean that maintenance does not require any TM - Having a maintenance access area could mean that maintenance does not require any TM

Recommendations:

1. E-ELIMINATE / R-EXTEND - The statutory requirement for this maintenance activity should be challenged to confirm if this is valid for roadside equipment. This could result it the requirement being removed or the time period between inspections been extended.
Note: This would have wider impact to all roadside equipment that has this requirement (both for MM and none MM roads)
2. R_REMOVE - With additional CCTV coverage fog sensors could be replaced by operational procedures
3. E-OFF_NET - Relocating the ESS off network will remove any requirement for TM to be installed on the motorway to perform this activity

ID:	26
Maintenance Activity Area:	Drainage
Maintenance Item:	Gulley cleaning
Maintenance Activity:	Drainage Maintenance
Frequency:	Adhoc (risk based) Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X								X				X	X			X

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.
R-EXTEND - The time between cleaning could be extended by being risk based. This can be based on rate of filling and the consequence of flooding to identify priority listings
I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance.
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

The AMOR introduces a risk based assessment so the recommendation would be to:
R-EXTEND - The time between cleaning could be extended by being risk based. This can be based on rate of filling and the consequence of flooding to identify priority listings

ID:	27
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	HADECS
Maintenance Activity:	Calibration
Frequency:	1 per Year Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X								X				X		X		

Options Explained:

R-EXTEND - This is a requirement for the camera to meet type approval but consideration should be given to whether the interval can be extended without undermining the enforcement process.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

C-ACC-GANT - Having accessible gantries will remove the requirement to use vehicles that allow access at heights.

Recommendations:

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	28
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	HADECS
Maintenance Activity:	Support to HADECS Maintainer
Frequency:	1 per quarter Estimated 12 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + 1-3 Lanes depending on item location Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1&2 - L3&4 depending on item location Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E-REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
						X	X						X	X			X		X		

Options Explained:

R-INC_MTBF - Increase the mean time between fail of HADECS Cameras will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving HADECS Cameras in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

C-ACC-GANT - Having accessible gantries will remove the requirement to use vehicles that allow access at heights.

Recommendations:

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	29
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	Ice/Carriageway temperature sensors
Maintenance Activity:	All Faults
Frequency:	10% per year Estimated 1 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
						X							X	X		X	X				

Options Explained:

R-INC_MTBF - Increase the mean time between fail of Sensors will reduce the number of faults experienced on the network.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

I-OFF-NET - The outstation cabinet could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

Recommendations:

I-OFF-NET - The outstation cabinet could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

ID:	30
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	Ice/Carriageway temperature sensors
Maintenance Activity:	Statutory Electrical testing
Frequency:	1 per Year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E-REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X								X			X	X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combined with any other maintenance activity that is scheduled to take place by the equipment item.

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I_OFF-NET - The outstation could in located where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - Having a maintenance access area could mean that maintenance does not require any TM

Recommendations:

1. E-ELIMINATE / R-EXTEND - The statutory requirement for this maintenance activity should be challenged to confirm if this is valid for roadside equipment. This could result it the requirement being removed or the time period between inspections been extended.
Note: This would have wider impact to all roadside equipment that has this requirement (both for MM and none MM roads)

2. E-OFF_NET - Relocating the sensor off network will remove any requirement for TM to be installed on the motorway to perform this activity

3. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

ID:	31
Maintenance Activity Area:	Drainage
Maintenance Item:	Interceptors
Maintenance Activity:	Drainage Maintenance
Frequency:	1 per year Estimated 60 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X			X					X				X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance. Consider negotiating access rights from off the network with adjacent land owners

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	32
Maintenance Activity Area:	Lighting
Maintenance Item:	Lighting
Maintenance Activity:	Asses structural condition
Frequency:	1 per Year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
					X						X		X				X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

R_REMOVE - Remove/reducing lights that are no longer required will reduce the number of items this maintenance activity is required for.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	33
Maintenance Activity Area:	Lighting
Maintenance Item:	Lighting
Maintenance Activity:	Asses structural condition (Central Reserve)
Frequency:	1 per Year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
					X						X		X				X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

R_REMOVE - Remove/reducing lights that are no longer required will reduce the number of items this maintenance activity is required for.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	34
Maintenance Activity Area:	Lighting
Maintenance Item:	Lighting
Maintenance Activity:	Bulk lantern change and clean
Frequency:	1 per 3 Years Estimated 36 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
					X	X					X		X	X		X	X				

Options Explained:

R_REMOVE - Remove/reducing lights that are no longer required will reduce the number of items this maintenance activity is required for.

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

R-INC_MTBF - Using lighting which has a longer lifespan will reduce the time between bulk lantern changes

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Using quick / easy replace module equipment will reduce the time spent replacing/fixing the item

I_OFF-NET - The item could be installed/relocated off network so this maintenance activity does not require any TM on the motorway

Recommendations:

R-INC_MTBF - Using lighting which has a longer lifespan will reduce the time between bulk lantern changes

ID:	35
Maintenance Activity Area:	Lighting
Maintenance Item:	Lighting
Maintenance Activity:	Electrical testing
Frequency:	1 per 6 Years Estimated 10 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X	X			X						X		X	X		X	X				

Options Explained:

E-COMBINE - This maintenance activity could be combined with any other maintenance activity that is scheduled to take place by the equipment item.

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Using quick / easy replace module equipment will reduce the time spent replacing/fixing the item

I_OFF-NET - The item could be installed/relocated off network so this maintenance activity does not require any TM on the motorway

Recommendations:

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

ID:	36
Maintenance Activity Area:	Lighting
Maintenance Item:	Lighting
Maintenance Activity:	Electrical testing (Central Reserve)
Frequency:	1 per 6 Years Estimated 10 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X	X			X						X		X	X			X				

Options Explained:

E-COMBINE - This maintenance activity could be combined with any other maintenance activity that is scheduled to take place by the equipment item.

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

R_REMOVE - Remove/reducing lights that are no longer required will reduce the number of items this maintenance activity is required for.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Using quick / easy replace module equipment will reduce the time spent replacing/fixing the item

Recommendations:

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

ID:	37
Maintenance Activity Area:	Drainage
Maintenance Item:	Linear drainage systems surface water channels gullies catchpits grit traps, headwalls, aprons and pumps.
Maintenance Activity:	Drainage Maintenance
Frequency:	0.5 per year Estimated 30 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X			X					X				X				

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance. Consider negotiating access rights from off the network with adjacent land owners

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	38
Maintenance Activity Area:	Drainage
Maintenance Item:	Long Stop Condition – Piped drainage system combining detailed inspection with CCTV or other inspection to identify the condition of pipework etc.
Maintenance Activity:	Drainage Maintenance
Frequency:	1 per 10 years 10% per year Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X			X					X				X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance. Consider negotiating access rights from off the network with adjacent land owners

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	39
Maintenance Activity Area:	Drainage
Maintenance Item:	Long Stop Condition – Piped drainage system combining detailed inspection with CCTV or other inspection to identify the condition of pipework etc. (Central Reserve)
Maintenance Activity:	Drainage Maintenance
Frequency:	1 per 10 years 10% per year Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X			X					X				X				

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance. Consider negotiating access rights from off the network with adjacent land owners

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	40
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MIDAS Loops
Maintenance Activity:	Loop Failure
Frequency:	10% per year Estimated 13 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + 1-3 Lanes depending on item location Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1&2 - L3&4 depending on item location Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
				X			X						X	X			X				

Options Explained:

E-REPLACE/R-LOW_MAINT - MIDAS loops could be replaced with other technology that does not require installation in the road surface, eliminating the maintenance activity completely (but introducing a new maintenance requirement for the new equipment)

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

Recommendations:

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

ID:	41
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MIDAS Loops
Maintenance Activity:	Roadside joint failure
Frequency:	10% per year Estimated 13 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
				X				X					X	X			X				

Options Explained:

E-REPLACE/R-LOW_MAINT - MIDAS loops could be replaced with other technology that does not require installation in the road surface, eliminating the maintenance activity completely (but introducing a new maintenance requirement for the new equipment)

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

Recommendations:

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

ID:	42
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MIDAS Outstation
Maintenance Activity:	Any Other Fault (except loop failure)
Frequency:	0.001 per week Estimated 5 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
						X	X						X	X		X	X	X			

Options Explained:

R-INC_MTBF - Increase the mean time between failure of MIDAS equipment will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving MIDAS system in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

I-OFF-NET - The MIDAS equipment could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

ID:	43
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MIDAS Outstation
Maintenance Activity:	MIDAS equipment Failure
Frequency:	0.0001 per week Estimated 1 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
						X	X						X	X		X	X	X			

Options Explained:

R-INC_MTBF - Increase the mean time between fail of MIDAS equipment will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving MIDAS system in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

I-OFF-NET - The MIDAS equipment could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Utilising equipment/components that are quickly and easily replaceable will reduce the time taken to perform the maintenance activity

I-OFF-NET - The MIDAS equipment could be installed where off network access if available so this maintenance activity does not require any TM on the motorway

ID:	44
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	MIDAS Outstation
Maintenance Activity:	Statutory Electrical testing & Calibration & Battery Replacement
Frequency:	1 per Year Estimated 22 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X								X			X	X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combined with any other maintenance activity that is scheduled to take place by the equipment item.

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I_OFF-NET - Subject to constraints on loop feeder and communications link consider whether outstation cabinets can be located where off network access is available to reduce need for TM to support this activity.

C-ACC_BAY - Having a maintenance access area could mean that maintenance does not require any TM - Having a maintenance access area could mean that maintenance does not require any TM

Recommendations:

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	45
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MS3
Maintenance Activity:	Any Other Fault
Frequency:	0 per week Estimated 0 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X			X	X		X	X	X			

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_MTBF - Increase the mean time between fail of MS3 will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving a MS3 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults allowing AMI to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace MS3 with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The equipment cabinets could be installed where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving a MS3 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults allowing AMI to be fixed in less visits/TM

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	46
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MS3
Maintenance Activity:	Faults requiring access to equipment at height
Frequency:	0.01 per week Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E-REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X	X		X	X			X		X		

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults and potentially fixed faults without the need for a site visit.
R-INC_MTBF - Increasing the mean time between fail of MS3s will reduce the number of faults experienced on the network.
R-INC_TTF - Increasing the time to fix (Leaving a MS3 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities
R-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults allowing MS3 to be fixed in less visits/TM
R-TOLLERANCE - Change the failure criteria (QTY of LEDs not working etc...) will extend the time before the MS3 requires repair.
I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity
I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.
I-EASY-REPLACE - Utilising easy replace MS3 with reduce the amount of time performing the maintenance activity.
C-ACC_GANT - Utilising accessible gantries will remove the requirement for use of high access vehicles (cherry pickers etc...) A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults and potentially fix faults without the need for a site visit.
R-INC_TTF - Increasing the time to fix (Leaving a MS3 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM
R-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults allowing AMI to be fixed in less visits/TM
I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	47
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MS3
Maintenance Activity:	Faults requiring an out station replacement
Frequency:	0.003 per week Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E-REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X	X		X	X		X	X	X			

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults and potentially fixed faults without the need for a site visit.

R-INC_MTBF - Increasing the mean time between failure of MS3 outstations will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving MS3 outstations in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other TM

R-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults allowing MS3 to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace MS3 outstation components with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The equipment cabinets could be installed where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving a MS3 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on MS3 to remotely identify faults allowing AMI to be fixed in less visits/TM

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-OFF-NET - The equipment cabinets could be installed where off network access is available so this maintenance activity does not require any TM on the motorway

ID:	48
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	MS3
Maintenance Activity:	Statutory electrical testing. (bulb/lamp checks annually with electrical test OR reactive issues when reported)
Frequency:	1 per Year Estimated 12 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E-REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X						X		X				X		X		

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place on that gantry

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

R_REMOVE - Remove/reducing MS3 that are no longer required will reduce the number of items this maintenance activity is required for.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

C-ACC-GANT - Having accessible gantries will remove the requirement to use vehicles that allow access at heights.

Recommendations:

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

R_REMOVE - Remove/reducing MS3 that are no longer required will reduce the number of items this maintenance activity is required for.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	49
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MS4
Maintenance Activity:	Any Other Fault
Frequency:	0.004 per week Estimated 12 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X			X	X		X	X	X	X		

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults and potentially fixed faults without the need for a site visit.

R-INC_MTBF - Increase the mean time between failure of MS4 will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving a MS4 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults allowing MS4 to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace MS4 with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The equipment cabinets could be installed where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

C-ACC_GANT - Utilising accessible gantries will remove the requirement for use of high access vehicles (cherry pickers etc...) A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults and potentially fixed faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving a MS4 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults allowing MS4 to be fixed in less visits/TM

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	50
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MS4
Maintenance Activity:	Faults requiring access to equipment at height
Frequency:	0.08 per week Estimated 225 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E-REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X	X		X	X			X		X		

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults and potentially fix faults without the need for a site visit.

R-INC_MTBF - Increasing the mean time between failure of MS4s will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving a MS4 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other maintenance activities

R-REMOTE_DI - Remote diagnostics can be used on MS4s to remotely identify faults allowing MS4 to be fixed in less visits/TM

R-TOLLERANCE - Change the failure criteria (QTY of LEDs not working etc...) will extend the time before the MS4 becomes requires repair.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace MS4 with reduce the amount of time performing the maintenance activity.

C-ACC_GANT - Utilising accessible gantries will remove the requirement for use of high access vehicles (cherry pickers etc...) A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults and potentially fixed faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving a MS4 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults allowing MS4 to be fixed in less visits/TM

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	51
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	MS4
Maintenance Activity:	Faults requiring an out station replacement
Frequency:	0.02 per week Estimated 58 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X	X		X	X		X	X	X			

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults and potentially fixed faults without the need for a site visit.

R-INC_MTBF - Increasing the mean time between failure of MS4 outstations will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving MS4s in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in with other TM

R-REMOTE_DI - Remote diagnostics can be used on MS4 outstations to remotely identify faults allowing MS4 to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace MS4 outstation components with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The equipment cabinets could be installed off network or off network access if available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults and potentially fixed faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving a MS4 in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on MS4 to remotely identify faults allowing MS4 to be fixed in less visits/TM

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-OFF-NET - The equipment cabinets could be installed off network or off network access if available so this maintenance activity does not require any TM on the motorway

ID:	52
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	MS4
Maintenance Activity:	Statutory electrical testing. (LED panel checks annually with electrical test OR reactive issues when reported)
Frequency:	1 per Year Estimated 19 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X								X				X		X		

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place on that gantry

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

C-ACC-GANT - Having accessible gantries will remove the requirement to use vehicles that allow access at heights.

Recommendations:

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	53
Maintenance Activity Area:	Fault Maintenance
Maintenance Item:	NRTS
Maintenance Activity:	All Faults
Frequency:	1 per quarter Estimated 24 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E-REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
			X			X	X			X			X	X		X	X	X			

Options Explained:

E-REMOTE_DI - Remote diagnostics can be used on NRTS to remotely identify faults and potentially fixed faults without the need for a site visit.

R-INC_MTBF - Increase the mean time between failure of NRTS will reduce the number of faults experienced on the network.

R-INC_TTF - Increasing the time to fix (Leaving a NRTS in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on NRTS to remotely identify faults allowing MS4 to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace NRTS with reduce the amount of time performing the maintenance activity.

I-OFF-NET - The equipment cabinets could be installed where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

E-REMOTE_DI - Remote diagnostics can be used on NRTS to remotely identify faults and potentially fixed faults without the need for a site visit.

R-INC_TTF - Increasing the time to fix (Leaving a NRTS in a 'faulty' state for longer) may reduce the TM requirements if the maintenance activity can be scheduled in within other TM

R-REMOTE_DI - Remote diagnostics can be used on NRTS to remotely identify faults allowing MS4 to be fixed in less visits/TM

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to components will provide quick and easy access for maintenance reducing the time spent performing the maintenance activity

I-SHARE_TM - The maintenance activity could be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY-REPLACE - Utilising easy replace NRTS with reduce the amount of time performing the maintenance activity.

ID:	54
Maintenance Activity Area:	Routine Maintenance
Maintenance Item:	NRTS
Maintenance Activity:	Statutory Electrical testing
Frequency:	1 per Year Estimated 26 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X								X			X	X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I_OFF-NET - The item could be located where off network access is available so this maintenance activity does not require any TM on the motorway

C-ACC_BAY - Having a maintenance access area could mean that maintenance does not require any TM

Recommendations:

1. E-ELIMINATE / R-EXTEND - The statutory requirement for this maintenance activity should be challenged to confirm if this is valid for roadside equipment. This could result it the requirement being removed or the time period between inspections been extended.
Note: This would have wider impact to all roadside equipment that has this requirement (both for MM and none MM roads)

2. E-OFF_NET - Relocating the equipment off the network will remove any requirement for TM to be installed on the motorway to perform this activity

3. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

ID:	55
Maintenance Activity Area:	Paved Area
Maintenance Item:	Paved Areas - Long Stop Condition
Maintenance Activity:	Annual Inspections of Motorways
Frequency:	1 per year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X												X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	56
Maintenance Activity Area:	Paved Area
Maintenance Item:	Paved Areas - Long Stop Condition
Maintenance Activity:	Detailed inspection
Frequency:	Adhoc Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + 1-3 Lanes depending on item location Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1&2 - L3&4 depending on item location Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X												X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

The AMOR introduces a risk based assessment so the recommendation would be to:
R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

ID:	57
Maintenance Activity Area:	Drainage
Maintenance Item:	Pumps and valves and penstocks
Maintenance Activity:	Drainage Maintenance
Frequency:	2 per year Estimated 24 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X			X					X				X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance. Consider negotiating access rights from off the network with adjacent land owners

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance. Consider negotiating access rights from off the network with adjacent land owners

ID:	58
Maintenance Activity Area:	Road Markings
Maintenance Item:	Road Markings
Maintenance Activity:	Replacement (HS & L1)
Frequency:	10% per year Estimated 7 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X												X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years
R-LOW-MAIN - Use longer lasting materials to reduce frequency of interventions.
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

R-LOW-MAIN - Use longer lasting materials to reduce frequency of interventions.

ID:	59
Maintenance Activity Area:	Road Markings
Maintenance Item:	Road Markings
Maintenance Activity:	Replacement (L2 & L3)
Frequency:	10% per year Estimated 7 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X												X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years
R-LOW-MAIN - Use longer lasting materials to reduce frequency of interventions.
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

R-LOW-MAIN - Use longer lasting materials to reduce frequency of interventions.

ID:	60
Maintenance Activity Area:	Road Markings
Maintenance Item:	Road studs
Maintenance Activity:	Replacement (HS & L1)
Frequency:	10% per year Estimated 7 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X												X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years
R-LOW-MAIN - Use longer lasting materials to reduce frequency of interventions.
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

R-LOW-MAIN - Use longer lasting materials to reduce frequency of interventions.

ID:	61
Maintenance Activity Area:	Road Markings
Maintenance Item:	Road studs
Maintenance Activity:	Replacement (L2 & L3)
Frequency:	10% per year Estimated 7 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X												X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years
"R-LOW-MAIN" - Use longer lasting materials to reduce frequency of interventions.
I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

R-LOW-MAIN - Use longer lasting materials to reduce frequency of interventions.

ID:	62
Maintenance Activity Area:	Sweeping and Cleaning
Maintenance Item:	Road Surface
Maintenance Activity:	Assess condition of carriageways, verges, footways, slopes and amenity areas on All motorways and APTRs
Frequency:	1 per Year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X				X																

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place. Sweeping and Cleaning within the TM while it is set out. Litter picking on the verge could be combined with soft estate maintenance because of the need for daylight working.
R-EXTEND - The quantity of sweeping and cleaning maintenance task could be reduced. The timing of "litter blitz" may need to be delayed until the next available time slot when TM can be installed during daylight.

Recommendations:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place. Sweeping and Cleaning within the TM while it is set out. Litter picking on the verge could be combined with soft estate maintenance because of the need for daylight working.
R-EXTEND - The quantity of sweeping and cleaning maintenance task could be reduced. The timing of "litter blitz" may need to be delayed until the next available time slot when TM can be installed during daylight.

ID:	63
Maintenance Activity Area:	Sweeping and Cleaning
Maintenance Item:	Road Surface
Maintenance Activity:	Environmental amenity Index
Frequency:	1 per month Estimated 72 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X																

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place. Sweeping and Cleaning within the TM while it is set out.
R-EXTEND - The quantity of sweeping and cleaning maintenance task could be reduced

Recommendations:

Environmental Amenity Index has been/is being removed from the performance measurement, so ERIC results are no longer required

ID:	64
Maintenance Activity Area:	Winter Services
Maintenance Item:	Road Surface
Maintenance Activity:	Salting
Frequency:	Adhoc Estimated 84 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: Activity: Vehicle travelling at near traffic speed
Equivalent MM-ALR TM / Activity:	Lanes Closed: Activity: Vehicle travelling at near traffic speed
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X									X												

Options Explained:

R-NONE - The activity will continue as normal, however additional 'passes' may be required to cover all 4 lanes and depending on performance targets 1 or more vehicles may be required.

Recommendations:

Review winter maintenance plan as additional vehicles will be required.

ID:	65
Maintenance Activity Area:	Winter Services
Maintenance Item:	Road Surface
Maintenance Activity:	Snow Clearance
Frequency:	Adhoc Estimated 12 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: Activity: Vehicle travelling at lower than traffic speed
Equivalent MM-ALR TM / Activity:	Lanes Closed: Activity: Vehicle travelling at lower than traffic speed, removing snow to L1
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X									X												

Options Explained:

R-NONE - The activity will continue as normal.
The winters services plan will need to be reviewed to establish how snow will be removed for each area (as there is now no HS for it to be 'stored' in)

Recommendations:

The winters services plan will need to be reviewed as removal is not practical in the short term and so the HA would need to consider what would be acceptable - i.e. using lane 1 or lane 4 for storage

ID:	66
Maintenance Activity Area:	Road Traffic Signs
Maintenance Item:	Road Traffic Signs
Maintenance Activity:	Assess condition - All aspects
Frequency:	1 per Year Estimated 12 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X						X			X			X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near the item

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

R_REMOVE - Remove signs that are no longer required will reduce the number of items this maintenance activity is required for.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Using quick / easy replace module equipment will reduce the time spent replacing/fixing the item

C-ACC_BAY - Having a maintenance access area could mean that maintenance does not require any TM

Recommendations:

R_REMOVE - Remove signs that are no longer required will reduce the number of items this maintenance activity is required for.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	67
Maintenance Activity Area:	Road Traffic Signs
Maintenance Item:	Road Traffic Signs
Maintenance Activity:	Assess condition - Moving parts, electrical safety visual inspection
Frequency:	1 per 2 Years Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X				X						X			X			X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near the item

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

R_REMOVE - Remove signs that are no longer required will reduce the number of items this maintenance activity is required for.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-EASY_REPLACE - Using quick / easy replace module equipment will reduce the time spent replacing/fixing the item

C-ACC_BAY - Having a maintenance access area could mean that maintenance does not require any TM

Recommendations:

R_REMOVE - Remove signs that are no longer required will reduce the number of items this maintenance activity is required for.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	68
Maintenance Activity Area:	Road Traffic Signs
Maintenance Item:	Road Traffic Signs
Maintenance Activity:	Electrical testing
Frequency:	1 per 6 Years Estimated 20 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X	X	X			X						X			X			X				

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near the item

E-ELIMINATE / R-EXTEND -The requirement for statutory electrical testing came from was a result of the requirement for domestic/commercial equipment and been adopted for roadside equipment possibly without any thought to the location and use of equipment. This could be challenged to either extend or eliminate this requirement

R_REMOVE - Remove signs that are no longer required will reduce the number of items this maintenance activity is required for.

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to cables and components will provide quick and easy access to perform this activity.

I-EASY_REPLACE - Using quick / easy replace module equipment will reduce the time spent replacing/fixing the item

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

1. E-ELIMINATE / R-EXTEND - The statutory requirement for this maintenance activity should be challenged to confirm if this is valid for roadside equipment. This could result it the requirement being removed or the time period between inspections been extended.
Note: This would have wider impact to all roadside equipment that has this requirement (both for MM and none MM roads)
2. R_REMOVE - Remove signs that are no longer required will reduce the number of items this maintenance activity is required for.
3. E-COMBINE / I-SHARE_TM - Where possible this maintenance activity should be performed with other maintenance activities and/or scheduled to take place when other TM will be in place.

ID:	69
Maintenance Activity Area:	Drainage
Maintenance Item:	Soakaways, manholes, filter drains ditches
Maintenance Activity:	Drainage Maintenance
Frequency:	1 per 5 years 20% each year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X						X		X	X		X	X	X			

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

R-REMOVE / I-OFF_NET - Man holes should be removed off the network where possible or repositioned in the centre of running lanes to reduce damage caused by vehicles running on them

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-ACC_BAY - A maintenance access bay could be installed so that the maintenance activity does not require any TM on the motorway

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	70
Maintenance Activity Area:	Drainage
Maintenance Item:	Soakaways, manholes, filter drains ditches (central reserve)
Maintenance Activity:	Drainage Maintenance
Frequency:	1 per 10 years 10% per year Estimated 3 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: 2 Lane (L 3 & 2) Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: 2 Lane (L 4 & 3) Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
	X				X							X	X	X		X	X				

Options Explained:

E-COMBINE - This maintenance activity could be combine with any other maintenance activity that is scheduled to take place near by.

R-EXTEND - The time between inspection could be extended to reduce the number of visits required.

R-REMOVE / I-OFF_NET - Man holes should be removed off the network where possible or repositioned in the centre of running lanes to reduce damage caused by vehicles running on them

I-ACC_EQUIP - Utilising equipment / installation methods that allow easy access to drainage will provide quick and easy access for maintenance.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	71
Maintenance Activity Area:	Soft Estate
Maintenance Item:	Soft Estate
Maintenance Activity:	Assess condition
Frequency:	1 per 5 years 20% each year Estimated 6 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
					X			X							X		X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

R-LOW_MAINT - Using slow growing and short grass/trees will reduce the frequency of surveys

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-HARD_SURF - Putting 'hardened surface' fully to back of barrier will reduce the amount of soft estate to maintain and provide better working area for maintainers

Recommendations:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

ID:	72
Maintenance Activity Area:	Soft Estate
Maintenance Item:	Soft Estate
Maintenance Activity:	Assess condition of trees within area Network and those within falling distance of the highway boundary.
Frequency:	1 per 3 Years Estimated 2 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: Activity: walking on the verge
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity: Walking on the verge
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
					X			X			X				X		X				X

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

R-LOW_MAINT - Using slow growing, short trees will reduce the frequency of surveys

R-REMOVE - Removing/reducing the amount of trees will remove the requirement for these to be maintained.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

I-HARD_SURF - Putting 'hardened surface' fully to back of barrier will reduce the amount of soft estate to maintain and provide better working area for maintainers

C-ACC_WALK - Installing accessible walkways giving access to the whole link (i.e. around/under bridges etc..) will result in the maintainer not having to enter the motorway TM area to access the next park of the link to perform the maintenance activity

Recommendations:

R-REMOVE - Removing/reducing the amount of trees will remove the requirement for these to be maintained.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

ID:	73
Maintenance Activity Area:	Soft Estate
Maintenance Item:	Soft Estate
Maintenance Activity:	Grass cutting and landscape maintenance
Frequency:	2 per year Estimated 24 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
					X			X			X				X		X				X

Options Explained:

R-EXTEND - Extending the interval between this maintenance activity will reduce the number of activities per year.

R-LOW_MAINT - Using low grow grass will reduce the need for grass cutting

R-REMOVE - Removing/reducing the amount of grass, trees etc... will remove the requirement for these to be maintained.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities. Note need for daylight will restrict this opportunity but that litter picking has the same requirement.

I-HARD_SURF - Putting 'hardened surface' fully to back of barrier will reduce the amount of soft estate to maintain and provide better working area for maintainers

C-ACC_WALK - Installing accessible walkways giving access to the whole link (i.e. around/under bridges etc..) will result in the maintainer not having to enter the motorway TM area to access the next park of the link to perform the maintenance activity

Recommendations:

R-LOW_MAINT - Using low grow grass will reduce the need for grass cutting

R-REMOVE - Removing/reducing the amount of grass, trees etc... will remove the requirement for these to be maintained.

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities. Note need for daylight will restrict this opportunity but that litter picking has the same requirement.

ID:	74
Maintenance Activity Area:	Structures
Maintenance Item:	Structures
Maintenance Activity:	General Inspection
Frequency:	1 per 2 years Estimated 13 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X												X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

The AMOR introduces a risk based assessment so the recommendation would be to:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

ID:	75
Maintenance Activity Area:	Structures
Maintenance Item:	Structures
Maintenance Activity:	Graffiti removal
Frequency:	20% of items per year Estimated 20 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
												X		X			X				

Options Explained:

R-TOLLERANCE - Relaxing the criteria for what and when graffiti is required to be removed will reduce the requirement of this maintenance activity
I_EASY_REPLACE - use graffiti resistant, easily cleanable surfaces to reduce time taken to remove graffiti
I-SHARE_TM - The maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

I_EASY_REPLACE - use graffiti resistant, easily cleanable surfaces to reduce time taken to remove graffiti

ID:	76
Maintenance Activity Area:	Structures
Maintenance Item:	Structures
Maintenance Activity:	Principal Inspection
Frequency:	1 per 6 years Estimated 20 maintenance activities per year for sample scheme
Current TM / Activity:	Lanes Closed: HS + L1 Activity:
Equivalent MM-ALR TM / Activity:	Lanes Closed: L1 + 2 Activity:
Comments:	

REGULATORY REQ	E-COMBINE	E-ELIMINATE	E- REMOTE_DI	E-REPLACE	R-EXTEND	R-INC_MTBF	R-INC_TTF	R-LOW-MAINT	R-NONE	R-REMOTE_DI	R-REMOVE	R-TOLERANCE	I-ACC_EQUIP	I-EASY_REPLACE	I-HARD_SURF	I-OFF_NET	I-SHARE_TM	C-ACC_BAY	C-ACC_GANT	C-ACC_LOW	C-ACC_WALK
X					X												X				

Options Explained:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.

Recommendations:

The AMOR introduces a risk based assessment so the recommendation would be to:

R_EXTEND - Extending the interval between this maintenance activity will result in an overall reduction in the maintenance activity over several years

and additionally to:

I-SHARE_TM - As this is a known requirement, the maintenance activity can be scheduled to be performed so that it shares TM with other maintenance activities.