

Maintenance Requirements Plan: Area 4



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[Part 0] Document Structure

This Maintenance Requirements Plan has been developed to address the requirements of AMOR V1.15 (Part 0, page 15) in the context of the Area 4 Asset Support Contract. Where we have Major Projects on the network this MRP will not apply, please refer to relevant DLOA (Detailed Local Operating Agreement).

The following table sets out those requirements and where each is addressed.

	Requirement	Section / Document Reference
1	Details of sources of information about condition data, including the identification of asset data gaps and a mitigation approach.	Part 6, detailed for each maintenance requirement
2	The Provider's risk-based Processes and Procedures for Inspection and Make Safe and Repair including taking into account the Employer's requirements covered in the key operational processes described above (AMOR Section 0).	Parts 2 & 3, showing where these elements are covered in our quality plan
3	Detail of risk assessments of the Area Network (refer to Identify Maintenance Requirements Sub-process in Annex 24 of the Service Information - Quality Plan Framework) and assumptions made about categorisation and prioritisation of Defects.	Part 5 for our safety inspections and Part 6 and each maintenance requirement
4	Programme of Inspections	Available on our Integrated Area Programme, via IBMS+
5	Response and Repair timescales covering Defect identification, verification, response and repair. Defects and repairs will be recorded in accordance with the Asset Data Management Manual (ADMM).	Part 4, with any exceptions recorded against the specific maintenance requirement and ADMM.
6	How work is packaged to minimise network occupancy (including road space booking requirements, TM requirements and Temporary Traffic Regulation Orders).	Available in the Network Occupancy Plan, via IBMS+
7	Hold points with release mechanisms specific to each Maintenance Requirement.	Available on our Integrated Area Programme, via IBMS+
8	Details of planned preventative maintenance including programme, who is going to undertake the work, frequency of operations, timescales. The same level of detail is required for activities undertaken by Provider's suppliers.	Available on our Integrated Area Programme, via IBMS+
9	The plan is a 'live document' and must be updated accordingly. The current version of the MRP is held on IBMS+ under Processes 2.02 – Identify Maintenance Requirements, 3.01 – Develop Maintenance Requirements and 4.01 – Deliver Maintenance Requirements.	
10	MRP Hold Point: The Provider must prepare and submit the Maintenance Requirements Plan in accordance with Part 0 of the AMOR prior to the start of the next financial year.	

Release Mechanism: Written acceptance by the Service Manager of the Maintenance Requirements Plan.

[Part 1] Our overall approach to the risk-based execution of inspections and maintenance in accordance with AMOR

The features of our approach achieve effective management of the primary risks which we are required to identify, assess, evaluate and manage (risks to the safety and availability of the network), as well as the provider outcomes and provide the Employer with a special defence under section 58 of the Highways Act.

The risk-based approach required by AMOR is key to the delivery of the ASC. Our approach is designed to ensure a consistent interpretation and delivery of the risk-based approach. Our approach to the AMOR risk-based execution of inspections, maintenance and operations is illustrated in the Risk Management cycle below:



Alignment with AMOR Part 0 is achieved by implementing these tasks within our sub-processes and procedures within our quality management system, IBMS+. Our planned activities are documented in this Maintenance Requirements Plan through the Integrated Area Programme and the evidence of our activities being completed successfully and on time will be stored in IAM IS.

The following table sets out detail of the activities of the risk management cycle and shows in which of the Annex 24 sub-processes they occur.

Task 1: Maintain Network Intelligence	NN-MR-00 Identify Maintenance Requirements, NN-AM-00 Asset Management
Up to date network intelligence in accordance with our Watchman Plan under process 2.05, underpins an effective risk-based approach. It is this intelligence on which risks are assessed and controls are developed. All staff and the wider team (Highways England, Collaboration Hub, RTMC, Supply Chain) have a role to play in maintaining the intelligence, for example through the submission of Watchman Cards via the APP or any other intelligence that is then transferred to watchman mal box.	
Task 2: Understand Network Character	NN-MR-00 Identify Maintenance Requirements
A clear understanding of the character of the network is needed to accurately evaluate the risks. Defined Maintenance and Operations (M&O) routes ensure that local variations in the nature of the routes are considered when assessing risks and controls. Each route has been assigned an Area Maintenance Supervisor who will be responsible for the maintenance and appearance of their route.	

Task 3: Assess Network Risks and Identify Risk Controls (Safety Inspections)	NN-AC-00 Inspect Asset Condition
<p>To ensure the safety of the road user and to maximise the availability of the network, we have developed a regime of safety inspections. This takes into account the character of the route, traffic flows and other key risks including the levels of flooding and pothole history. In some cases, the inspection frequency is increased from accepted levels used in the Routine and Winter Service Code to better manage the risks to the road user. These are set out in part 5 of this plan.</p>	
Task 4: Assess risk to asset and identify risk controls (Service Inspections and Planned Maintenance)	NN-AC-00 Inspect Asset Condition, NN-MR-00 Identify Maintenance Requirements
<p>Risks to the asset will be managed through a combination of timely service inspections to evaluate the asset condition and using a programme of planned preventative maintenance. The frequency of both the inspection and maintenance activities has been evaluated for each M&O route, which ensures that specific risks such as a particular drainage issue or deterioration associated with an ageing pavement are addressed. These are set out in part 6 of this plan.</p>	
Task 5: Prioritise Asset Inspection and Maintenance Activities	NN-AC-00 Inspect Asset Condition, NS-DMRP-00 Develop Maintenance Requirements Plan
<p>Our Area Maintenance Managers and our Asset Inspection Manager will maintain a programme of inspections and maintenance activities as documented in the MRP, which will be incorporated in the Integrated Area Programme (IAP), alongside all other planned activities on the network. They will prioritise and target activities to ensure that key risks are addressed in their areas, for example ensuring amenity grassland areas are maintained, or drainage is cleared in advance of forecast rain. They will ensure that all of these decisions are captured in accordance with process 3.01 Develop Maintenance Requirements Plan.</p>	
Task 6: Deliver asset Inspection and Maintenance Activities	NN-AC-00 Inspect Asset Condition, DS-DMR-00 Deliver Maintenance Requirements
<p>The planned, prioritised inspection and maintenance activities are carried out in accordance with the accepted MRP and all actions undertaken are recorded in IAM IS (or the appropriate Annex 6 system.)</p>	
Task 7: Control Defects	DS-DMR-00 Deliver Maintenance Requirements
<p>Defects will be repaired in accordance with the response times and actions in the MRP (Part 4). Our preferred approach is to use a permanent repair to eliminate the need for return visits to site. This is a safer method of working for our road workers and reduces disruption for road users. Defects will be reported, and repairs recorded through IAM IS.</p>	
Task 8: Demonstrate Compliant Delivery	NN-AC-00 Inspect Asset Condition, DS-DMR-00 Deliver Maintenance Requirements

Compliance with our accepted MRP is measured and reported monthly through CPF scores. Additionally, our Inspection & Maintenance Assurance Officer provides additional confidence to Highways England by undertaking independent verification of completed inspection and maintenance activities

Task 9: Validate Risk Controls

NN-AC-00 Inspect Asset Condition, DS-DMR-00 Deliver Maintenance Requirements

Following completion of inspection and maintenance activities, we review their effectiveness in managing the identified risks. The risks documented in MRP will be used to assess if our activities have been effective, part of the review in accordance with process 3.01 Develop Maintenance Requirements Plan.

Task 10: Adjust Risk Controls

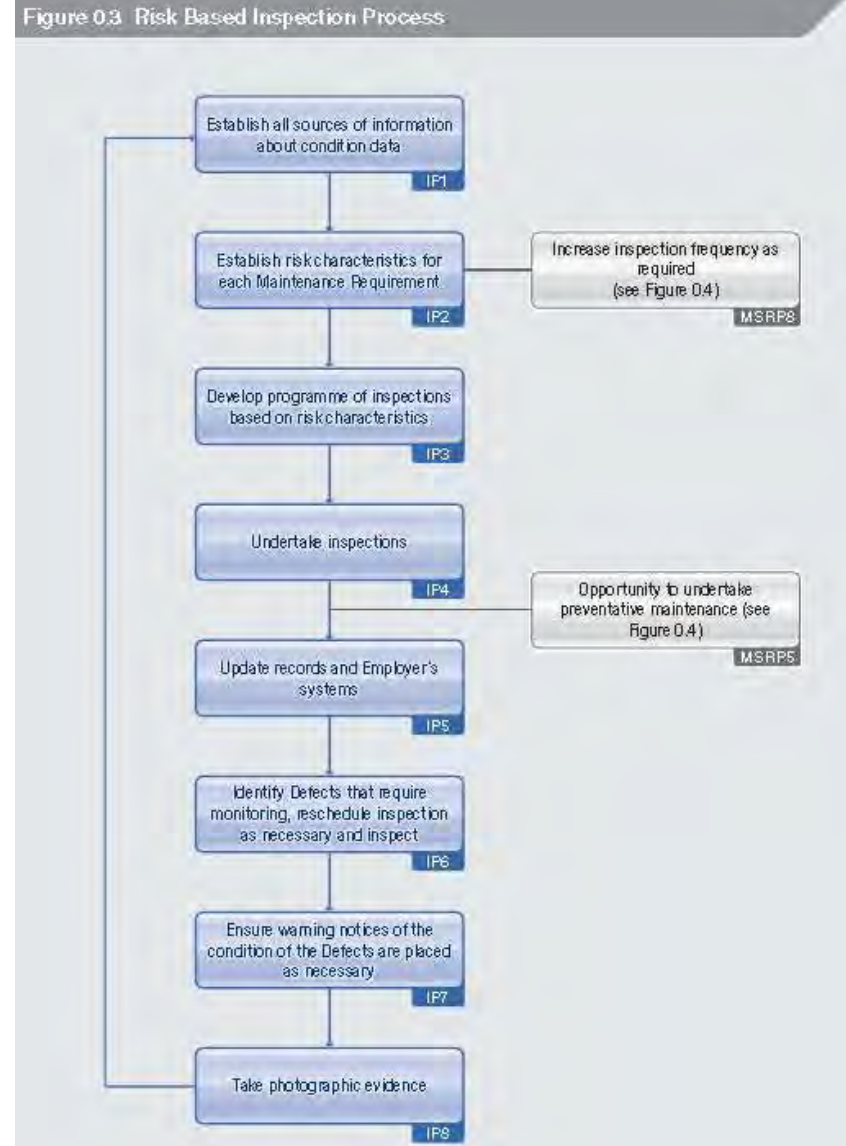
NN-AC-00 Inspect Asset Condition, NS-DMRP-00 Develop Maintenance Requirements Plan

Where our risk controls require updating to reflect the needs of the network, adjustments will be made to ensure that risks are managed going forward. This adjustment can be made at any time as the need emerges and the process controls will be used to ensure that all changes to the Maintenance Requirements are captured and accepted.

[Part 2] How we have adopted the risk-based inspection process in AMOR Part 0 (page 8) as part of our approach

The table below shows how the activities within the AMOR inspection process have been adopted as part of our risk-based approach within our process designs for: NN-AC-00 Inspect Asset Condition (IAC), NN-MR-00 Identify Maintenance Requirements (IMR), DS-SMRP-00 Develop Maintenance Requirements Plan and DS-DMR-00 Deliver Maintenance Requirements (DMR). IP Activities below links to the activities in AMOR part 0 page 8 (shown to the right)

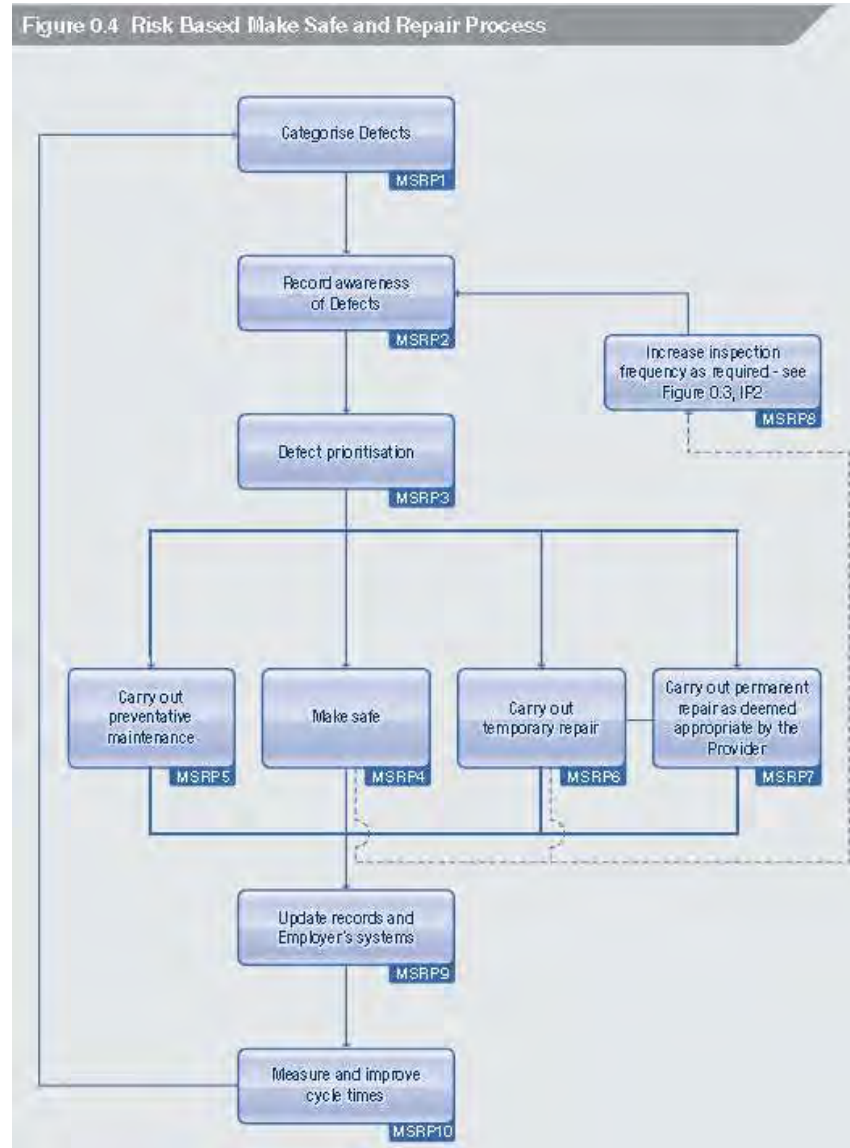
IP Activity	Annex 24 Process and Activity Reference
IP1	2.01 IAC activities 6 and 7
	2.02 IMR activity 2
	2.04 AM activity 14, GAP Analysis Report and Asset Data Improvement Plan
IP2	2.01 IAC activity 8
	2.02 IMR activity 5
	2.04 AM activity 15, Asset Management Plans and NN-AM-P03 and NN-AM-P04
IP3	2.01 IAC activities 1
IP4	2.01 IAC activity 5
IP5	2.01 IAC activity 6
	4.01 DMR activities 9 and 16
IP6	2.01 IAC activities 4, 6 and 7
	Asset Management Plans and NN-AM-P03, NN-AM-P04
IP7	4.01 DMR activity 7
IP8	2.01 IAC activity 5



[Part 3] How we have adopted the risk based make safe and repair process in AMOR Part 0 (page 10) as part of our approach

The table below shows how the activities within the AMOR make safe and repair process have been adopted as part of our risk based approach within our process designs for: NN-AC-00 Inspect Asset Condition (IAC), NN-MR-00 Identify Maintenance Requirements (IMR), NN-AM-00 Asset Management (AM), DS-SMRP-00 Develop Maintenance Requirements Plan and DS-DMR-00 Deliver Maintenance Requirements (DMR). Make Safe and Repair Process (MSRP) Activity links to the activities in AMOR part 0 page 10, shown to the right.

MSRP Activity	Annex 24 Process and Activity Reference
MSRP1	IMR activity 5
MSRP2	IAC activity 5
MSRP3	IAC activity 6
	DMR activity 3 and 4
MSRP4	DMR activities 5, 6 and 7
MSRP5	DMR activities 5, 6 and 7
MSRP6	DMR activities 5, 6 and 7
MSRP7	DMR activities 5, 6 and 7
MSRP8	IAC activities 8 and Asset Management Plans with NN-AM-P03 & P04
MSRP9	DMR activity 9
MSRP10	DMR activity 10



[Part 4] Defect Identification, Assessment and Response

A key function of our safety and service inspections is the safe and effective identification and categorisation of defects (as defined in AMOR) on the network. We will distinguish defects as either safety defects (those which present an immediate risk to the users of the network or place the Minister for Transport in a breach of one or more of his statutory duties) or service defects (all other defects).

For each maintenance requirement we have identified the types of defect which may occur, the risk this presents and the appropriate response. We will classify these as either safety or service defects. For each defect we have established a time scale for our response. A response to a safety defect will have an initial ‘make safe’ response to mitigate the immediate risk followed by a repair. The make safe action and the repair action could be additional maintenance type work, such as cleaning a gully, or it could involve placing a hazard warning sign or undertaking a repair to the asset.

Where a temporary repair is deemed necessary, our Area Works Managers will monitor the site and agree changes to the inspection frequency as necessary with the Asset Inspection Manager. Where a change to the accepted maintenance frequency is justified, permission to update the frequency and programme will be sought from the Service Manager in accordance with the change control mechanisms in 3.01 Develop Maintenance Requirements Plan. Our Maintenance Sub-processes (2.02 Identify, 2.04 Asset Management, 3.01 Develop and 4.01 Deliver) have been designed to allow our teams scope to deliver preventative maintenance in accordance with the programme, whilst retaining sufficient autonomy to react to emerging issues.

For defects which are not described above (Service defects), we will distinguish those which need attending to and those which should be monitored and resolved as and when an opportunity presents with two different categories. Where a service defect does require action (historically referred to as a Cat 2.1 defect), we will address these within 6 months of identification if they cannot be resolved by planned works (scheme) at that location. A service defect which is superficial (does not change the characteristic or function of the asset) will be monitored (and if required, re-categorised and a repaired as appropriate).

If the defect is not on a Highways England asset, we will report it to the asset owner for rectification within 24 hours of identification. If the defect on a 3rd party asset is a Safety defect, we will treat it as required to keep the network safe and open.

Unless otherwise stated, the defect make safe and repair periods for all safety (Cat 1) and service (Cat 2) defects will be in line with this table and repairs recorded in accordance with the ADMM. Exceptions are stated in the specific maintenance requirements (Part 5).

Defects will be identified by those trained to do so and will be recorded in accordance with the ADMM. Where a suspected defect is reported, it will be passed to a trained resource to assess and categorise accordingly. Feedback will be provided to those who report defects as to the categorisation and justification.

Defect Response and Repair Timescales	
Safety Defect	
Make Safe	Immediately, or as soon is as reasonably practicable, but no longer than 24 hours after identification
Permanent Repair	28 days
Service Defect	
Service Defect (H)	6 months, unless included in a funded scheme for repair.
Service Defect (L)	To be repaired as part of a scheme

[Part 5] Our area specific risk-based approach to assessing Network risks and identifying risk controls: Safety inspections

Our approach to assessing network risks aligns with AMOR by considering Network character together with the primary risks of Network safety and availability. Central to our approach is to ensure Highways England is provided with a ‘special defence’ under the Highways Act (1980). To achieve this, we have based our controls on a Safety inspection and Safety patrol frequency in line with the Routine and Winter Service Code (RWSC).

We have then assessed the current inspection frequencies used to provide the special defence under the RWSC frequencies against Network character, using the criteria below. The following tables show our methodology and assumptions, a summary of the proposed changes and our quantitative risk assessment. Our quantitative table shows where we propose a change in inspection frequency.

58	<p>Special defence in action against a highway authority for damages for non-repair of highway.</p> <p>(1) In an action against a highway authority in respect of damage resulting from their failure to maintain a highway maintainable at the public expense it is a defence (without prejudice to any other defence or the application of the law relating to contributory negligence) to prove that the authority had taken such care as in all the circumstances was reasonably required to secure that the part of the highway to which the action relates was not dangerous for traffic.</p> <p>(2) For the purposes of a defence under subsection (1) above, the court shall in particular have regard to the following matters:—</p> <ul style="list-style-type: none"> (a) the character of the highway, and the traffic which was reasonably to be expected to use it; (b) the standard of maintenance appropriate for a highway of that character and used by such traffic; (c) the state of repair in which a reasonable person would have expected to find the highway; (d) whether the highway authority knew, or could reasonably have been expected to know, that the condition of the part of the highway to which the action relates was likely to cause danger to users of the highway; (e) where the highway authority could not reasonably have been expected to repair that part of the highway before the cause of action arose, what warning notices of its condition had been displayed; <p>but for the purposes of such a defence it is not relevant to prove that the highway authority had arranged for a competent person to carry out or supervise the maintenance of the part of the highway to which the action relates unless it is also proved that the authority had given him proper instructions with regard to the maintenance of the highway and that he had carried out the instructions.</p> <p>(3) This section binds the Crown.</p>
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Safety Risk Indicator	Risk description	Measure
Network character	In accordance with Section 58 of the Highways Act (1980), we have considered the ‘character of the highway, and the traffic which was reasonably to be expected to use it’ and intelligence from HE route-based strategies to divide the Network into routes.	Type of route and traffic flow
Susceptibility to Barrier Strikes	This reflects the frequency of barrier strikes (data available on GIS). By considering the amount of barrier per route, we ensure the indicator is not skewed by longer routes with less barrier or shorter routes with longer lengths of barrier.	Barrier Safety defects per km of barrier.
Susceptibility to Carriageway Failure	This indicator gives an increased weighting to surfacing safety defects (data available on GIS) where fewer lanes are available, for example a single carriageway. This is a key measure due to safety, the potential to damage vehicles and their high profile with customers.	Number of surfacing safety defects (potholes) per lane km
Susceptibility to Flooding	Flooding is frequently associated with injury accidents on the network and indicates vulnerability to severe weather (e.g. heavy rain).	Floods per route km
Susceptibility to Unplanned Closures	This measure considers the number of recorded unplanned closures on the route over a 12-month period.	Duration of unplanned closures \ carriageway km

Route breakdown	Route type	Route category (TRMM Vo 2)	Inspection frequency	Reason for frequency
A2 London - Canterbury - Dover (Faversham - Dover)	Dual and single carriageway APTR	B	W	CRCP with known failures
A2 London - Canterbury - Dover (M25 - Rochester)	Dual carriageway APTR	A	D, W	Continuation of motorway standard, high traffic volume
A20 London - Maidstone - Dover	Dual carriageway APTR	B	W	High HGV volume
A2070 Romney Marsh to Ashford	Dual and single carriageway APTR	C	4W	Rural road network, comparatively low traffic volume for APTR
A21 London – Hastings Area 4: M25 to Hastings Bdy Please see exception below	Dual and single carriageway APTR	C	4W	Local commuter route with limited alternatives for traffic, high customer impact
A21 Vauxhall interchange to Morley's interchange	Dual carriageway APTR	C	2W	Increased over this dual section due to thin surfacing on structures, defective joints and increased defects.
A23 London – Brighton Area 4: A25 to A27	Dual carriageway APTR	B	W	Continuation of motorway but upgrades are fairly new
A23 London - Brighton (Gw Spur)	Dual and single carriageway APTR	A	D	Continuation of motorway standard, link with Gatwick Airport – high stakeholder impact
A249 Sheerness – Maidstone Area 4: Stockbury area only	Single carriageway APTR	C	4W	Roundabout section and links to motorway
A259 Folkestone - Chichester	Single carriageway APTR	C	4W	Rural road network, comparatively low traffic volume for APTR
A26 Maidstone – Newhaven Area 4 Lewes to Newhaven	Dual and single carriageway APTR	C	4W	Rural road network, comparatively low traffic volume for APTR

Route breakdown	Route type	Route category (TRMM Vo 2)	Inspection frequency	Reason for frequency
A27 Pevensey - Newton (Chichester - Lancing)	Dual carriageway APTR	B	W	Local commuter route with limited alternatives for traffic, through residential areas, high customer impact
A27 Pevensey - Newton (Havant - Chichester)	Dual carriageway APTR	B	W	Local commuter route with limited alternatives for traffic, through residential areas, high customer impact
A27 Pevensey - Newton (Lancing to Lewes)	Dual and single carriageway APTR	B	W	Local commuter route with limited alternatives for traffic, through residential areas, high customer impact
A27 Pevensey - Newton (Lewes - Pevensey)	Dual carriageway APTR	C	4W	Local commuter route with limited alternatives for traffic, through residential areas, high customer impact
M2 London - East of Faversham	Motorway	A	D, W	Motorway, high traffic volumes, high customer and stakeholder impact, ageing network in places
M20 Mid-Kent Motorway	Motorway	A	D, W	Motorway, high traffic volumes, high customer and stakeholder impact, ageing network in places, Concrete section showing defects.
M23 London – Crawley	Motorway	A	D, W	Motorway, high traffic volumes, high customer and stakeholder impact, link from M25 to Gatwick

Note: Inspection frequency is for either a Safety Inspection or a Safety Patrol.

Safety patrols are carried out 6 days a week on category A routes and comprise inspection of Trafficked Paved Areas, Road Restraint Systems and obscured signs ONLY (e.g. covered by vegetation or hidden some way).

Key:

D = Daily

W = Weekly

2W = Every 2 weeks

4W = Every 4 weeks

Route	AADF (one-way 24hr)	HGV (%>6.6m)	Class of Route			Barriers	Potholes	Floods
			M'way	Dual APTR	Single APTR	Safety defects per km Asset	Potholes per km of Route	Floods per km of Route
A2	96649	13		X	X	0.00181597	7.82	0.11
A20	14316	21.8		X		0.00151807	7.87	0.52
A2070	6735	5.9		X	X	0.0005242	3.69	0.00
A21	20794	7.5		X	X	0.0009256	5.87	0.08
A23	38226	6.4		X		0.00124357	2.80	0.41
A249	24421	13.1		X		0	43.89	0.00
A259	15861	4.7		X	X	0.004422	12.73	0.19
A26	7680	9.1			X	0	12.62	0.00
A27	33147	7.5		X	X	0.00094907	6.04	0.28
M2	50008	13.7	X			0.00149969	15.73	0.14
M20	60521	19	X			0.00165429	9.31	0.18
M23	65655	6.8	X			0.00164404	4.26	0.59

Data Source IAMIS March 2018

The following table summarises the rationale behind the changes to the inspection frequency from the RWSC

Route	Change	Justification
A23 London to Brighton (Gatwick Spur)	inspection frequency increased from category B to A	The smooth running of this link is key to the operation of the airport; therefore, we will inspect this daily, allowing us to pre-empt issues such as accumulation of litter or the formation of potholes.
A27 Pevensey – Newton (Chichester – Lancing)	inspection frequency increased from category C to B	The character of this route with its relatively high traffic and susceptibility to flooding justifies an increased inspection frequency to manage the risks associated with this key link.

[Part 6] Managing the Operational Requirements

In the following sections, for each maintenance requirement (AMOR parts 5-16*) we will:

- Set out the details of the information sources
- Set out the risk characteristics for each maintenance requirement, mapped against Provider Outcomes for each asset group. This assumes no controls are in place (controls will typically be inspections, maintenance and defect repair)
- Set out our risk assessment of the maintenance requirement and any specific controls. (This is in addition to network wide asset risk controls such as Watchman reporting by all members of the wider Area 4 team)
- Establish example defects, defect response and repair times for the maintenance requirement
- A Hold Point with release mechanism for each maintenance requirement to demonstrate Service Manager acceptance of the above for each maintenance requirement.

(* Note: Maintenance Requirements Parts 1-4 have their own plans incorporated in our quality system)

Our risk analysis uses our risk matrix (shown right) which considers the severity of the hazard together with the likelihood of it occurring to determine a resultant risk that could impact on the safety of the road user (S), network availability (A) and reputation (R) (to both A-one+ and Highways England). The calculated risk rating of High (H), Medium (M) or Low (L) is then attributed to either Safety, Availability or Reputation. In most cases there is an impact in more than one area. This risk assessment will be reviewed and updated as required to meet the changing needs of the network and the Employer.

Risk Assessment Matrix		Hazard Severity				
		Negligible	Slight	Moderate	High	Very High
Likelihood of Occurrence	Very Unlikely	Low	Low	Low	Low	Low
	Unlikely	Low	Low	Low	Med	Med
	Possible	Low	Low	Med	Med	High
	Likely	Low	Med	Med	High	High
	Very Likely	Low	Med	High	High	High

Maintenance Requirement – Example Maintenance Requirement Structure

Scope: The system within the Area Network which removes water from trafficked surfaces, sub-layers and ... including components from the point at which water drains from paved or other areas to the outfall.

The Scope of the Maintenance Requirement, as defined in AMOR

Sources of information:

Inventory Type	Master Data Source	Condition Information
Gullies & Gully Covers	HADDMS	IAM IS

Sources of Information (Inventory and Condition)

Note: Data gaps and mitigations will be covered in the gap analysis for records and asset information as required by the service Annex 25.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic		
	Risk		
<u>Asset Group:</u> Drainage (AMOR Part 5)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes[PO]: PO 1. The drainage system is managed and maintained to minimise the risk of Flood Events on trafficked surfaces and remove standing water from trafficked surfaces. PO 2. The drainage system is managed and maintained to remove sub-surface water to enhance the longevity of paved areas and associated earthworks. PO 3. The drainage system is managed and maintained to minimise the risk of pollution to receiving water courses.		
Pipework	Sediment build up prevents water from draining effectively from trafficked surface or sub-surface [PO 1,2]	H	M

Details of the asset risk assessment and how they relate to the delivery of the provider outcomes

Route Character and Quantitative Risk Assessment:

Routes within the ASC (HAPMS Route Names)	MAC Inspection Frequency	Network character (m)					Asset risks				Assessed level of risk
		Concrete	High Friction Surface	Hot Rolled Asphalt	Surface Dressing	Thin Surfacing	Thin surface >10yrs (m)	HRA >20yrs old (m)	Network SCRIM failure (m)	Rutts >15mm	
A2 London - Canterbury - Dover (Faversham - Dover)	Annual		1697.5	37419.8		42559.7	2454.2	28828.4	210.0		
A2 London - Canterbury - Dover (M25 - Rochester)	Annual		1403.0	917.1		48791.0	11138.3	481.1	2067.8		

Quantified assessment of the route character

Service Inspection and Maintenance Frequencies:

Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Pipework	10%/year	Jetting to clear sediment causing service defects	As identified
Gullies	100%/year	Preventative Maintenance cleansing	50% every year
		Hotspot cleansing	100% every year


Service Inspection and planned maintenance to manage the identified risks

Based on the route risk assessment, the following exceptions to these frequencies will be adopted:

- Deep cleansing of the interceptors at A, B and C which have been shown to be full
- Additional gully emptying on the A27 at Lancing due to a high flooding frequency

Exceptions to those frequencies to manage specific risks

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	<p>Flooding</p> 	<p>Attend and identify cause; ensure traffic can pass safely. Where possible clear cause with hand tools (e.g. gully top). Secondary response options include deployment of additional TM and pumps. In extreme cases High-Volume Pump may be requested.</p>

Defect definitions & indicative responses. For full details of defect and condition assessment, see the IBMS training

6.1 Maintenance Requirement – Drainage

Scope: The system within the Area Network which removes water from trafficked surfaces, sub-layers and other parts of the highway asset, including components from the point at which water drains from paved or other areas to the outfall.

Sources of information:

Inventory Type	Master Data Source	Condition Information
Pipework	HADDMS	HADDMS
Gullies & Gully Covers	HADDMS	IAM IS
Catchpits	HADDMS	IAM IS
Culverts (Internal Diameter <900mm)	HADDMS	Aone server/HADDMS
Filter drain	HADDMS	IAM IS
Ditches	HADDMS	Aone server /HADDMS
Counterfort drains	HADDMS	HADDMS / HAGDMS
Grips	HADDMS	IAM IS
Outfalls	HADDMS	IAM IS
Interceptors	HADDMS	IAM IS
Flow Control Devices	HADDMS	IAM IS
Balancing Ponds	HADDMS	IAM IS
Pumps	HADDMS	IAM IS

Note: Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Drainage inventory is captured within the Drainage Asset Management Plan. Currently condition information is captured on IAMIS but following HADDMS consolidation, HADDMS will be the primary condition data source. This is covered in the Asset Data Improvement Plan.

Flood Hotspots are determined in accordance with AMM 122/10 Flood Risk Management. The definitions are as follows:

- A “Flood” is defined as the accumulation or passage of water at the ground surface where it is not normally experienced.
- A “Flood Hotspot” is defined as a location at high risk of repeated flooding

Flood hotspots and events are mapped on HADDMS and replicated on A-one+ Area 4 GIS.

Flood Hotspot Review is to be undertaken on an annual basis, refer to HADDMS. New flood events that are associated within an existing hotspot shall be checked to confirm hotspot status when the flood event is closed on HADDMS in accordance with AMM 122/10. Validation of flood hotspots is carried out in accordance with AMM122/10.

Flood hotspots will be monitored on the following risk-based approach: (Flood Hotspot Risk Status as determined in AMM122/10 and HADDMS)

Hotspot Risk Status	Inspection frequency	Maintenace Frequency	Deep Clean frequency
A1 and A	Quarterly	Clean as identified from inspection	Annually (last quarter of year following leaf drop)
B	6 monthly	Clean as identified from inspection	Annually (last quarter of year following leaf drop)
C and D	Annually	Clean as identified from inspection	Annually (last quarter of year following leaf drop)

Deep clean – emptying gullies, catchpits and flushing through pipe system, check and clean as necessary outfalls

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
<u>Asset Group:</u> Drainage (AMOR Part 5)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes[PO]: PO 1. The drainage system is managed and maintained to minimise the risk of Flood Events on trafficked surfaces and remove standing water from trafficked surfaces. PO 2. The drainage system is managed and maintained to remove sub-surface water to enhance the longevity of paved areas and associated earthworks. PO 3. The drainage system is managed and maintained to minimise the risk of pollution to receiving water courses.			
Pipework	Sediment build up prevents water from draining effectively from trafficked surface or sub-surface [PO 1,2,3]	H	M	M
Gullies & Gully covers	Debris and silting prevents gully from operating as designed [PO 1,3]	H	M	L
	Damaged Steelwork presents danger to road user	H	L	L
Catchpits Culverts	Sediment not effectively retained, leading to reduced performance of other assets in the system [PO 1,2,3]	L		
	Build-up of sediment and detritus, reducing hydraulic performance [PO 1,2]	L		L
	Build-up of debris on screens increases potential to cause flooding to 3 rd parties.			M
	Structural failure, impacting on integrity of trafficked surfaces [PO1]	M	L	L

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Filter drain, Ditches, Counterfort drains & Grips Outfalls, Interceptors, Flow Control Devices, Pumps	Build-up of sediment and detritus, especially vegetation, reducing hydraulic performance of the system [PO 1,2]	M	L	L
	Discharges not as intended due to build-up of silt or vegetation, control mechanisms not serviced effectively, increasing risk of pollution to receiving waters [PO 3]			M
Balancing Ponds	Build-up of sediment reduces capacity of the pond [PO 1,2,3]	L	L	L
	Water discharged from the pond not controlled, increasing risk of pollution to receiving waters [PO 3]			L

Route Character and Quantitative Risk Assessment:

Route	Network Character							
	Piped Drainage (m)	Gullies (no)#	Ponds (no)	Surface Channels (m)	Outfalls (no)	Catchpits(no)	Soakaways (no)	Pumping Stations
M2	150,175	2520	31	3,233	N/A	N/A	262	0
M20	192,794	3360	22	12,069	N/A	N/A	28	3
M23	27,950	846	10	6,521	N/A	N/A	8	0
A2	253,620	3365	25	9,161	N/A	N/A	214	0
A20	52,510	1076	1	8,291	N/A	N/A	209	5
A21	123,404	2637	4	55,421	N/A	N/A	24	0
A23	70,347	1533	9	34,659	N/A	N/A	24	0
A26	6,359	443	0	0	N/A	N/A	0	0
A27	140,176	4668	15	22,902	N/A	N/A	343	4
A249	2,018	6	0	0	0	N/A	1	0
A259	21,643	1476	0	266	N/A	N/A	2	0
A2070	35,399	1486	3	0	N/A	N/A	0	0
Total	1,076,395	23416	120	152,523	1716	14139	1,115	12
Data Source			On going consolidation data source					

Gully numbers are from the A-one+ GIS ongoing data project as of Nov 2018 N/A breakdown not available

Note: Titles are colour coded with regards to confidence level of asset. Red - low confidence, Amber - medium confidence, Green - high confidence

Service Inspection and Maintenance Frequencies:

Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Pipework	As identified	Jetting to clear sediment causing service defects	As identified
Gullies	100%/year	Preventative Maintenance cleansing – Non-Hotspots	50% every year
		Preventative Maintenance cleansing –Hotspots	In accordance with Flood Hotspot strategy above
Gully covers	100%/year	Swept In line with the Paved Area Highway requirement	

Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Catchpits	20%/year	Targeted cleaning based upon inspection	5% every year
Culverts	100%/year	Clean trash screens. where identified clean culvert	100% every year As identified
Filter drain	100%/year	Targeted treatment with Weed killer or hot water based treatment	Based on assessment
		Edge back overburden as required from inspection	As required
Ditches	100%/year	Targeted cleaning based upon inspection. Clear obstructions, clean inlets and outlets.	10% every year
Outfalls	100%/year	Clear and service penstocks / flaps	100% every year
Grips	100%/year	Recut	As required
Counterfort drains	100%/year	Treat with Weed killer and edge back overburden	100% every year
Interceptors	100%/6months	Oil Interceptors: Emptied as required based on inspections	As required
	100%/6months	Other Interceptors: Emptied as required based on inspections	As required
Balancing Ponds	50%/year	Sites strimmed, fencing and ancillaries serviced	100% every year
Linear Drainage (Kerb drainage units, aco or slotted type drains)	Assess during annual maintenance visits	Targeted cleaning based on assessment	As required based on assessment
Flow Control & specialist equipment (e.g. Pumps)	Specialist drainage equipment is maintained as per manufacturer's recommendations where available, or if unavailable, best practice is adopted based on similar equipment. Pumps maintenance have service agreement (six month maintenance). Penstock and flaps are maintained once a year and inspected if there is any incident around the equipment.		


Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
All – flood risk		Additional maintenance of flooding hotspots as needed (e.g. Recut grips, clear trash screens) See Flood Hotspots frequencies.	In advance of heavy forecast rain (Met Office Warning)




Note: Where we have major works on the network the above is not applicable, please refer to the relevant DLOA.

Based on the route risk assessment, the following exceptions to these frequencies will be adopted

- High Risk Routes will be prioritised for activity in advance of Forecast Heavy Rain
- Gullies, full networks gullies (100%) are inspected once a year. Frequency will be reviewed based on the findings.
- Interceptors are inspected twice a year. After any spillages within the area trigger cleaning after the incident as appropriate.
- Pumping stations will have M&O Manuals developed for them as they are not available at the point of handover
- For the flooding hotspots, the gully is inspected prior to significant severe weather forecast to prevent potential floodings.
- Flood hotspot map available via the A-one+ Area 4 GIS
- Repeated floods reported on the network are subject to an engineering visit within 28 days of the incident to ascertain the cause of the flooding and to ensure the correct remedial measures have been identified.

Indicative Defect Definitions and Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	<p>Flooding</p> 	Attend and identify cause; ensure traffic can pass safely. Where possible clear cause with hand tools (e.g. clear gully top). Secondary response options include deployment of additional TM and pumps. In extremis, the High-Volume Pump may be requested.

Defect Category	Defect Description	Indicative Response Action
Safety	Blocked Gully 	Attend and clear with hand tools if safe and possible to do so. If required, deploy gully cart.
Service (H)	Partial Blockage - Drainage function working, but compromised 	Clear when identified.
Safety	Fencing to potentially deep water missing (e.g. Pond) 	Cone extent of missing fence to make safe. Use Temporary fencing material (ski fence) or similar until permanent repair effected in accordance with Part. 6.2 Fences, Screens and Environmental Barriers.

These are indicative defects and responses. A more comprehensive list is in NN_AC_G06 Defect Guidance available on IBMS+ and HADDMS Guide: Drainage Condition Quick Assessment Method.

When further action is required a work, order is raised and will be attended by the specialist supplier to address the defect.

6.1 Maintenance Requirement Plan Hold Point (refer to page 5)

6.2 Maintenance Requirement – Fences, Screens and Environmental Barriers

Scope: All types of fences, screens and environmental barriers within the Area Network, inclusive of walls, stock proofing and wildlife fences.

- Boundary fencing – including any additions such as livestock proofing or suicide prevention mesh
- Noise barriers
- Environmental fencing - fencing designated “wildlife barrier” on Environmental Information System (EnvIS). Examples are deer fencing, badger proof fencing and rabbit proof fencing
- Anti-glare screens
- Walls classified as a type of fencing
- Other specialist fencing (e.g. fencing restricting access to balancing ponds and structures, fencing to prevent falls from strengthened earthworks)

Sources of information:

Inventory Type	Master Data Source	Condition Information
Boundary Fence	IAM IS	IAM IS
Environmental Fence	IAM IS	Envis
Noise Barrier	IAM IS	Envis
Antiglare Barrier	IAM IS	Envis

Note: Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Fencing inventory is captured within the Fencing Asset Management Plan and IAMIS.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
<u>Asset Group:</u> Fences, Screens and Environmental Barriers (AMOR Part 6):	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes [PO]: PO 1. Fences, screens and environmental barriers are safe and stable and fulfil their intended safety purpose. PO 2. Fences, screens and environmental barriers are managed to identify Defects that would adversely impact upon their intended functional purpose.			
Boundary Fence	Asset not stock proof [PO 1]	M	L	L

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Environmental Fence	Asset does not perform to its intended specification (e.g. deer fencing not preventing deer from accessing the network) [PO 1,2]	M	L	L
Noise Barrier	Sound insulation performance does not meet the level specified in BS EN1793-2 [PO 2]			L
Antiglare Barrier	Safety of traffic on adjacent network impacted by glare from traffic on area network	M		M

Route Character and Quantitative Risk Assessment:

Routes within the ASC (HAPMS Route Names)	Network character (m)						Asset risks		Route asset risk
	Boundary Fence	Environmental Fence	Noise Fence	Anti-glare fence	Wall	Other fencing	Boundary Fence Defects	Animals on network	
A2 London - Canterbury - Dover (Faversham - Dover)	31327	712	493	0	0	0	15	8	L
A2 London - Canterbury - Dover (M25 - Rochester)	18063	277	2429	0	0	100	9	6	L
A20 London - Maidstone - Dover	12282	0	254	0	652	1275	6	3	L
A2070 Romney Marsh to Ashford	18241	70	2079	211	0	0	0	5	L
A21 London - Hastings	63221	505	1458	0	7	381	8	31	M
A23 London - Brighton	2913	790	17715	211	0	2009	5	8	L
A23 London - Brighton (Gw Spur)	Figures included in A23 London - Brighton								
A249 Sheerness - Maidstone	261	0	0	0	0	0	1	0	L
A259 Folkestone - Chichester (East and West)	20938	5722	636	0	280	330	3	5	L
A26 Maidstone - Lewes	8102	0	69	0	0	357	0	1	L
A27 Pevensey - Newton (Havant - Pevensey)	72871	3079	1228	479	758	2373	12	59	L

Routes within the ASC (HAPMS Route Names)	Network character (m)						Asset risks		Route asset risk
	Boundary Fence	Environmental Fence	Noise Fence	Anti-glare fence	Wall	Other fencing	Boundary Fence Defects	Animals on network	
M2 London - East of Faversham	75996	221	1.624	4883	188	6885	78	14	H
M20 Mid-Kent Motorway	122454	1247	11936	786	0	9928	46	45	M
M23 London - Crawley	36942	6677	1873	127	11	402	7	23	M
Data Source	IAM IS						2016-2018		

Service Inspection and Frequencies:

Asset type	Road Type	Principle for inspection	Inspection frequency
Boundary fencing	Motorway	All fencing to be inspected	100% every 6 months
Boundary fencing	All-purpose trunk road	Challenge ownership where fencing is identified but ownership unconfirmed. Update records accordingly. Only inspect fencing confirmed as Highways England asset	100% every 6 months
Environmental fencing	All	Inspection of fencing confirmed as Highways England assets on EnvIS. Challenge ownership of additional fencing identified and update records	100% a year
Noise barriers	All	Inspection of fencing confirmed as Highways England assets on EnvIS. Challenge ownership of additional fencing identified and update records	100% a year
Antiglare	All	Inspection of fencing confirmed as Highways England assets. Challenge ownership of additional fencing identified and update records	100% a year
Other specialist fencing	All	Once a year or inspect fencing at the same time as the asset/reason for the fencing being required	At least 100% a year

Based on the route risk assessment, the following exceptions to these frequencies will be adopted


- No exceptions required for this maintenance requirement



Maintenance and Frequencies:



All Safety defects require a temporary repair or other works to mitigate the safety hazard within 24 hours of identification. Permanent repairs are required then within 28 days.

For Service defects (H) permanent repairs are required within six months, or as part of a funded scheme. Service defects (L) will be raised a Network Need for repair as part of a scheme in the forward programme.

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	<p>Motorway Boundary Fence no longer stock-proof</p> 	<p>Deploy TIRT to mitigate safety issue, for example erect orange mesh across fencing. Raise permanent repair on Highstone. Inform land owner to manage livestock risk.</p>

Defect Category	Defect Description	Indicative Response Action
Service (H)	<p>Broken rail but remains stock-proof.</p> 	<p>Raise permanent repair on Highstone. Incorporate works into a planned scheme if required. Monitor through planned inspections. Inform land owner to manage possible livestock risk</p>
Service (H)	<p>Failure of non-stock proofed boundary fence (no livestock in adjacent land or public access)</p> 	<p>Raise permanent repair on Highstone. Incorporate works into a planned scheme if required. Monitor through planned inspections. Mark up site. Inform land owner to manage possible livestock risk</p>

Defect Category	Defect Description	Indicative Response Action
Service (L)	<p>Aging noise barrier, outer coating with holes.</p> 	<p>Incorporate works into a planned scheme if required. Monitor through planned inspections</p>
Service (L)	<p>Missing environmental barrier</p> 	<p>Incorporate works into a planned scheme if required. Monitor through planned inspections (no safety issue). Mark up site.</p>

Defect Category	Defect Description	Indicative Response Action
Service (H)	<p>Leaning posts and loose/missing panels</p> 	<p>Raise permanent repair on Highstone. Incorporate works into a planned scheme if required. Monitor through planned inspections</p>
Service (L)	<p>Defective panels within a noise barrier not impacting safety or stability of the barrier</p> 	<p>Raise Network Need for renewal of the fence. Monitor through planned inspections.</p>

Note: all permanent repairs shall be in accordance with MCHW Volumes 1,2 and 3.

6.2 Maintenance Requirement Plan Hold Point (refer to page 5)

6.3 Maintenance Requirement – Geotechnical Assets

Scope: Geotechnical assets within the Area Network, comprising: embankments and cuttings on which the pavement and other assets are founded, and noise/landscape bunds.

Sources of information:

Inventory Type	Master Data Source	Condition Information
Embankments	HAGDMS	HAGDMS
Cuttings	HAGDMS	HAGDMS
Bunds	HAGDMS	HAGDMS
Rock slopes	HAGDMS	HAGDMS
Counterfort Drains	HADDMS	HADDMS

Note: Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Geotechnical inventory is captured within the Geotechnical Asset Management Plan and HAGDMS.

Counterfort Drains are captured primarily within HADDMS whereas built information is available. A secondary source of information is HAGDMS where identified during Geotechnical Inspections. Data Gaps have been captured in the Asset Data Gap Analysis and are included in the Geotechnical Asset Management Plan.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation ®:

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Geotechnical Assets (AMOR Part 7):	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes[PO]: PO 1. Potential Defects with geotechnical assets are identified. PO 2. Defects are managed to minimise risks to road users. PO 3. Defects are managed to minimise risk of damage to other assets.			
Embankments	Asset destabilises and negatively impacts on lane availability [PO 1,2,3]		M	L
Cuttings	Asset destabilises and negatively impacts on the structural integrity of the network [PO 1,2,3]		L	L
Bunds	Asset destabilises and negatively impacts on the structural integrity of the network [PO 1,2,3]		L	L
Rock slopes	Debris falling on to trafficked surface [PO 1,2,3]	H	L	M
Counterfort Drains	Not referenced in AMOR. Impact on slope stability due to historic lack of maintenance or identification.		L	M

To manage the Geotechnical risk to the network, the Geotechnical Asset Management Plan includes a risk based Principal Inspection regime. The assessment of risk is based on a combination of:

- Geotechnical risk level of an area or earthwork. A map of locations is included within the Geotechnical Asset Management Plan.
- Maximum traffic Annual Average Daily Traffic counts for the relevant section of road.
- Level of disruption assuming geotechnical failure closes one running lane.
- Length of diversions based on the Area 4 agreed emergency routes.
- Other issues, such as stakeholders and local action groups.

Full details are provided in the Geotechnical Asset Management Plan but extracts of the relevant sections are provided in Appendix A.

In addition to the Principal Inspections all Feature Grade 5 and 4 defects and selected higher risk grade 3 defects are inspected more frequently by Monitoring Inspections. Details of these are provided in the Geotechnical Asset Management Plan but extracts of the relevant sections are provided in Appendix A.

A summary of the HD41 Feature Grade observations for each route in Area 4 is provided in the table below. The lengths indicate defects on the geotechnical assets and lengths where the geotechnical asset is at risk.

Route Character and Quantitative Risk Assessment:

Route	Inspected length (km)	HD41 Feature Grade length (km)					Totals (km)
		1	2	3	4	5	
A2	116.710	1.862	0.643	2.045	0.144	0.000	4.694
A20	25.866	0.000	0.000	0.432	0.000	0.000	0.432
A2070	37.442	0.000	0.070	0.284	0.000	0.000	0.354
A21	117.957	1.149	0.353	0.969	0.126	0.000	2.597
A23	60.268	0.042	0.511	0.107	0.013	0.000	0.673
A249	0.087	0.000	0.000	0.000	0.000	0.000	0.000
A259	76.874	0.112	1.034	0.296	0.048	0.040	1.53
A26	15.712	0.000	0.000	0.000	0.003	0.000	0.003
A27	209.686	0.755	1.018	5.207	0.422	0.000	7.402
M2	87.139	0.008	1.78	0.091	0.002	0.000	1.881
M20	133.996	0.344	2.653	1.331	0.314	0.000	4.642
M23	44.299	2.084	0.519	1.468	0.012	0.000	4.083
Totals	926.036	6.356	8.581	12.230	1.084	0.040	28.291
% of inspected asset length	100%	0.69%	0.93%	1.32%	0.12%	0.00%	3.06%
Data Source						HAGDMS March 2018	

Note: Data taken from HAGDMS. Due to the reporting constraints of HAGDMS, the data for this maintenance requirement is shown at whole route level rather than operational route.

Service Inspection and Maintenance Frequencies:



Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Embankments	Risk based, in line with HD41 and approved Geotechnical Asset Management Plan. See Appendix A.	Maintained in line with HD41 and the Geotechnical Asset Management Plan. Note: this MRP refers to the short-term management of safety critical defects in accordance with AMOR. HD22 refers to technical approval of planned geotechnical activities. Short term mitigation of safety defects is therefore not applicable, and reporting does not apply. Planned physical works will be delivered via schemes following the requirements of HD22.	
Cuttings			
Bunds			
Rock Slopes			

Note: Counterfort Drain inspections and maintenance are covered under the Drainage Asset.

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	<p>Significant Landslip causing impacting VRS</p> 	<p>Immediate response: Protect traffic through closing affected lanes if required.</p> <p>Intermediate response: Erect temporary VRS. Increase inspection frequency</p> <p>Full repair: In accordance with scheme processes</p>

Defect Category	Defect Description	Indicative Response Action
Safety	<p>Major void in central reservation or verge</p> 	<p>Immediate response: Protect traffic through closing affected lanes if required.</p> <p>Intermediate response: Urgent investigation of void and temporary infill. Increase inspection frequency.</p> <p>Full repair: In accordance with scheme processes</p>
Service (H)	<p>Full height embankment failure not impacting other assets</p> 	<p>No immediate response. Inform Geotech team</p> <p>Raise Network need and repair in accordance with scheme processes. Increase inspection frequency.</p>

Defect Category	Defect Description	Indicative Response Action
Service (H)	<p>Minor geotechnical defect causing defects in other assets</p> 	<p>Immediate response: As required in the MRP for the non-geotechnical asset affected. Inform Geotech team</p> <p>Full repair: Raise Network need and repair in accordance with scheme processes. Increase inspection frequency</p>
Service (L)	<p>Significant areas of animal burrowing, but not affecting geotechnical asset stability or other assets</p> 	<p>No immediate response.</p> <p>Raise Network need and repair in accordance with scheme processes. Review inspection frequency</p>

6.3 Maintenance Requirement Plan Hold Point (refer to page 5)

6.4 Maintenance Requirement – Lighting

Scope: Lighting equipment within the Area Network, specifically:

- Luminaires, including their internal control electronics & electrics (including the photocell if fitted) and lamp & reflector.
- Belisha beacons and vertical wig wag signs at school or animal crossings.
- Lighting columns, including attached accessories, base or, if on a structure, mounting bracket.
- Road traffic sign lighting, including lamp, luminaire, photocell, cables, ducting.
- Other access lighting such as pedestrian walkways, cycle ways and subway lighting.
- The electrical and optical elements of tall mast lighting systems (20m or more in height) and catenary lighting systems.
- Associated electrical supplies, including ducting, chambers, cables and feeder pillars and all switch gear, control equipment (including the photocell if fitted), monitoring equipment and heaters therein.
- Alternate energy sources such as solar panels or wind turbines etc. used for the purpose of road lighting or sign lighting.
- Any energy saving equipment, i.e. midnight switch off equipment and/or dimming equipment.
- Any power distribution cables downstream of the Distribution Network Operator (DNO) connection point.

Sources of information:

Inventory Type	Master Data Source	Condition Information
Feeder Pillar	IAM IS	IAM IS
Lighting point, (columns and signs)	IAM IS	IAM IS
Cables & Ducts	Locally held information until arrival of Mayrise	Locally held information until arrival of Mayrise

Note: Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Lighting inventory is captured within the Electrical Procurement Strategy (EPS) Datasheet and Lighting Asset Management Plan. The EPS is submitted monthly in accordance with ADMM. The Lighting Asset Management Plan is revised annually.

Cable and duct inventory is currently not captured within IAM IS and has previously been supplied through Mayrise. Further details and information capture are contained within the LAMP.

In accordance with AMOR and LAMMM – A Lighting Asset Condition Report is to be produced and issued to the Service Manager following the end of each financial year. The report to provide an annual summary of inspection, routine operations and any changes to the Network.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Lighting (AMOR Part 8)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes[PO]: PO 1. Lighting does not present a hazard to the road user, road worker, or third parties. PO 2. Road lighting continues to fulfil its intended purpose as an accident reduction intervention. PO 3. Other lighting continues to fulfil its intended purpose; road traffic signs, lighting to highlight the location of a road traffic sign, gantry lighting to highlight the presence of the sign and to help read the sign, and other lighting (subway and access) to provide route guidance and hazard identification.			
Feeder Pillar, Street Lighting, Light Signs.	Electric shocks to road users, roadworkers and third parties from unmaintained feeder pillars without modern disconnection devices. [PO 1]	H		L
Lighting point	Lighting presents a hazard (e.g. column deterioration, electrically unsafe) [PO 1]	H		L
	Asset does not fulfil its safety or intended purpose (e.g. Lamp not on) [PO 2,3]	M		L
Cables and ducts	Cabling and ducting presents a hazard (e.g. electrically unsafe, localised ground subsidence) [PO 1]	M		L
	Asset does not fulfil its safety or intended purpose (e.g. Lamp not on) [PO 2,3]	M		L

Route Character and Quantitative Risk Assessment:

Routes within the ASC (HAPMS Route Names)	Network character (m)			Route asset risk
	Feeder Pillars	Street Lighting	Lit Signs	
A2 (East) London - Canterbury - Dover (Faversham - Dover)	42	928	292	M
A2 London (west) - Canterbury - Dover (M25 - Rochester)	31	888	142	L
A20 London - Maidstone - Dover	15	300	121	M
A2070 Romney Marsh to Ashford	12	321	58	L
A21 London - Hastings	37	233	157	M
A23 London - Brighton	49	1086	214	H
A23 London - Brighton (Gw Spur)	3	119	19	M
A249 Sheerness - Maidstone	3	37	33	L
A259 Folkestone - Chichester (East)	6	107	31	M
A259 Folkestone - Chichester (West)	9	273	50	M
A26 Maidstone - Lewes	1	32	4	M
A27 Pevensey - Newton (Chichester - Lancing)	48	761	263	M
A27 Pevensey - Newton (Havant - Chichester)	5	66	10	M
A27 Pevensey - Newton (Lancing to Lewes)	16	429	215	M
A27 Pevensey - Newton (Lewes - Pevensey)	14	130	54	M
M2 London - East of Faversham	33	1013	168	M
M20 Mid-Kent Motorway	43	1018	232	M
M23 London - Crawley	5	101	57	L
Total	372	7842	2120	

Data from EPS November 2018

The annual LAMP develops and implement a risk-based methodology to govern the frequency of:

- road lighting electrical testing interval (5 years desirable - 6 years maximum);
- road lighting structural inspection interval (5 years desirable starting around 15 years after installation);
- road lighting optical maintenance (bulk lamp change and lens cleaning as a minimum) - (5 years desirable minimum);
- electrical test, structural inspection & optical maintenance to be completed at least once at each site during the initial term of contract.

Re-use of lamps with more than 25% of residual design life remaining are covered within the LAMP.

Service Inspection and Maintenance Frequencies:



Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Lighting Point	In line with AMOR requirements and approved Lighting Asset Management Plan (LAMP)		
Feeder Pillar			
Cables and Ducts			



Note: The LAMP will also cover details of the Electrical Asset Safety testing required every six years.



Asset Type	Service Inspection Frequency	Inspection Strategy	Maintenance Strategy
Street Lighting lanterns	100%/month as defined in strategy	<p>Conduct Lighting Operational Performance Surveys (“scouting”) covering the Area Network in order to verify achievement of Outcomes and performance levels. Make all survey data available to the Employer.</p> <p>Execute a survey of the Area Network during the last full week of: April, August, October, November, January and February; report results to Employer by third working day of following month.</p> <p>Execute a survey of the Area Network in the five working days following the 26th of December; report results to the Employer by the tenth working day following the 26th December.</p>	<p>Make safe Defects. e.g. Isolate, remove or replace. Inspect access doors and repair as necessary</p>
Outage Repairs	100% repair by the time of the next Scout.	<ol style="list-style-type: none"> 1. Summer April to October – No more than 6 per 20 lamps, maximum number of consecutive failures. Repair deadline 7 days for both Motorways and APTRs. Failure target 2% 2. Last week in October - No more than 4 per 100 lamps out for Motorways and 1 per 24 for trunk roads. No repair deadline given, but total lamp failure. 3. Winter November to March – No more than 6 per 20 lamps, maximum number of consecutive failures. Target levels change from 2 % to 3%. Scouting to be carried out the last week in each month, report to be submitted to Highways England within the first week of the following month with the exception of December scout. Failure rectification to be carried out within 7 days. 	



Energy Saving initiatives are generated through the Renewals Programme and are reflected in the EPS submission.

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	<p>Door missing from Feeder pillar/ Street Lighting column, wires exposed.</p> 	<p>Deploy Electrical team to isolate and make safe. Provide and temporary cover for the street lighting column/ feeder Pillar until a permanent Solution is in place within required timescale.</p>
Service (H)	<p>Cable on surface</p> 	<p>Ensure it is safe and visually marked up. Identify owner and arrange for cable to be relocated</p>

Defect Category	Defect Description	Indicative Response Action
Service (H)	Maintenance access overgrown 	Clear access
Service (H)	Breach jointed cable with secondary joint. 	Deploy the Electrical Maintenance team to excavate back to main supply cable to re-join. Raise watchman to ensure replacement can be made as part of the scheme
Defect Category	Defect Description	Indicative Response Action

<p>Safety</p>	<p>Illuminated sign post rusting at key points, base, sign fixing & top.</p> 	<p>Deploy Electrical Maintenance team to make safe electrical service and remove light unit. Details passed to signs team for replacement.</p>
<p>Safety</p>	<p>Resultant cable failure within a lighting column due to a knockdown further along the electrical circuit.</p> 	<p>Deploy Electrical Maintenance team to make safe and investigate level of damage to lighting circuits.</p>
<p>Defect Category</p>	<p>Defect Description</p>	<p>Indicative Response Action</p>

<p>Safety</p>	<p>Buried underground flange plated column foundation, not visible during normal visual inspections or structural testing.</p> 	<p>Deploy Electrical Maintenance team to dig out flange plate. Details of this is not a requirement for the EPS data however these details are recorded locally.</p>
<p>Safety</p>	<p>Underground cables strained following barrier replacement works which caused premature cable failure.</p> 	<p>Deploy Electrical Maintenance team to make safe/isolate and repair within 28 days.</p>

Note – A number of electrical defects relating to outages and associated inspections are defined in AMOR.

6.4 Maintenance Requirement Plan Hold Point (refer to page 5)

6.5 Maintenance Requirement – Paved Areas

Scope: Paved areas, comprising: trafficked areas, hard shoulders, footways, cycle tracks, bridle ways, paved pedestrian areas, hard-standing paved areas, paved central reserves, traffic islands and cross-overs, covers, gratings, frames, boxes, kerbs, edgings and preformed channels which fall within the Area Network.

Sources of information:

Inventory Type	Master Data Source	Condition Information
Carriageway Construction Database, paved pedestrian areas, hard-standing paved areas, paved central reserves, cross-overs	HAPMS	National Machine Surveys in HAPMS, Visual Inspections in IAM IS
Footways	IAM IS	IAM IS
Cycle Tracks	IAM IS	IAM IS
Bridleways	IAM IS	IAM IS
Traffic Islands	IAM IS	IAM IS
Covers, gratings, frames, boxes	HADDMS	IAM IS
Kerbs and edgings	IAM IS	IAM IS
Preformed channels	HADDMS	IAM IS

Note: Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Pavement inventory is captured within HAPMS and the Pavement Asset Management Plan.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Paved Areas (AMOR Part 9)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes[PO]: PO 1. The paved area provides a safe and even surface for all road users.			
Highway, incl. hard shoulder	Deterioration of the surface course material [PO 1]	H	H	H
Cross overs	Crossover gates do not operate when needed due to lack of maintenance		M	L
Central Island	Surface deterioration does not provide a safe & even road surface for NMUs [PO 1]	M		M
Kerb, Edgings	Uneven kerbs and edgings present a trip hazard to NMUs [PO 1]	M		M
	Missing / incomplete kerbs and edgings reduce effectiveness of drainage system	L		
Preformed channels	Accumulation of debris reduces effectiveness of drainage system causing flooding of carriageway or additional build-up of silt downstream (e.g. in a pipe)	H	M	M
Hard standings	Surface deterioration does not provide a safe and even road surface [PO 1]	L		
Covers, grating, frames and boxes, manholes	Frames and covers protrude from the road surface, damaging vehicles.	L		L
	Broken ironwork collapses, causing accident risk and further carriageway damage.	M	L	L
Footways, cycleways, pedestrian crossing	Surface deterioration does not provide a safe and even surface for non-motorised users on the network [PO 1]	M		M
Nosings, ghost islands, Other paved areas	Surface deterioration does not provide a safe and even road surface [PO 1]	L	L	L

Route Character and Quantitative Risk Assessment:

Routes within the ASC (HAPMS Route Names)	Network character (m)					Asset risks (m)				Route Asset Risk
	Conc.	HFS	HRA	Surface D'ing	Thin Surface	Thin surface >10yrs	HRA >20yrs old	Network SCRIM failure	Rutting >15m	
A2 London - Canterbury - Dover (Faversham - Dover)	0	2245	44376	0	113054	21004	43905	2973	1324	H
A2 London - Canterbury - Dover (M25 - Rochester)	0	2207	336	0	138186	84867	336	778	0	H
A20 London - Maidstone - Dover	0	2542	15710	0	44131	13099	15710	1085	132	H
A2070 Romney Marsh to Ashford	0	6936	17768	0	27360	0	8062	3734	70	L
A21 London - Hastings	0	4707	48251	1572	135585	25888	26095	18595	400	H
A23 London - Brighton	0	2462	91652	0	67726	2326	89633	4241	534	M
A23 London - Brighton (Gw Spur)	0	777	123	0	7885	0	123	756	0	M
A249 Sheerness - Maidstone	0	502	578	0	353	0	578	70		L
A259 Folkestone - Chichester (East)	0	3320	4624	63	47687	6221	4624	15201	0	H
A259 Folkestone - Chichester (West)	0	2083	6058	0	23023	4885	6058	5178	170	H
A26 Maidstone - Lewes	0	1837	10641	0	3532	1254	4	1840	0	L
A27 Pevensey - Newton (Chichester - Lancing)	0	9927	39523	0	97049	15001	38536	2666	1181	M
A27 Pevensey - Newton (Havant - Chichester)	0	298	1647	0	54489	17014	1647	215	100	M
A27 Pevensey - Newton (Lancing to Lewes)	0	8991	52997	0	80955	671	46144	6508	1372	M
A27 Pevensey - Newton (Lewes - Pevensey)	0	6669	6413	0	51061	11156	5247	6082	0	H
M2 London - East of Faversham	0	3994	10913	0	218268	124323	3263	395	0	H
M20 Mid-Kent Motorway	118695	4708	26617	0	276486	127025	25346	20585	1400	H
M23 London - Crawley	0	3157	24410	0	117313	5467	24107	1885	300	M
Data Source:	HAPMS Nov 2018									

Service Inspection and Maintenance Frequencies:



Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Highway, incl. hard shoulder	100%/year	<i>For all paved areas:</i>	Estimated 10 shifts / month or as determined by inspection data As required refer to TA91/05 Table 8.1. NMU construction details
Cross overs	100%/year	Hot material repairs to defective areas of pavement as needed across the network in accordance with HD31	
Central island	100%/year		
Kerb, edgings	100%/year	Repairs to ironwork / chambers	
Preformed channels	100%/year		
Hard standings	100%/year	NMU Access (e.g. footways and cycleways) maintained to the same standard as trafficked surfaces. Soft estate encroachment managed through Soft estate maintenance requirement.	
Covers, grating, frames and boxes, manholes	100%/year		
Footways, cycleways, pedestrian crossing	Urban footways 100%/6 months Rural footways 100%/every 2 years	For all mototoways and *A2 (M25 to Rochester) Planned preventative sweeping and cleaning of the entire network: Nearside Centre NMU Routes	100%/6 months 100% every year 100%/6 months
Nosing's, ghost islands, Other paved areas	100%/year		

Note: AMOR Appendix 15 - The Secretary of State has responsibility for fulfilling the requirements on the motorway network and local authorities typically have responsibility for sweeping and cleaning of APTR. Section 86(11) of the Environmental Protection Act (1990) allows the Secretary of State to transfer responsibilities from the local authority to the highway or road authority. Under Appendix 15, the following sections of road where the Secretary of State has exercised this power. Within Area 4 the Secretary of State retains the responsibility for sweeping and cleaning on the *A2 from its junction with the M2 Motorway (Junction 1) to its junction with the M25 Motorway (Junction 2).

Based on the route risk assessment, the following exceptions to these frequencies will be adopted

- There are no route-based exceptions for this maintenance requirement

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	Hazard requiring immediate action; (As defined in AMOR with a performance target of zero within 24hrs of verification) 	Deploy Tactical Incident Response Team (TIRT) and make safe using either warning signage or a lane closure until such time it is safe to fill the defect. Where possible hot material repairs will be used in accordance with HD31.
Non-Safety (H)	Deterioration within 6 months of requiring a Safety defect intervention 	Monitor defect, proactively repair if a Roadspace opportunity is available.
Non-Safety (L)	Cracking/crazing discreet area	Repair as part of scheme

Notes:

1. Defects relating to asphalt or concrete carriageways will be repaired in accordance with the MCHW, HD 31 or HD 32 respectively and the associated DMRB Volume, this includes response to diesel spillages.
2. Defects relating to asphalt or concrete Footways and Cycle Tracks will be repaired in accordance with HD 39 or HD 40 respectively and the associated DMRB Volume.
3. Warnings of slippery conditions will be implemented in accordance with HD 28.
4. Statutory Undertakers or licence holders who are governed by the New Roads and Street Works Act 1991 may execute minor repairs to paved areas. In the event that completed repairs are defective within the guarantee period (as defined in the Specification for the Reinstatement of Openings in Highways), A-one+ will inform the Undertaker of the Defects using the procedure contained in Chapter 4 of the Code of Practice for Inspections. If immediate risks are posed to persons, A-one+ will rectify Defects and recover costs from the Undertaker.
5. Safety defects are recorded in IAMIS and Highstone, Service defects are recorded in IAMIS only, this is in accordance with the Provider Contract and the ADMM Provider Requirements.

6.5 Maintenance Requirement Plan Hold Point (refer to page 5)

6.6 Maintenance Requirement – Road Markings and Road Studs

Scope: Road markings and road studs in all materials within the Area Network.

Sources of information:

Inventory Type	Master Data Source	Condition Information
Longitudinal markings	IAM IS	IAM IS
Hatched road markings	IAM IS	IAM IS
Transverse road markings	IAM IS	IAM IS
Safety critical road markings	IAM IS	IAM IS
Other road markings	IAM IS	IAM IS

Note: Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Road Markings and Road Studs inventory is captured within the Road Markings Asset Management Plan. Identification of these gaps and proposals for capturing the required information will be reported in the Asset Data Improvement Plan.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Road Marking and Road Studs (AMOR Part 10):	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes [PO]: PO 1. Road markings and road studs are safe and visible			
Longitudinal markings	Road markings not safe and visible, resulting in increased incidents [PO 1]	M		M
Hatched road markings	Road markings not safe and visible, resulting in increased incidents [PO 1]	L		L
Transverse road markings	Road markings not safe and visible, resulting in increased incidents [PO 1]	L		L
Safety critical road markings	Road markings not safe and visible, resulting in increased incidents [PO 1]	H		M
	Road markings not legally enforceable (e.g. double white line systems missing road studs) [PO 1]	H		M
	Road studs missing making white line systems not legally enforceable [PO 1]	H		M
Other road markings	Road markings not safe and visible, resulting in increased incidents [PO 1]	L		L

**Route Character:
Transverse & Special Road Markings**

Marking Type (No.)	Route												
	M2	M20	M23	A2	A20	A21	A23	A26	A27	A249	A259	A2070	total
Arrows	42	39	20	122	45	193	85	54	556	0	150	104	1410
Give-Way	20	33	5	140	53	63	76	1	197	2	120	45	755
Loading	0	0	0	5	2249	0	0	0	1	0	7	0	2262
Roundabout	0	0	0	0	3	6	5	0	1	0	0	0	15
Stop	12	4	16	26	24	6	14	0	49	9	32	23	215
Words	37	62	38	79	76	78	112	11	459	16	96	49	1113
Other	526	85	5	51	21	33	37	6	139	0	146	0	1049
TOTAL	637	223	84	423	2471	379	329	72	1402	27	551	221	6819
Data Source												IAM IS 2018	

Hatched Road Markings

Marking Type	Bars		Chevron		Cross		Diagonal		Solid		Total	
	No.	Length (m)	No.	Length (m)	No.	Length (m)	No.	Length (m)	No.	Length (m)	No.	Length (m)
M2	1	118.1	38	2831.46	3	23.02	21	2293.45	0	0	63	5266.03
M20	2	794.57	73	7222.24	0	0	85	11960.05	0	0	160	19976.86
M23	0	0	21	2168.25	0	0	9	1033.28	0	0	30	3201.53
A2	4	1127.69	162	7368.81	4	110.01	188	15416.02	3	150.38	361	24172.91
A20	1	403.32	66	1508.44	9	159.17	31	721.01	2	9.78	109	2801.72
A21	3	1201.24	42	1606.28	0	0	153	8229.9	0	0	198	11037.42
A23	0	0	63	3169.85	0	0	58	2414.03	0	0	121	5583.88
A26	0	0	2	25.27	0	0	17	1122.17	0	0	19	1147.44
A27	26	1678.97	153	5269.45	13	138.18	390	15590.49	1	3.85	583	22680.94
A249	1	13.85	3	56.71	0	0	11	217.5	0	0	15	288.06
A259	4	3.2	3	65.08	5	74.99	62	4297.06	0	0	74	4440.33
A2070	0	0	13	159.86	0	0	57	3417.05	0		70	3576.91
Total	42	5340.94	639	31451.7	34	505.37	1082	66712.01	6	164.01	1803	104174.03
Data Source												IAM IS 2018

Longitudinal Road Markings

Marking Type (lin.m)	Route												
	M2	M20	M23	A2	A20	A21	A23	A26	A27	A249	A259	A2070	total
Broken	146,395	268,242	94,613	178,107	33,664	101,611	99,391	10,316	245,156	1,012	52,719	22,728	1,253,954
Broken & Unbroken	0	0	0	0	0	2,559	0	1,917	429	0	426	0	5,331
Unbroken	228,216	295,443	116,950	215,102	55,686	212,279	102,390	12,937	344,132	186	81,830	43,920	1,709,071
Zig-Zag	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	374,611	563,685	211,563	393,209	89,350	316,449	201,781	25,170	589,717	1,198	13,4975	66,648	2,968,356

Road Studs

Route	Length (m) of studs in IAM IS (2018)												
	M2	M20	M23	A2	A20	A21	A23	A26	A27	A249	A259	A2070	total
Studs	340,422	681,994	204,073	424,022	81,182	230,772	176,096	11,577	432,629	0	44,361	36,288	266,3416

Service Inspection and Maintenance Frequencies:

Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Longitudinal markings	100%/year (Day & Night)	Renew (Prioritising Safety Critical Road Markings)	In accordance with AMOR part 10. Additionally, 20% every year in accordance with Annex N of the Network Information
Hatched road markings	100%/year (Day & Night)		
Transverse road markings	100%/year (Day & Night)		
Safety critical road markings	100%/year (Day & Night)		
Other road markings	100%/year (Day & Night)		
Road Studs	100%/year (Day & Night)	Replace missing in accordance with defect response below. Renew as part of lining scheme or marking renewal as above (Prioritising Safety Critical areas of safety or enforcement)	In accordance with AMOR part 10 and TD26

Based on the route risk assessment, the following exceptions to these frequencies will be adopted

- There are no route-based exceptions for this maintenance requirement.
- All the double white line systems and stop lines on within Area 4 are classified as safety critical.
- Day and Night inspections will be undertaken to check: in accordance with the risk-based approach in the Road Markings Asset Management Plan and TD26/17.
 - wear;
 - retro-reflectivity (dry);
 - retro-reflectivity (wet);
 - colour;
 - Luminance Factor or Luminance Co-efficient; and
 - skid resistance.

Extract from TD26/17 regarding Road Marking visibility.

Table 2: Required road marking visibility distances (m) for various speed limits and preview times (dry conditions)

Preview Time (secs)	Speed Limit (miles per hour)					
	20	30	40	50	60	70
1.8 (absolute minimum)	16	24	32	40	48	56
2.2 (desirable minimum)	20	30	39	49	59	69

Table 2.1: Age Related Corrections to Achieved Visibility Distances from Initial Surveys

Age Related Corrections to Visibility Distances				
Age <30	Age 30-40	Age 40-50	Age 50-60	Age >60
-14.2%	-9.5%	-4.8%	-2.4%	N/A

Table C.1: Visual Assessment Scoring for wear

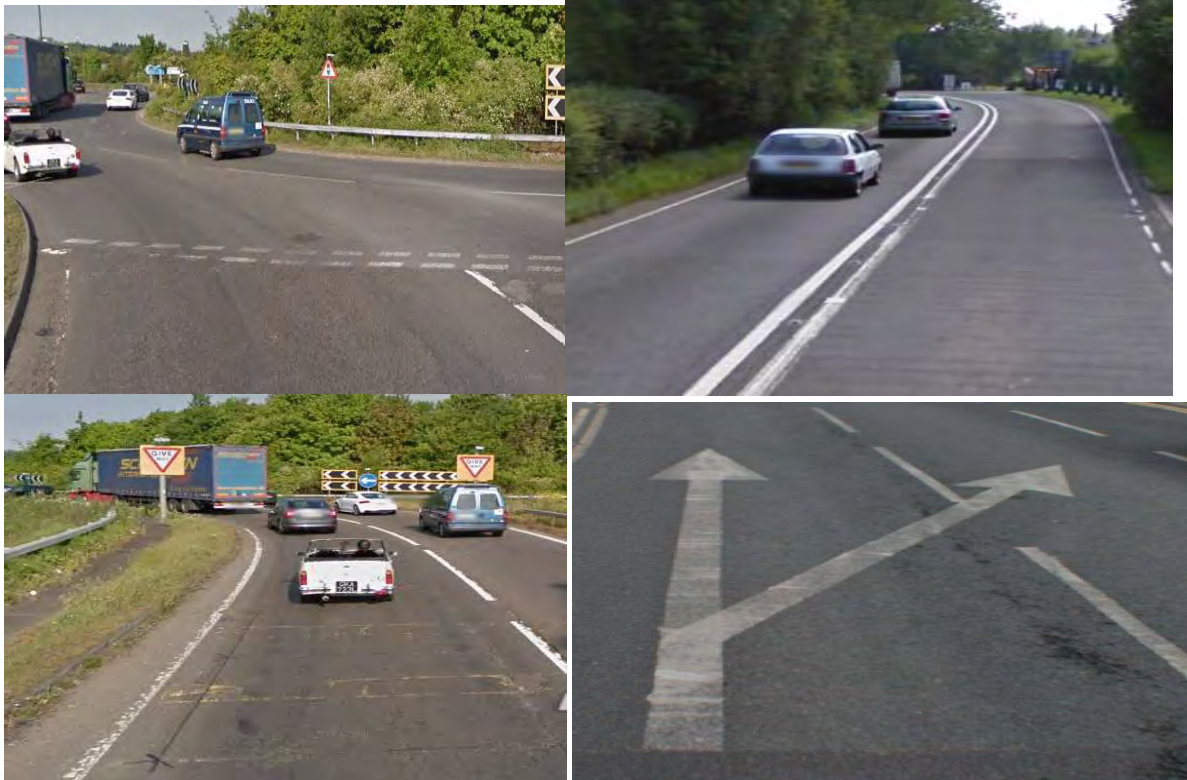
Assessment	Score	Defect type when score averaged
Non-existent, residue only	0	Critical Defect
Barely visible	10	Critical Defect
Visible, but has randomly spaced small bare spots	20	Potentially Critical Defect – judgement required taking into account location and function and plan shall be put in place to manage
Marginal – some visible wear, larger bare spots	30	Non-Critical Defect
Very little wear	40	Non-Critical Defect
No obvious wear	50	Not a defect



Characteristic	Threshold Level	Method
Retro-reflectivity (R)	<p>< 100 mcd/m²/lux in lit areas and < 150 mcd/m²/lux in unlit areas for line type (a) – see note 3</p> <p>< 80 mcd/m²/lux in lit areas and < 120 mcd/m²/lux in unlit areas for line type (b) – see note 3</p> <p>< 35 mcd/m²/lux for “Condition of wetness”(where applicable for markings specified to SHW [Ref. 5] clause 1212.5)</p>	BS EN 1436 [Ref. 17]
Wear	< 30 Score for each type of marking	Visual assessment (Table C.1)
Luminance factor (β)	< 0.30 for white or < 0.20 for yellow line type (c)	BS EN 1436 [Ref. 17]
Or	Or	
Luminance Co-efficient (Qd)	Q2 or B3	

Inspection and Maintenance requirements will adhere to the procedure and criteria held in TD26/17 Annex C.

Safety defects are recorded in IAMIS and Highstone, Service defects are recorded in IAMIS only, this is in accordance with the Provider Contract and the ADMM Provider Requirements.

Defect Definitions and Indicative Responses: Road Markings

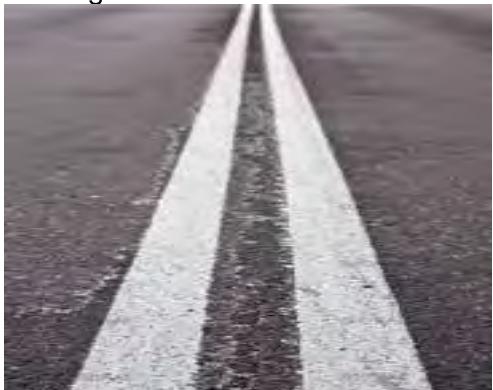
Defect Category	Defect Description	Indicative Response Action
<p>Safety (Critical)</p>	<p>Critical areas of the network refer to those areas of the network that may pose a risk to the road user if badly worn. These shall be defined with local knowledge (on GIS) but shall include:</p> <ul style="list-style-type: none"> (a) GIVE WAY lines and STOP lines (b) Regulatory markings e.g. double white lines, solid edged ghost islands (c) Large areas of markings, e.g. "SLOW" markings, exit arrows to slips on the main line and on-carriageway 'destinations' (d) Transverse yellow bars (e) Markings at or within 50m of a junction 	<p>Erect temporary warning signs within 24 hours. Renew road markings within 28 days.</p>


Defect Category	Defect Description	Indicative Response Action
<p>Non-safety (H) (Non-critical)</p>	<p>More than 30% wear to non-regulatory lines in non-critical areas or a score of <30 when assessed in line with TD26/17</p> 	<p>Repair within 6 months unless the defect falls within the limits of a scheme whose delivery date is within 6 months of the due date of the repair.</p>
<p>Non-safety (L) (Non-critical)</p>	<p>Short lengths with <70% mark remaining when assessed within a 100-metre section</p> 	<p>Add the defect to the schedule of sites which will be subject to a reflectivity test</p>

Defect Category	Defect Description	Indicative Response Action
Non-Safety (L) (Non-critical)	Single marking missing or faded 	Monitor during inspections to ensure the missing markings do not become a safety concern

For white lining the functional life of the marking must be determined and recorded in IAM IS. Where a functional life has not been recorded the white lining will be subject to a visual assessment. Any areas of lining with less than the required visibility distance or a visual assessment score of less than 40 (when assessed in line with the requirements of TD26/17 Annex C) shall be the subject of a reflectivity test.

Defect Definitions and Indicative Responses: Road Studs

Defect Category	Defect Description	Indicative Response Action
Safety (Critical defect)	Missing studs as part of a double white line system. Cavity left by missing roadstud. 	Erect temporary warning signs or replace within 24 hours. Replace missing studs within 28 days.

Defect Category	Defect Description	Indicative Response Action
Non-safety (H) (Non-critical defect)	More than one in any ten consecutive roadstuds are missing or defective or >31% missing or non-reflecting roadstuds (determined from night time inspection) in the relevant section	Repair within 6 months unless the defect falls within the limits of a scheme whose delivery date is within 6 months of the due date of the repair.
Non-Safety (L) (Non-critical defect)	<p>More than one in any thirty consecutive roadstuds are missing or defective or 11-30% missing or non-reflecting roadstuds (determined from night time inspection) in the relevant section</p> 	Ensure the defects form part of a renewal scheme. Monitor areas during safety inspections to ensure stud loss does not become a safety concern. Update scheme delivery date if appropriate (this is not a defect under TD26/17)

All road studs associated with double white line systems and prohibitory hatchings are safety critical.

6.6 Maintenance Requirement Plan Hold Point (refer to page 5)

6.7 Maintenance Requirement – Road Restraint Systems

Scope: All vehicle restraint systems and pedestrian restraint systems within the Area Network, including: vehicle safety barriers, crash cushions, terminals, transitions, pedestrian guard rails, vehicle parapets and pedestrian parapets on bridges and other structures.

Sources of information:

Inventory Type	Master Data Source	Condition Information
Vehicle restraint system	IAM IS	IAM IS and Aone+ Server
End terminals, Crash cushions	IAM IS	IAM IS
Structure parapets	SMIS	SMIS
Emergency crossing points	IAM IS	IAM IS
Pedestrian Guard rail	IAM IS	IAM IS

Notes:

1. Asset inventory was provided by HE. Inventory is validated and condition data is captured by the detailed inspections which are carried out in conjunction with the tension checking programme.
2. Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Road Markings and Road Studs inventory is captured within the Road Markings Asset Management Plan.
3. Identification of these gaps and proposals for capturing the required information will be reported in the Asset Data Improvement Plan.
4. Information held on data bases shall be in accordance with the Asset Data Management Manual [ADMM].
5. Management of assets is covered under process 2.04 Asset Management.
6. Refer to the Asset Management Plan [AMP] for VRS for a summary of the VRS inventory plus required maintenance activities.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Road restraint systems (AMOR Part 11)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes [PO]: PO 1. Road restraint systems are managed and maintained to function in accordance with their intended design and performance requirements.			
Vehicle restraint system	Vehicles not contained as intended [PO 1]	H	H	H
End terminals, Crash cushions	Terminals and crash cushions do not provide appropriate protection [PO 1]	M		M
Structure parapets	Vehicles not contained as intended [PO 1]	H	H	H
Emergency crossing points	Do not function when required to be operated [PO 1]		L	L
Pedestrian Guard rail	NMUs not afforded appropriate protection from traffic [PO 1]	M		L

Route Character and Quantitative Risk Assessment:

Routes within the ASC	Network character (m)				Pedestrian Guardrailings	(No.) Arrester Beds	Asset risks Safety Defects	Route asset risk
	Concrete Barrier	Tensioned Systems	Untensioned Systems	Wire Rope				
A2	3367.42	107306.843	46266.238		894.608	2	285	H
A20	200.31	22302.07	7765.498	33.77	1748.639	1	46	M
A2070		10156.71	7012.26		49.63		10	M
A21	341.34	55203.438	23663.352	2901.06	365.64		76	M
A23	4127.5	60054.92	22664.48		91.871		108	H
A249			110.87					M
A259		1908.59	578.97		528.55		11	M
A26		3.41	56.35					M
A27	196.53	116844.25	49441.14	7373.3	2000.349		165	H
M2	1035.7	95586.39	50075.12		1391.83		220	H
M20	6507.36	99996.62	121081.577		289.7		377	H
M23	4990.57	21360.14	28966.559				91	M
Data Source	IAM IS March 2018							

Service Inspection and Maintenance Frequencies:

Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Vehicle restraint system (Concrete Systems)	100% every 2 years	No Maintenance Required.	
Vehicle restraint system (non-concrete Systems)	100% every 2 years	In accordance with manufacturers inspection specifications, undertake full detailed inspection of all systems and tension checking of tensioned systems	100% every 2 years
End terminals, Crash cushions	100% twice a year	Serviced in accordance with manufacturers specifications	100%/ 6 months
Structure parapets	100% every 2 years	Serviced in accordance with manufacturers specifications	100% every 2 years
Emergency crossing point gates	100%/year	Serviced in accordance with manufacturers specifications	100%/year
Pedestrian Guard rail	100%/year	Serviced in accordance with manufacturers specifications, and repair as identified as per inspection	100%/year




Based on the route risk assessment, the following exceptions to these frequencies will be adopted.




- The High risks come from the service condition of the VRS and this risk is managed through our inspection regime, high risk routes come under daily safety patrols therefore no route specific exceptions are required.


Notes:

- Inventory and defects are held in IAM IS.
- IAM IS does not have the capacity for holding the actual tension checking and detailed inspections records, A-one+ currently collate the tensioning and inspections records via SASETS which is then manually entered into a single spreadsheet and stored on A-one+ servers.
- For proprietary systems, barrier tension is maintained in accordance with manufactures recommendations, for non- proprietary systems or where manufactures requirements are not available, BS 7669-3 used.
- Where re-tensioning of non-proprietary tension corrugated beam systems is undertaken, this is carried out in accordance with BS 7669-3 which includes for the replacement of post screws.
- When a barrier is damaged the risk assessment process in AMOR Appendix 11 [Risk Assessments for Lane Restrictions at Barrier Repairs] is followed to identify an appropriate repair time and also recommends mitigation actions to be taken at high risk sites.

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety (Critical)	Accident Damage 	Deploy TIRT to make safe. Assess in accordance with AMOR. Repair as defined.**
Safety (Critical)	Broken, loose or missing safety critical components 	Assess in accordance with AMOR. Repair as defined.**
Service (H)	Severe corrosion of steel barrier 	Identify on Network Needs Register as high priority. Ensure VRS is in the forward programme for renewal. Monitor defect until renewals scheme carried out.

Defect Category	Defect Description	Indicative Response Action
Service (L)	<p>Mild corrosion of steel barrier</p> 	<p>Identify scheme on Network Needs Register to replace barrier.</p>
Service (L)	<p>Broken, loose or missing non-safety critical components</p> 	<p>Assess in accordance with AMOR. Repair as defined**</p>
Service (L)	<p>Cracking or spalling of concrete barrier</p> 	<p>Identify scheme on Network Needs Register to replace barrier.</p>

Defect Category	Defect Description	Indicative Response Action
		
Service (L)	Signs of fluid or gas build up in metal parapets	Release trapped fluid or gas / Identify scheme on Network Needs Register to replace parapet
Safety (critical)	Damage Pedestrian guard rail 	Site made safe and then DCP process followed to repair.

** = Repairs to proprietary systems to be carried out in accordance with manufactures recommendations, for non- proprietary systems or where manufactures requirements are not available, BS 7669-3 to be used.

6.7 Maintenance Requirement Plan Hold Point (refer to page 5)

6.8 Maintenance Requirement – Road Traffic Signs

Scope: Traffic signs within the Area Network, including all posts, supports and fastenings; all bollards; mechanical variable message signs, together with associated electrical equipment where appropriate.

Out of Scope:

- The lighting of road traffic signs (which are included in Lighting Maintenance Requirements);
- Structural aspects of road traffic signs classified as structures in BD 63 (which are included in Structures Maintenance Requirements);
- Management of soft estate to preserve road users' visibility of road traffic signs (which is included in the Soft Estate Maintenance Requirements);
- Light emitting variable message signs (which are included in the Technology Management and Maintenance Manual); and,
- Proprietary Motorway Service Area signs

Sources of information about condition data, including the identification of asset data gaps and a mitigation approach:

Inventory Type	Master Data Source	Condition Information
Signs (Posts, plates and fixtures)	IAM IS	IAM IS
Safety Bollards	IAM IS	IAM IS
Signal posts	IAM IS	IAM IS

Note: Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Signs inventory is captured within the Signs Asset Management Plan which is reviewed annually.

Identification of these gaps and proposals for capturing the required information will be reported in the Asset Data Improvement Plan.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Road Traffic Signs (AMOR Part 12)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes [PO]: PO 1. Road traffic signs are safe and clearly legible PO 2. Road traffic signs give effect to regulatory position			
Signs (Mandatory, regulatory, directional, information)	Signs not legible due to fading or obscured by vegetation [PO 1]	M		M
	Signs are not safe, for example, rusted sign posts [PO 1]	L		
	Signs are not enforceable due to fading or obscured by vegetation [PO 2]	H		M
Safety Bollards	Bollards are missing or unsafe (e.g. wiring exposed) [PO 1]	L		L
Signal posts	Posts do not facilitate visibility / function of signals	M		L

Route Character and Quantitative Risk Assessment:

Tables from Road Signs Asset Management Plan

Table 5.3.1 - No of signs by Route (Data from IAMIS correct as of 03/07/2017)

Motorways	No of Signs	Trunk Roads	No of Signs
M2	812	A2	1928
M20	1228	A20	1073
M23	361	A21	1555
		A23	803
		A26	303
		A27	3301
		A249	46
		A259	1003
		A2070	427
Total	2401	Total	10439

Table.5.3.2 - Type of signs by Route (Data from IAMIS correct as of 03/07/2017)

Route	Bus Tram Cycle	Driver Location	Information	Other	Regulatory	Warning
A2	110	1	747	2	675	393
A20	39	0	275	26	589	144
A21	33	3	572	32	428	487
A23	80	2	292	7	243	179
A26	2	0	78	0	110	113
A27	208	0	1236	23	1029	805
A249	0	0	16	0	11	19
A259	98	0	264	0	300	341
A2070	3	0	169	1	126	128
M2	0	182	414	0	47	169
M20	7	285	774	52	56	54
M23	1	105	181	0	29	45
Total	581	578	5018	143	3643	2877

Table.5.3.3 - Sign Mounting method by Route (Data from IAMIS correct as of 03/07/2017)

Route	Bridge	Gantry	Lamp Post	Other	Post	Traffic Signal	Wall
A2	0	61	202	100	1564	1	0
A20	4	0	333	83	597	6	50
A21	1	1	54	21	1476	0	2
A23	2	2	71	21	707	0	0
A26	0	0	19	0	284	0	0
A27	25	10	282	90	2887	4	3
A249	0	0	6	0	40	0	0
A259	0	0	88	0	911	1	3
A2070	0	0	56	6	365	0	0
M2	0	32	12	162	606	0	0
M20	1	56	9	234	926	0	2
M23	0	2	2	67	290	0	0
Total	33	164	1134	784	10653	12	60

Table.5.3.3 - Sign illumination method by Route (Data from IAMIS correct as of 03/07/2017)

Route	External	Internal	Remote
A2	523	1	0
A20	163	28	2
A21	136	0	11
A23	274	1	1
A26	20	0	0
A27	626	39	0
A249	20	0	0
A259	120	0	2
A2070	106	0	0
M2	159	1	1
M20	226	6	1
M23	46	1	0
Total	2419	77	18

Service Inspection and Maintenance Frequencies:



Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Signs	100%/year	Sign face cleaning in accordance with Part 2 TD 25/15, Each sign must be cleaned on an “as required” basis, commensurate with the local environment and the rate at which dirt and/or vegetation builds-up on the sign face. Note: Recommended Maximum Interval between Cleaning Signs mounted at height (eg, on gantries) 6years Other signs 3 years (Visibility covered in Soft Estate Requirement)	100% every year as identified through inspections and in accordance with Part 2 TD 25/15 Max 6 years Max 3 years
	<i>Regulatory Signs: an additional condition inspection of all regulatory signs at network interfaces</i>	<i>Regulatory Signs: Sign face cleaning in accordance with Part 2 TD 25/15 (Visibility covered in Soft Estate Requirement)</i>	100% every year
Safety Bollards	100%/year	Cleaning in accordance with Part 2 TD 25/15 (Visibility covered in Soft Estate Requirement)	100%/year
Signal Poles	100%/year	Access checked and cleared	100%/year




Based on the route risk assessment, the following exceptions to these frequencies will be adopted

- Route specific risks managed with additional regulatory signs inspection and safety inspection regime

Regulatory provision for Road Traffic Signs is given in the Traffic Signs Regulations and General Directions (TSRGD) and includes those specially authorised by the Secretary of State under Section 64 of the Road Traffic Regulation Act, signs ceasing to have effect as defined in Regulation 3, and those which are obsolete as defined in TD 25.

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	<p>Faded / Obscured regulatory/warning sign</p> 	<p>Erect temporary warning signs. Restore visibility of sign (This may be a clean or a renewal of the sign.)</p>
Service (H)	<p>Damage requiring repair to prevent further deterioration (e.g. Severely corroded posts on the network)</p> 	<p>Monitor defect until repair effected.</p>

Defect Category	Defect Description	Indicative Response Action
Service (L)	Minor damage not affecting use 	Monitor defect
Service (H)	Poor reflectivity 	Ensure sign is clean, add sign to scheme of works, repair within 6 months
Service (H)	Damage keep left bollards (KLB). 	Temporary sign put in place to mitigate and then renew within set time scale.

Defect Category	Defect Description	Indicative Response Action
Service (H)	Damage bollard/reflector post. 	Make safe and renew within 6 months

Signs under warranty

All signs have a manufacture label on the back of the signs, any sign found to have a manufacturing fault or Defect falling within a sign's warranty period Aone+ will proactively pursue warranty claims on behalf of the Highways England.

Example: Regulatory signs on A2 (West) 10 regulatory signs found to be faded due to poor reflectivity batch during manufacture, all signs have been replaced.



Non compliant signs

Previous contract identified 95 signs that do not comply with current regulations, the signs are TSRGD 1981 that ceased to be legal on 1st January 2015. These signs are: Blue bordered signs and Service signs white on green, see example. HE gave URS task to design sign replacement schemes, Do something option same as Do minimum: Replace sign faces and Replace posts and associated foundation. Do not replace lighting units as not required by current regulations. Signs will be added to the programmes for sign replacement per route.



Blue border signs



Green service sign on trunk road

6.8 Maintenance Requirement Plan Hold Point (refer to page 5)



6.9 Maintenance Requirement – Soft Estate

Scope: The semi-natural, improved / semi-improved and landscaped parts within the Area Network, including biodiversity, cultural heritage assets and hard landscaping areas.

Sources of information

Inventory Type	Master Data Source	Condition Information
Soft Estate	Envis	Envis
Verges	Envis	Envis
Trees	Envis	Envis
Hedges	Envis	Envis
Environmental structures	Envis	Envis
Other environmental assets	Envis	Envis

Note: Data gaps and mitigations will be covered in the gap analysis for records and asset information as required by the service information and Annex 25. Improvements are captured within the Asset Data Improvement Plan. Envis updates are submitted Quarterly as per IAN 84/10.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Soft Estate (AMOR Part 13)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes[PO]: PO 1. Soft estate condition is managed and maintained to minimise risks to road users, road workers and adjacent affected parties PO 2. Soft estate is managed and maintained to protect and maintain protected designated and Protected Habitats / Species, improved / semi-improved / landscaped parts. PO 3. Soft estate is managed and maintained to meet existing commitments to Public Inquiries, Planning Consents, their parties, protection of Designated Sites (International, National) or Protected Habitats / Species. PO 4. Soft estate is managed and maintained not at the detriment of its aesthetic value. PO 5. Soft estate is managed and maintained within the wider landscape to maximise the Area Networks potential to link and enhance habitats.			
Soft Estate	Soft estate is poorly maintained and presents a poor image to the customer of Highways England [PO 1,4]			H

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
	Soft estate is poorly maintained and obscures risks to roadworker [PO 1]	M		L
	Soft estate is not managed to meet legislative requirements (e.g. protection of species and designated sites [PO 2,3,5])			M
Verges	Sightlines to signs and junctions are obscured [PO 1]	H		M
	Established trees not maintained, obscuring infrastructure [PO 1]	M		L
Trees	Self-seeded trees establishing themselves in locations close to the carriageway [PO 1,4]	M		
	Obscuration of CCTV operational visibility splays from overgrown vegetation [PO 1]	M		
	Poor management of individual trees and trees in woodland resulting in tree collapse and degrading habitat [PO 1,2,3,4,5]	H		L
Hedges	Sensitive habitats not maintained with due concern for protected habitats or species [PO 2,3,5]			M
Environmental structures	Structures in place to keep wildlife off the carriageway are not maintained (e.g. associated fencing not stock proof) [PO 1,2,3,5]	M	L	L
	Acoustic fences, Badger tunnels not adequately maintained resulting in wildlife in the carriageway and noise complaints from customers [PO 1,2,5]		L	L
	Cultural Heritage assets including the Grade II listed pylons on the A23 not maintained resulting in damage from invasive species [PO 3,4]			M
Other environmental assets	Specialist wildlife assets such as bat & bird boxes and wild flower meadows not maintained to meet their intended function (e.g. bat boxes cleaned annually). This could result in loss of protected habitats or species from the area network [PO2,5]			L

Route Character and Quantitative Risk Assessment:

Routes within the ASC (HAPMS Route Names)	Network character (km ²)				Asset risks		Route asset risk
	Vegetated Area	Grass Land Area	Trees (No)	Hedges	Species	Cultural Heritage	
A2 London - Canterbury - Dover (Faversham - Dover)	1.82	0.36		2.05	444	49	M
A2 London - Canterbury - Dover (M25 - Rochester)	1.61	0.75		0.4	75	45	M
A20 London - Maidstone - Dover	0.44	0.61	9	1.08	211	15	M
A2070 Romney Marsh to Ashford	0.78	0.53	18	4.8	74	8	M
A21 London - Hastings	4.51	1.99	20	22.52	521	28	H
A23 London - Brighton	1.54	1.6	13	15.03	202	20	M
A23 London - Brighton (Gw Spur)	0.06	0.01			3	1	L
A249 Sheerness - Maidstone							L
A259 Folkestone - Chichester (East)	0.15	0.51	41	15.63	60	16	M
A259 Folkestone - Chichester (West)	0.19	0.08	35	0.82	73	2	M
A26 Maidstone - Lewes	0.13	0.08	15	0.87	1	17	M
A27 Pevensey - Newton (Chichester - Lancing)	1.8	1.29	108		249	79	H
A27 Pevensey - Newton (Havant - Chichester)	0.52	0.45	23	4.17	104	14	H
A27 Pevensey - Newton (Lancing to Lewes)	0.91	1.66	14	1.75	172	17	H
A27 Pevensey - Newton (Lewes - Pevensey)	0.47	0.29	7	21.2	92	25	M
M2 London - East of Faversham	2.7	0.88		3.43	265	16	M
M20 Mid-Kent Motorway	4.74	1.72	1	5.01	818	22	H
M23 London - Crawley	1.97	0.03	3	0.2	288	4	M
Data Source	Envis Data						March 2018

Note: Due to the nature of the data, the risks associated with the environmental asset are better understood through viewing on a GIS. There are substantial areas of the network which pass through Areas of Outstanding Natural Beauty as well as Sites of Special Scientific Interest. Ensuring that works are completed appropriately in these areas is a risk which is addressed in our RAMS for maintenance and separately for each scheme affected.

The risks around this asset type are complex and diverse in their nature and are addressed in more detail in the respective plans. The assessment here is purely around undertaking the maintenance.




Service Inspection and Maintenance Frequencies:


Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Soft Estate Verges Trees Hedges Environmental structures Other environmental assets	Inspected in accordance with Environmental Management Plan / Landscape Management Plan	Maintained in accordance with EMP/ LMP and AMOR, set out in the 2018/19 Area Programme on the shared drive, including but not limited to; <ul style="list-style-type: none"> • Twice annual swathe cuts, including visibility splays of signs, tree works and litter picking • 33% of all trees and woodland inspected annually • 20% of landscape and environmental assets inspected annually • Maintenance of access to communications equipment, meter cut around access and surround of comms cabinet. • Emptying litter bins on the network when required • Collaborative litter picking on the APTR network with the responsible authority • Cutting back trees to ensure visibility of signs is maintained • Control the spread of injurious, invasive non-native species. • Management of the South Downs Way Ahead Nature Improvement Area is detailed in the EMP and LMP • Maintenance of road users sight lines is detailed in the EMP. Guidance is in the Sight Line Guidance Sheet Vol 2. • Stakeholder management is outlined in the EMP <p>NOTE: AMOR deliverables 17, 18, 19 are currently not being fully fulfilled due to the ongoing CE004.</p>	

Based on the route risk assessment, the following exceptions to these frequencies will be adopted

- Exceptions and Constraints are detailed in the EMP and LMP

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	Dangerous Tree Branch 	Install traffic management if required, arrange for tree to be felled/limb removed as soon as practical
Safety	Grass/vegetation obscuring visibility 	Cut back as soon as practical
Service (H)	Injurious Weeds 	Assess area, remove/spray weeds in accordance with injurious weed management plan

Defect Category	Defect Description	Indicative Response Action
Service (H)	<p>Grass hanging over footway</p> 	<p>Ensure safe passage by NMU by addressing all safety critical areas. Programme within the 6 month period for cyclic grass cutting-Monitor during inspections</p>

6.9 Maintenance Requirement Plan Hold Point (refer to page 5)

6.10 Maintenance Requirement – Structures Maintenance

Scope: A civil construction within the Area Network, situated under, over or adjacent to the Strategic Road Network. Structures include, but are not limited to:

- Overbridges;
- Underbridges of enclosed length less than 150m;
- Subways of enclosed length less than 150m;
- Footbridges;
- Cycle bridges;
- Retaining Walls;
- Culverts with a clear span or internal diameter greater than 0.9m;
- Buildings;
- Structural maintenance of fences, walls, screens and environmental barriers >3m in height;
- Gantries, signs, lighting columns or catenaries, CCTV masts, classified as structures in BD 63.

Non-structural elements also included within the scope of this maintenance requirement include, but are not limited to:

- Cross carriageway ducts, ducts through structures, technology equipment cabinets and all ancillary equipment (e.g. hoists, winches, covers).

Sources of information:

Inventory Type	Master Data Source	Condition Information
All Structures as defined above	SMIS	SMIS

Note: Data gaps and mitigations were included in the Asset Data Gap Analysis Report submitted February 2017. Updated Structures inventory is captured within SMIS and the Structures Asset Management Plan.

Identification of these gaps and proposals for capturing the required information will be reported in the Asset Data Improvement Plan.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Structures (AMOR Part 14)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes [PO]: PO 1. Structures and their constituent parts are managed and maintained to minimise risks to road users.			
Structures	Structure not maintained regularly, causing defects to deteriorate rapidly [PO 1]	M	M	M
	Minor defects like graffiti not addressed, negatively impacting on Highways England's reputation			M

Route Character and Quantitative Risk Assessment:

Route	Bridge and Large Culvert	Small Culvert	Retaining Wall	Mast	Sign/Signal Gantry	Mast Scheme	Road Tunnel	service crossing and other	Total
A2	53	2	20	5	49			4	133
A20	25	0	23	0	2		1	4	55
A21	49	12	5	0	0	1		12	79
A23	31	6	13	0	3			1	54
A26	1	0	0	0	0				1
A27	100	10	9	2	8		1	5	135
A249	0	0	0	0	0				0
A259	12	0	10	0	0				22
A2070	20	6	1	0	0				27
M2	73	6	5	6	38			4	132
M20	121	3	22	26	68	1		35	276
M23	32	7	1	3	40				83
Total	517	52	109	42	208	2	2	65	997

Data Source Area 4 Structures Management v1.2.1 March 2018

Feature Managed	Applicable Standard	Number of Structures	Completed Assessments	Partially Completed	Unmanaged	Percent Managed
Buried Concrete Box Structures	BA 88/04	99	3		96	3.03 %
Corrugated Steel Buried Structures	BA 87/04	30	0		30	0.00 %
Half-Joints	BA 39/93	21	8	10	3	38.10 %
Deck Hinges	BA 93/09	0	0		0	N/A
Parapet Assessments	IAN 97/07	0	0		0	N/A
Pier Assessments	BD 48/93	0	0		0	N/A
Post-Tensioned	BD 54/15	81	4	12	65	4.94 %
Scour	BD 97/12	58	2	0	56	3.45 %
Sub-standard Headroom	TD 27/07	36	11		25	30.56 %
Sub-standard Structure	BD 79/13	5	4		1	80.00 %

Data Source Area 4 Structures Management v1.2.1 March 2018

Note: The SMIS Health check report indicates a number of areas warranting further information; this information is included in the Asset Data Gap Analysis Report submitted February 2017. Proposals for capturing the required information will be reported in the Asset Data Improvement Plan.

Service Inspection and Maintenance Frequencies:

Asset Type	Service Inspection Frequency	Maintenance Strategy
Structures	Inspected in accordance with BD63	Routine Maintenance (e.g. sweeping bearing shelves & cleaning guttering) annually for every structure
Bearings	Inspected in accordance with BD63 or as part of special inspection	Regreasing/maintenance in accordance with manufacturers specification
Joints	Inspected in accordance with BD63	Remove debris

Asset Type	Service Inspection Frequency	Maintenance Strategy
Multi – element or Type 5 joints	Inspected in accordance with BD63	Make safe following failure, planned maintenance will be carried out in accordance with manufacturers specification and subject to parts availability. Option for replacement of parts will be included as planned schemes in the forward programme.

Based on the route risk assessment, the following exceptions to these frequencies will be adopted

- Exceptions will be managed through the defined processes in BD 62 & BD 63.
- Specific Structures maintenance requirements are covered in the Structures Asset Management Plan.
- Individual risk rankings are held within SMIS.
- Routine Maintenance annual requirements for each structure are issued via SMIS
- Annual inspection programmes are agreed with the client a minimum of 4 weeks before the start of the next financial year. Programmes are available via the Structures Inspection team.

Defect Definitions and Indicative Responses:

Defect Category	Defect Description	Indicative Response Action
Safety	Offensive Grafitti	Obscure or remove within 24 hours
Safety	Structural Damage resulting from vehicle strike	Competent person to assess the integrity of the structure. Lane closures/road closures initiated until repairs can be completed.
Safety	Failed Type 6 Expansion Joints	Ensure Carriageway is safe, deploy structures on call engineer to assess. Cut out metal rail as defined by engineer, push rubber into gap, fill with temporary repair material. Permanent solution to be progressed as a scheme.

Defect Category	Defect Description	Indicative Response Action
Safety	Failed Asphaltic Plug or Buried joint	Ensure Carriageway is safe, deploy structures on call engineer to assess. Ensure plate is flush to deck. Fill with repair material. Permanent solution to be progressed as a scheme if required.
Non-Safety (H)	Broken Guttering	Repair within 6 months unless included in future renewal scheme
Non-Safety (L)	Inoffensive Graffiti	Obscure or remove within 6 months

6.10 Maintenance Requirement Plan Hold Point (refer to page 5)

6.11 Maintenance Requirement – Sweeping and Cleaning

Scope: Sweeping and cleaning of:

- All motorways and their surrounds within the Area Network;
- APTRs and their surrounds within the Area Network **only** when listed in tables 15.1 or 15.2 in the Appendix to this requirement.
- ATPR and their surrounds through agreement with the local authority.
- Cleaning and servicing of amenity facilities within the Area Network
- Graffiti within the Area Network.
- Emptying of litter bins within the Area Network. (those owned by HE only)
- The management of animal fatalities within the Area Network.

Out of Scope:

- Initial response to Incidents involving or giving rise to debris, detritus or animal carcasses (see Incident Response requirements).
- Sweeping and cleaning of APTRs and their surrounds not listed in tables 15.1 or 15.2 in the Appendix to this requirement, or where no local authority agreement exists.

Sources of information about condition data

Inventory Type	Master Data Source	Condition Information
N/A		

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Sweeping and Cleaning (AMOR Part 15)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes[PO]: PO 1. The Area Network is predominantly free from litter, refuse and detritus and fly tipping PO 2. Amenity facilities are safe and serviceable PO 3. The functionality of the Area Network is not impeded by litter, debris, refuse, detritus, fly tipping or animal carcasses. PO 4. All graffiti is managed to ensure that the adverse impact on our customers experience of the Area Network is minimised. PO 5. Remove, identify, store and seek to inform owners of animal fatalities discovered within the Area Network.			
	Damage to vehicles caused by detritus on the network [PO 1,3]	L		L

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
	Accumulation of litter such that the requirements of the EPA are not met [PO 1,3]	L		M
	Risk to workforce from clearing hazardous materials (e.g. asbestos) [PO 1]	H		
	Amenity areas are not maintained to an appropriate level [PO 2]			M
	Graffiti on the network detrimental to the customer experience [PO 4]			M
	Owners of animal fatalities not identified			L

Service Inspection and Maintenance Frequencies:

Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Sweeping and Cleaning	N/A – The need for any additional sweeping and cleaning beyond the maintenance strategy will be identified through routine asset operation and maintenance. See paved area requirement for planned Sweeping and Cleaning.		

Based on the route risk assessment, the following exceptions to these frequencies will be adopted

- Amenity Areas and recognized litter hot spots will be picked additionally as required by the TIRT teams

Defect Definitions and Indicative Responses:

In the event of a build-up of litter on a route for which we are responsible, we will respond in accordance with the below table.

Maintenance Requirement	Defect Category	Defect Description	Response Times	Indicative Response Action
Sweeping and Cleaning	Service	Paved areas (motorway and APTR roundabouts and lay-bys, approach and slip roads) <grade A as defined in the code of practice on litter and refuse	Grade B or C: 14 days	Return to grade A via cleansing
			Grade D: 7 days	Return to grade A via cleansing
	Service	Paved areas (other paved areas & parts of the network) <grade A as defined in the code of practice on litter and refuse	Grade C: 28 days	Return to grade A via cleansing
			Grade D: 7 days	Return to grade A via cleansing
	Service	Non-paved areas to grade B as defined in the code of practice on litter and refuse	Grade C: 28 days	Return to grade B via cleansing
			Grade D: 7 days	Return to grade B via cleansing
	Service	Litter Bin identified as over spilling	Repair: 24 hours	Empty bin (and any associated overspill)
	Service	Instance of fly tipping on the network	Make Safe: 24Hrs	Confirm and check for hazardous content
			Repair: 28 days	Arrange and implement clear up.
	Service	Graffiti	If Offensive: 24 Hours	Initially cover within 24 hours, then remove
Other: 21 days			Remove	
Safety	Debris in running lane – Solid	To be cleared in accordance with AMOR table 3.1	Attend and remove debris	
			Attend spill; mobilise specialist response if required, protect environmental assets.	

6.11 Maintenance Requirement Plan Hold Point (refer to page 5)

6.12 Maintenance Requirement - Tunnels

Scope: Tunnels within the Area Network, including associated mechanical and electrical equipment, and Supervisory Control and Data Acquisition (SCADA) systems.

A highway tunnel is defined as any subsurface highway structure enclosed for a length of 150m or more, including associated access and service infrastructure. The Operation and Maintenance Manual and the Network Information must be consulted to further define the scope of responsibilities for each tunnel.

Sources of information about condition data:

Inventory Type	Master Data Source	Condition Information
Tunnels	SMIS	SMIS
M&E Equipment	SMIS	SMIS

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: Tunnels (AMOR Part 16)	The management and mitigation of the following risks will ensure the delivery of the following Provider Outcomes [PO]: PO 1. Tunnels are managed, maintained and operated to ensure that they are safe and structurally sound.			
	Obstruction in the tunnel causes incident within tunnel bore [PO 1]	H	H	H
	Tunnel infrastructure (technology) fails, preventing effective monitoring of traffic within the tunnel	H	H	H

Route Character and Quantitative Risk Assessment:

Routes within the ASC (HAPMS Route Names)	Network character	Route asset risk
	Tunnel Name and Description	
A20 London - Maidstone - Dover	Roundhill Tunnel is located between the A260 (Folkestone to Canterbury Road) junction to the east and the M20 terminal (J13) roundabout to the west. The eastbound approach to the West portal is by twin viaducts over Holywell Coombe (one for the East bound traffic and one for the West bound traffic). Within the 370m long tunnel, each carriageway is carried in separate bores.	H
A27 Pevensey - Newton (Lancing to Lewes)	Southwick Tunnel is a 480m long tunnel, with each carriageway carried in a separate bore that was opened in March 1996. It was constructed as part of the A27 Brighton and Hove Bypass which provided a dual carriageway with two lanes in each direction from West of Shoreham to East of Brighton on the Lewes Road.	H

Service Inspection and Maintenance Frequencies:

Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Tunnels and associated equipment	Inspected & Maintained in accordance with BD53 and tunnel specific M&O manual		

The Tunnels are managed in accordance with BA72, BD78, and the Tunnels Operations and Maintenance Manuals produced by the Area 4 Tunnels Manager. Information on the inspection programme and requirements in accordance with BD53 are included in the Tunnels Asset Management Plan.

Defect Definitions and Indicative Responses:

In accordance with BD53 and the tunnel specific M&O manuals.

6.12 Maintenance Requirement Plan Hold Point (refer to page 5)

6.13 Maintenance Requirement – Camera Maintenance Plan

Scope: The *Provider* prepares an annual camera maintenance plan for maintenance and calibration of any

- (1) Permanent fixed; and
- (2) Permanent average speed enforcement cameras (excluding Highways Agency Digital Enforcement Cameras)

Not installed for enforcement of a temporary speed limit for a Scheme. The annual camera maintenance plan details any necessary and desirable maintenance and calibration of the cameras so that the cameras remain serviceable, calibrated and certified for the enforcement of speed limits by the police during the next Financial Year. The annual camera maintenance plan is submitted to the *Service Manager* by the 28th February preceding the year covered by the annual camera maintenance plan.

Sources of information about condition data:

Inventory Type	Master Data Source	Condition Information
Permanent Fixed Cameras	3 rd Party	3 rd party
Permanent Average Speed Cameras	3 rd Party	3 rd party

Note: These assets are not owned by Highways England. We believe them to be owned by the local safety camera partnerships.

Uncontrolled risks to safety (S), availability (A), and Highways England Reputation (R):

Asset Type(s)	Risk Characteristic	Risk to		
	Risk	S	A	R
Asset Group: <i>Safety Camera's</i> (<i>Service Information</i> 6.12)	The annual camera maintenance plan details any necessary and desirable maintenance and calibration of the cameras so that the cameras remain serviceable, calibrated and certified for the enforcement of speed limits by the police during the next Financial Year			
	Camera Line of sight is obscured by vegetation, reducing the ability to enforce effectively [soft estate PO1]	H		H
	Maintenance access to the camera is blocked / overgrown	M		M
	Camera is not calibrated			M

Note: Maintenance of any structural components is covered within the structures requirement

Route Character and Quantitative Risk Assessment:

Routes within the ASC (HAPMS Route Names)	Network character (m)
	Assets
A21 London - Hastings	1 No Fixed Speed Camera
A259 Folkestone - Chichester (West)	1 No Fixed Speed Camera
A27 Pevensey - Newton (Chichester - Lancing)	2 No Fixed Speed Camera

Service Inspection and Maintenance Frequencies:

Asset Type	Service Inspection Frequency	Maintenance Strategy	Frequency
Fixed Speed Cameras	Maintained to the same access standard as Communications Cabinets and other technology assets, including any hard standings for maintenance access. Ensure that the camera is not obscured by vegetation or other highway assets.		

We will identify the asset owners to understand their current programme of maintenance and calibration and seek to collaborate with them to optimise the programme of maintenance and calibration. We will explore options to undertake the maintenance and calibration exercises concurrently to minimise the impact on the network.

6.13 Maintenance Requirement Plan Hold Point (refer to page 5)

[Part 7] How our risk-based approach has been used to identify network Maintenance and Operations (M&O) routes and resources

Based upon the location and type of routes in Area 4, we have divided the network up into two operational areas (North and South) as shown on the Operational Strategy plan. We have then sub-divided each operational into local M&O routes to ensure our service reflects the differing needs of each route. This approach will also promote a culture of network stewardship across Area 4.

Each operational area will have a dedicated Area Maintenance Manager responsible for the implementation of this MRP. They will be based out of Weatherhill in the South and Stanford in the North and report to our M&O Manager who will be based at Kings Hill Office, West Malling. Our eight Area Maintenance Supervisors (three in the North and five in the South), who report to the Area Maintenance Managers, will each be assigned to individual M&O routes as current best practice in Area 4. A key function of the Area Maintenance Managers and Area Maintenance Supervisors is working with our Maintenance Operations Programmer to ensure the works are planned to minimise disruption to customers and to meet the route maintenance needs. Up to date organisation charts can be found on IBMS+.

Operational Strategy



[Part 8] Outline statement of proposed working methods for safety inspections

Our Safety inspections will be completed by two person team inspecting from vehicles at the slowest safe prevailing speed within the prevailing traffic. Five Highway Inspectors with additional drivers are based throughout the network to meet the requirements of the inspection programme.. Our safety inspections utilise video and GPS technology to provide additional evidence inspection completion in support of our Section 58 special defence. Our working methods include:

Approach	Benefit
Inspectors trained in the identification of defect types	Consistent and accurate identification of defects, resulting in appropriate responses and repairs being mobilised. This will reduce the number of return visits to the site before a permanent repair is affected.
Use of IAM IS to plan and deliver inspections	Transparency and assurance to the Service Manager that work is undertaken in accordance with the MRP. IAM IS will be complemented by our systems (HighStone, Watchman GIS) supporting analysis and decision making.
A-one+ Inspection and Maintenance Assurance	Independent checking of inspection output and compliance by our Quality and Performance Team. They will undertake both desk-based (compliance) and site based (quality) checks on inspections undertaken.
Find and Fix defect repair	Inspectors will be trained and equipped to identify and initiate the appropriate response to Safety defects, for example where conditions permit, using temporary material to fill potholes, providing safe, cost effective repairs that minimise disruption
Robust Change Control	Where a change to the accepted inspection frequency is justified, permission will be sought from the Asset lead in accordance with the mechanisms in 2.01 Inspect Asset Condition & 3.01 Develop Maintenance Requirements Plan.

[Part 9] Outline statement of proposed working methods for service inspection

Our working methods, in addition to those in the previous section will include:

Approach	Benefit
Use of specialist supply chain	To ensure specialist activities are delivered safely and in a cost effective manner we will utilise our supply chain to complete these inspections, for example roped access to structures and confined space entry teams.
Use of technology to support inspection records capture	Use of a broad suite of technology to record inspections. Our solutions will include IAM IS Mobile Mapper for records loaded directly in to IAM IS, Android Mobile applications linked to HighStone for records not entered in to IAM IS, PocketGAD for Geotechnical records and specialist software such as HADDMS compliant CCTV survey software.

Our Five highways inspectors are based throughout the network in order to carry out service inspections as per programme.

Our structures inspections are carried out by Highway Sector schemes 31 accredited inspectors employed by our supply chain and managed by Structures Asset Lead and Structure steward.

Specialist inspections (soft estate, electrical, geotechnical etc.) will be managed by our Asset Leads, drawing on resources from A-one+ and our supply chain, these will be either stored on the Asset Database or held locally on Aone+ servers.

[Part 10] Outline statement of proposed working methods for maintenance activities

To provide the AMOR service in Area 4, we will use our dedicated Maintenance & Operations Team whose sole focus will be the safe and timely delivery of planned and reactive maintenance services. They will make sure the network remains safe, available and tidy.

Our eight Area Maintenance Supervisors will be based at the depots with the Area maintenance teams as set out in the premises document part A. Our Area Maintenance Supervisors will drive a culture of ownership among the multi-skilled workforce, taking pride in their patch.

Our Quality and Performance Team will undertake checking of the decision making (what was done), compliance (timescales) and the quality of the activity. They will provide evidence of these checks to the Service Manager to demonstrate MRP compliance.

[Part 11] Resourced programme of planned preventative maintenance.

This is an extract of our type of annual planned preventative maintenance programme, latest version can be seen from M&O planners. It has been developed in excel to identify who is going to undertake the work, frequency of operations and timescales. The programme covers our entire AMOR service; however, the following extract focuses on the high value customer facing activities as an example.

Activity ID and Name	Start	Finish	Q3 - 2016	Q4 - 2016	Q1 - 2017	Q2 - 2017
Area 4 Asset Support Contract	05-Jun-16	05-Jun-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
Call Outs and Cat 1 Repairs	05-Jun-16	04-Jun-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Incident Response Service (4 x TIRT teams)	05-Jun-16	04-Jun-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Severe Weather Service (14 routes)	05-Jun-16	04-Jun-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
Works within Static Traffic Management	05-Jun-16	07-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ A21	06-Jun-16	07-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Traffic Management	06-Jun-16	07-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Nearside Works	06-Jun-16	07-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Central Reserve Works	28-Jun-16	28-Jun-16	◆			
↳ A259 (East)	01-Jul-16	15-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Traffic Management	01-Jul-16	15-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Nearside Works	04-Jul-16	15-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Central Reserve Works	01-Jul-16	01-Jul-16	◆			
↳ A27	06-Jun-16	23-Apr-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Traffic Management	06-Jun-16	23-Apr-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Nearside Works	06-Jun-16	23-Apr-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Central Reserve Works	27-Jun-16	17-Jul-16	◆			
Works within Mobile Closures	05-Jun-16	05-Jun-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Soft Estates	05-Jun-16	16-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Swathe Cut - Nearside (2-man gang)	05-Jun-16	07-May-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Sweeping and Cleaning	05-Jun-16	09-Apr-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Carriageway sweeping - Nearside	05-Jun-16	09-Apr-17	[Gantt bar spanning Q3-2016, Q4-2016, Q1-2017, Q2-2017]			
↳ Carriageway sweeping - Central Reserve	27-Jul-16	29-Jul-16	◆			

Detailed extract of programme on following page



On the left is an example of an extract from our resource programme shows a detailed breakdown of the A27 planned preventative maintenance activities. Full breakdown can be provided and provided by the M&O Planners

Example: The graph on the right is derived from our resource loaded programme and illustrates a peak in resources (shown on the graph in hours). These are deployed to deliver the AMOR requirements following the end of mobilisation, ensuring compliance from the outset. After June, we have programmed our remaining activities for the year to balance the resource needs, providing the optimal amount of resource to deliver the service.

By developing a detailed programme, we have identified numerous opportunities where, through effective programming, we have been able to reduce the number of interventions on the network, reducing the customer impact of our activities whilst effectively delivering the AMOR



requirements. Up to date resource programmes are available from our Maintenance Inspection Programmes.