

Common Highways Agency Rijkswaterstaat Model (CHARM)

Business Specification

Version: 1_0

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1. Introduction

1.1 Background

On the 12th January 2012 the CHARM Governance Board agreed that both the Highways Agency (HA) and Rijkswaterstaat (RWS) were sufficiently similar to continue with CHARM and jointly define a new generation of traffic management systems¹ that may be jointly purchased.

Specifically the traffic management systems will:

- To a high extent support HA and RWS traffic management processes, currently and within the foreseeable future (current assumption for earliest delivery is 2015);
- Enable operational resilience (in case of fire, power failure, etc.);
- Support a (managed) service model, promote functional development during the operational phase, and prevent vendor lock-in;
- Enable the total cost of ownership to be reduced significantly from the parties' current generation of traffic management centres.

Building on the analysis performed to determine the level of similarity, the CHARM requirements and architecture tranche have continued their analysis to jointly develop a common scope, business model and requirements for CHARM to deliver.

Their analysis has been supported by both technology and business representatives across both organisations and has culminated in the development of this document. A full list of contributors is available in Annex H.

1.2 Purpose

The purpose of this Business Specification is two fold:

1. To inform internal and external stakeholders of the scope of CHARM, its context within the Highways Agency and Rijkswaterstaat, and the business activities CHARM will support.
2. To act as a foundation for further solution design and procurement of required IT and supporting services

The document is split into 3 main sections describing, in high-level business terms the scope, common (HA and RWS) business model and business requirements for CHARM.

¹ "Traffic management systems" specifically denotes systems that are typically located in traffic management centres. This document will describe this scope further.

2. Business Scope

2.1 CHARM in the Highways Agency & Rijkswaterstaat

Over a number of years, RWS and the HA have worked together to share knowledge and approaches to solving common problems. This relationship is embedded in a joint Memorandum of Agreement.

Both organisations have a similar purpose, they are both responsible for improving, maintaining and operating their respective countries strategic road networks (SRNs), operating out of a national traffic management centre and a number of regional traffic management centres.

Jointly these traffic management centres (TMCs) are responsible for approximately 10,000kms of motorways and all purpose trunk roads (APTR) and clearing over 400,000 incidents each year.

Both organisations are very similar in the way they operate their networks and have the following missions:

- HA: “Safe roads, reliable journeys and informed travellers”
- RWS: “Smooth and safe traffic on the road and reliable & useful information”

Furthermore both organisations each have a goal to do deliver this in a sustainable way.

However both organisations also share similar problems and challenges relating to the technology within their TMCs such as increasing cost of ownership, constrained business flexibility and labour intensive systems. It's these issues that CHARM aims to address.

More information relating to the HA and RWS can be found in Annex A.

2.2 Business services²

To fulfil the missions of “Safe roads, reliable journeys and informed travellers” and “Smooth and safe traffic on the road and reliable & useful information”, both HA and RWS share a need to deliver the following products:

- A **safe** journey on the strategic road network;
- A **smooth and reliable** journey on the strategic road network;
- **Reliable and useful information** to the road user; and
- Operate the network in a **sustainable** way.

The table on the next page describes how these products are broken down into business services that require support from CHARM to deliver. These requirements are explained further in the remainder of this document. Further information relating to these business services such as key performance indicators and relevant capabilities are available in Annex B:

² This business specification is only about business services for Traffic Management Centres

Product	Business Service
To deliver a safe journey on the strategic road network	<ul style="list-style-type: none"> - Dynamic traffic warnings - Control traffic (e.g. speed signals, AID, Managed Motorways) - Protect event scene (Incident Management) - Crisis management - Continuity management - Manage tunnels - Control traffic around tunnels and bridges - Operate hard shoulder lanes - Safe road works - Maintain safety in case of technical and infrastructure failures
To deliver a reliable and smooth journey on the road network	<ul style="list-style-type: none"> - Set national and regional detours - Incident management - Deploy traffic scenario's - Crisis management - Continuity management - Set traffic management measures - Operate hard shoulder lanes - To limit the disturbance of road works - Functional maintenance of traffic management systems (including tuning & configuration) - Maintain the function of the road network in case of failures and blockades
To deliver reliable and useful information to the road users	<ul style="list-style-type: none"> - Traffic management messages - Traffic information through information service providers and dedicated channels - Information via VMS and other roadside equipment - Information on road works - Information through social media
Operate the road network in a sustainable way	<ul style="list-style-type: none"> - Dynamic speed control

To be able to deliver these business services, a number of business supporting services are relevant. The list below gives business support services within scope of CHARM.

Product	Supporting Service
Business Support	<ul style="list-style-type: none"> - Performance management (set, evaluate and report performance)³ - Development, configuration and maintenance of procedures with information, documents - Education, training and practice on the job - Testing on the job - Business continuity management

³ This is a combination of operational and strategic traffic management

Product	Supporting Service
	<ul style="list-style-type: none"> ○ Fire and flood ○ Technical disturbance ○ Pandemic ○ Terror, cybercrime ○ Immediate evacuation ○ Power supply - Reduce disturbance of road works - Security - Human resource management (knowledge, roles, capacity, etc) - Information line (RWS: 0800-8002, HA: HAIL) - Winter management - Operation on road auditing - Business Information management (demand, interaction) <ul style="list-style-type: none"> ○ Operational user support and instruction ○ Functionality management (own and manage the specification + requirements, verify and validate, test) ○ Change management - Interface with/management of other technologies (vehicles, workspace, building, installations)

2.3 Service levels and KPIs

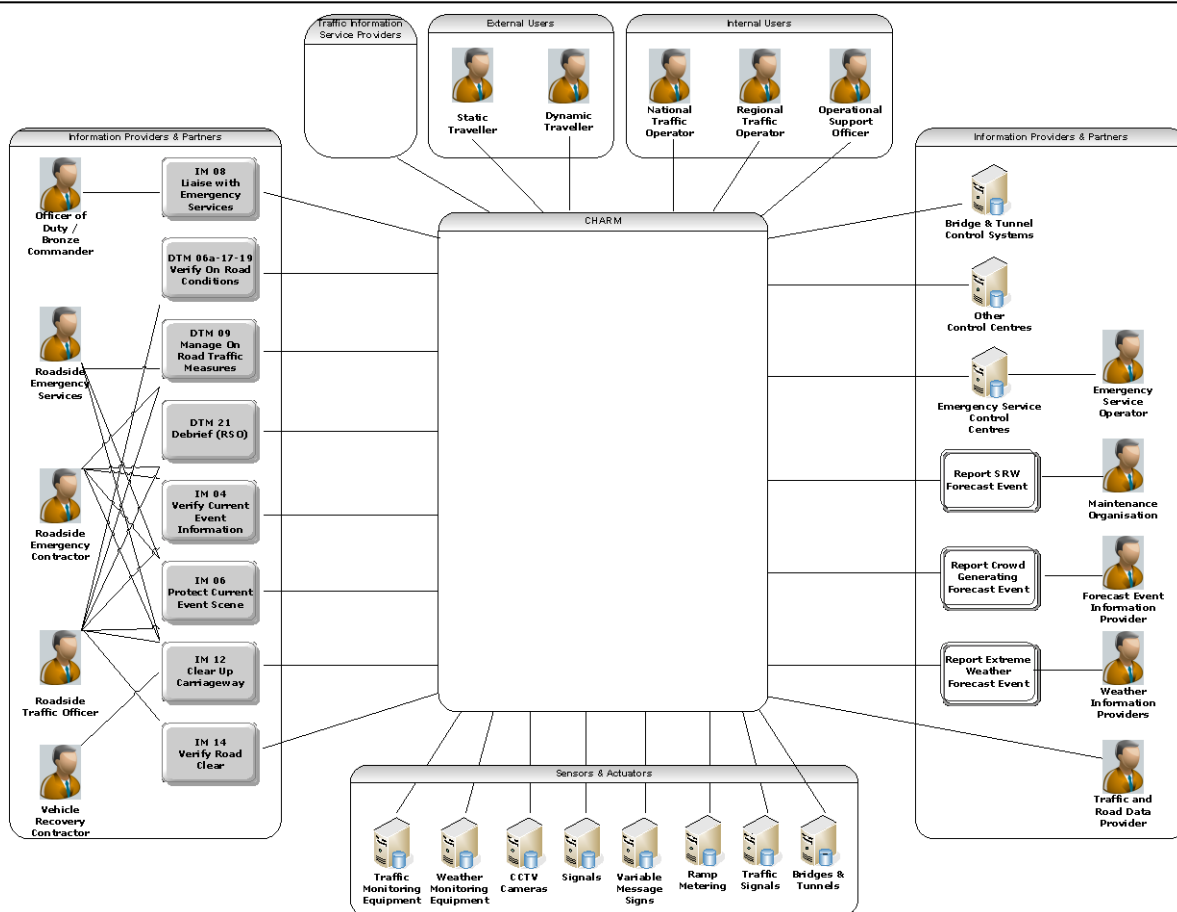
Annex B gives a first impression of Services levels and KPIs. These still have to be detailed further and will be influenced by developments.

2.4 Boundary and stakeholders

The Diagram below describes CHARM within the overall context of operating the strategic road network of both the HA and RWS, specifically in response to Current Events (such as vehicle breakdowns, collisions or during crisis management) and Forecast Events (e.g. scheduled road works, crowd generating and extreme weather forecast events).⁴

It shows the required interfaces between CHARM and business activities, users, partners and technology.

⁴ Within HA also the terms planned and unplanned events are used. Current events can be planned (e.g. road works) or unplanned (e.g. collision)



2.4.1 Internal Users

This group describes the roles (internal to either RWS or the HA) that will have a direct access to CHARM in order to operate the strategic road network.

Name	Description
National Traffic Operator	Responsible for: <ul style="list-style-type: none"> - Ensuring that traffic flow through the network is optimal during conditions of normality and that the impact of events on the road network impact road users not directly involved in an event as little as possible through dynamic management of traffic; and - Maintaining an overview of current events on the road network and co-ordinating the management of any that require a national and cross border response.
Regional Traffic Operator	Responsible for: <ul style="list-style-type: none"> - Managing the regional deployment and operation of on-road resources, and undertake regional traffic management activity, in response to events on the road network that disrupt the free flow of traffic on the live carriageway or jeopardise the safety of road users; and - When required, taking the lead in co-ordinating the

Name	Description
	incident handling.
Operational Support Officer	Responsible for: <ul style="list-style-type: none"> - Evaluating the effect of a Scenario making recommendations for areas of improvements; - Evaluating the performance of the road network and identifying the cause of identified problem; and - Reporting recommendations and lessons learnt both “upwards” to national level and “downwards” to support operations.

2.4.2 External Users

This group describes the roles (external to either RWS or the HA) that will access CHARM or the information contained within it (and are not otherwise mentioned in this section).

Name	Description
Static Traveller	A commercial or private person that is intending to travel but hasn't yet embarked on their journey. Instead they are in the process of planning their journey supported by CHARM.
Dynamic Traveller	A commercial or private person who has started their journey using a variety of modes of transport, such travellers are can either be a driver, car pooler (including a non-public transport passenger) or a public transport passenger.

2.4.3 Traffic Information Service Providers

This group describes organisations that share information with CHARM and other network operators to provide additional traffic information to users of the network, including dynamic and static travellers. For RWS this group includes, for example several privately owned (value adding) traffic information providers, such as ANWB, VID and Tom Tom Information.

2.4.4 Providers and Partners

This group describes the roles that share information with CHARM relating to Current and Forecast Events through pre-agreed channels.

Name	Description
Bridge and Tunnel Control Systems	Information required to detect and manage the following traffic impacting conditions on bridges and within tunnels, such as: <ul style="list-style-type: none"> - The status of the bridge or tunnel infrastructure; - The atmospheric pollution levels on the bridge or in the tunnel; - Fire in tunnels; and - The weather conditions on bridges.

Name	Description
Other Control Systems	<p>Information required to operate the road network hosted by other regions within RWS / HA and urban traffic control centres, specifically to:</p> <ul style="list-style-type: none"> - Gather information relating to current and forecast events; - Dispatch and control the activities of the vehicles and personnel belonging to a particular Service when they attend current and forecast events; - Provide reports on progress in dealing with the current and forecast events to enable traffic and travel management strategies to be updated; - Provide details of current event situations affecting road transportation that are reported directly to them, for instance through their call switchboard.
Emergency Service Control Systems	<p>Information required to be used by the emergency services (including police, fire and ambulance services) as part of their operations to:</p> <ul style="list-style-type: none"> - Gather information relating to current events; - Dispatch and control the activities of the vehicles and personnel belonging to a particular Service when they attend current events; - Provide reports on progress in dealing with current events to enable traffic and travel management strategies to be updated; and - Provide details of current event situations affecting road transportation that are reported directly to them, for instance through their call switchboard.
Maintenance Organisations	<p>These organisations are able to carry out work to build and/or maintain the road network and/or can carry out maintenance on equipment that is required to operate the road network. To support their role information is required to be:</p> <ul style="list-style-type: none"> - Provided to CHARM about the time, place and duration of scheduled road works. - Provided to CHARM about the status and completion of maintenance activities. - Shared relating to requests for maintenance work to be performed.
Forecast Event Information Providers	<p>These organisations are either themselves event organisers or have access to crowd generating forecast event information for events that may have an impact on the road network.</p>
Weather Information Service Providers	<p>These organisations are able to predict future weather conditions that may have an impact on the road network and inform CHARM of these Extreme weather forecast events.</p>
Traffic and Road data providers	<p>Dutch National Data Warehouse for road and traffic data (NDW) provides traffic data for the national and regional road network to RWS. In England it is equivalent to National Traffic Information Centre (NTIC).</p>

2.4.5 Actuators and sensors

This group describes the technology actuators and sensors that capture data and transmit information to and from CHARM to support the operation of the national road network. See Annex D for the list of measures that are deployed with these actuators and sensors and that CHARM supports.

Name	Description
Traffic Monitoring Equipment	<p>Located at roadside or within the road infrastructure, traffic monitoring equipment is used to provide information to the operator regarding the traffic conditions on the network, in some cases they are also used to automatically set signs and signals for queue protection.</p> <p>There are several types of traffic monitoring equipment, but the most prevalent are induction loops and ANPR (automatic number plate recognition). Radar & Magnetic anomaly detectors are being used in a small number of places, but are expected to become more popular than using loops in future. There are also high speed WIMS (Weigh In Motion System) devices to measure the weight of vehicles on the move.</p>
Weather Monitoring Equipment	<p>Located at roadside, weather monitoring equipment provide up to date wind and fog information to the operator, they are also used to automatically set signs and signals to advise travellers of the weather conditions.</p>
Closed Circuit Television Cameras	<p>A mixture of Pan, Tilt and Zoom (PTZ) and fixed cameras are situated at roadside and controlled by the operator. These provide up to date images of traffic conditions to the operator.</p>
Signals	<p>Signals are LED style displays, located at roadside that are used to mandate or advise of speeds, lane diverge or closures and fog to travellers. They are set either automatically by traffic and weather monitoring equipment, or by an operator.</p>
Variable Message Signs	<p>VMS is used to relay a message to the travelling public about road conditions ahead or strategically on other parts of the network. There are a variety of versions in which all can display text and some can also display pictures as well as text.</p> <p>Further details of the types of traffic management measures displayed on VMS can be found in Annex D.</p>
Ramp Metering	<p>A traffic signal based system typically located at the end of a motorway slip road, used to platoon traffic as it enters the motorway during peak periods.</p>
Traffic Signals	<p>Traffic Signals are used on the Trunk Road Network and around motorway intersections can be controlled by the operator.</p>

Name	Description
Bridges and Tunnels	Actuators and traffic management measures located in and around tunnels and on and around bridges required to manage the traffic and the safety of road users in / on them, including physical barriers, emergency lighting etc.

2.4.6 Roadside Resource

This group describes the roles (internal and external to either RWS or the HA) that operate from an on-road location but have a need to share information with CHARM.

Name	Description
Roadside Traffic Officer	<p>Roadside Traffic Officers are required to receive information from CHARM or provide information into CHARM in order to perform the following Dynamic Traffic Management or Incident Management duties:</p> <ul style="list-style-type: none"> - Verifying on-road conditions – providing confirmation of on-road conditions to CHARM; - Managing on-road traffic measures – managing the on-road response to an event, informing CHARM of progress; - Debriefing roadside resource – identifying compliance with procedures, possible performance improvements when responding to similar events and to monitor the welfare of roadside staff involved, informing CHARM of the output; - Verifying Current Event Information – providing required additional information to CHARM relating to Current Events; - Protecting the current event scene – securing the current event scene by placing their vehicle in fend-off positions, coning-off the incident or implementing rolling road clocks, providing updates to CHARM along with estimated clearance times. - Clearing up carriageways – managing the clearance of debris and other network incursions from the current event scene, informing CHARM of progress; - Verifying the road is clear – Following a current event, informing CHARM when the road is clear:
Officer of Duty / Bronze Commander	<p>Officer of Duty (RWS) or Bronze Commander are required to receive information from CHARM or provide information into CHARM in order to perform the following Incident Management duties</p> <ul style="list-style-type: none"> - Liaise with Police / Emergency Services – liaising with the police commander at scene to establish the details of when any closed carriageways or lanes will reopen and when other specialist resources are required to be deployed.

Name	Description
Roadside Emergency Contractor	<p>Roadside Emergency Contractors are required to receive information from CHARM or provide information into CHARM in order to perform the following Dynamic Traffic Management or Incident Management duties:</p> <ul style="list-style-type: none"> - Managing on-road traffic measures – managing the on-road response to an event, informing CHARM of progress; - Debriefing roadside resource – identifying compliance with procedures, possible performance improvements when responding to similar events and to monitor the welfare of roadside staff involved, informing CHARM of the output; - Verifying Current Event Information – providing required additional information to CHARM relating to Current Events; - Protecting the current event scene – securing the current event scene by placing their vehicle in fend-off positions, coning-off the incident or implementing rolling road clocks, providing updates to CHARM along with estimated clearance times. - Clearing up carriageways – managing the clearance of debris and other network incursions from the current event scene, informing CHARM of progress;
Roadside Emergency Services	<p>Roadside Emergency Services (Primarily the Police) are required to receive information from CHARM or provide information into CHARM in order to perform the following Dynamic Traffic Management or Incident Management duties:</p> <ul style="list-style-type: none"> - Verifying on-road conditions – providing confirmation of on-road conditions to CHARM; - Managing on-road traffic measures – managing the on-road response to an event, informing CHARM of progress; - Debriefing roadside resource – identifying compliance with procedures, possible performance improvements when responding to similar events and to monitor the welfare of roadside staff involved, informing CHARM of the output; - Verifying Current Event Information – providing required additional information to CHARM relating to Current Events; - Protecting the current event scene – securing the current event scene by placing their vehicle in fend-off positions, coning-off the incident or implementing rolling road clocks, providing updates to CHARM along with estimated clearance times. - Clearing up carriageways – managing the clearance of debris and other network incursions from the current event scene, informing CHARM of progress; - Verifying the road is clear – Following a current event, informing CHARM when the road is clear:

Name	Description
Vehicle Recovery Contractor	<p>Vehicle recovery contractors are required to receive information from CHARM or provide information into CHARM in order to perform the following Incident Management duty:</p> <ul style="list-style-type: none"> - Clearing up carriageways – managing the clearance of debris and other network incursions from the current event scene, informing CHARM of progress;

2.5 Exclusions and potential developments

Listed below are a number of areas that are not currently within the scope of CHARM as either stated or implied in the context diagram above:

- Business activities performed at roadside but required to operate the network, such as repairing damaged infrastructure or clearing the carriageway after a current event;
- Business activities performed within a traffic management centre that are performed for non-operational purposes, such as financial and facilities management⁵; and
- Support to the traveller to help with multi modal or public transport journey planning decisions, although the information collected by CHARM will need to be shared with these information providers and CHARM can receive information from these providers.

Listed below are a number of areas that although not within current scope, CHARM needs to factor in to its architecture to allow for potential developments.

- Technology located at Roadside⁶;
- Tunnel Management⁶;
- Bridge Management⁶;
- Co-operative Systems⁶;

HA and RWS are looking at how CHARM can be aligned with tunnel management. As a result of this the scope as stated in this document is subject to change depending on the outcome of this future analysis.

2.6 CHARM in context to the Highways Agency

The HA's Traffic Management Directorate (TMD) performs the majority of traffic management activity on behalf of the HA, (Annex B provides further information). TMD itself is undergoing a Change Programme, implementing a Future Operating Model (FOM) by 2013. The Change Programme is delivering a number of key changes to the way the HA operates its network and as such has been an important input into the analysis that supports this document.

To help show the areas of the FOM that are supported by CHARM, each CHARM activity identified has been associated with a FOM process. Analysis of the level of support has been conducted and can be found in Annex E. In summary:

⁵ ICT services required to support and manage the CHARM solution are within the scope of CHARM

⁶ Currently only the interfaces to these systems are in scope of CHARM.

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- 17 FOM Processes are fully supported by CHARM.
 - 6 FOM processes are partially supported by CHARM, mainly because processes such as “Protect Current Scene” are performed both by an operator in a TMC but also at roadside by a roadside traffic officer.
 - 14 FOM Processes are not supported by CHARM, mainly because these processes are either not operational activities such as “manage contracts” or performed outside the traffic management centre such as “manage current event scene”

2.7 CHARM in context to Rijkswaterstaat

The RWS's Traffic and Water Management Directorate (VWM) performs the majority of traffic management activity on behalf of the RWS. The business services that are delivered, including the level of service (KPI) are described in Annex B. RWS has implemented uniform business processes (UPP) in all traffic management centres, including standard protocols and procedures. First analyses of the UPP-business processes on CHARM shows that about 60% of UPP is supported by CHARM, see Annex F.

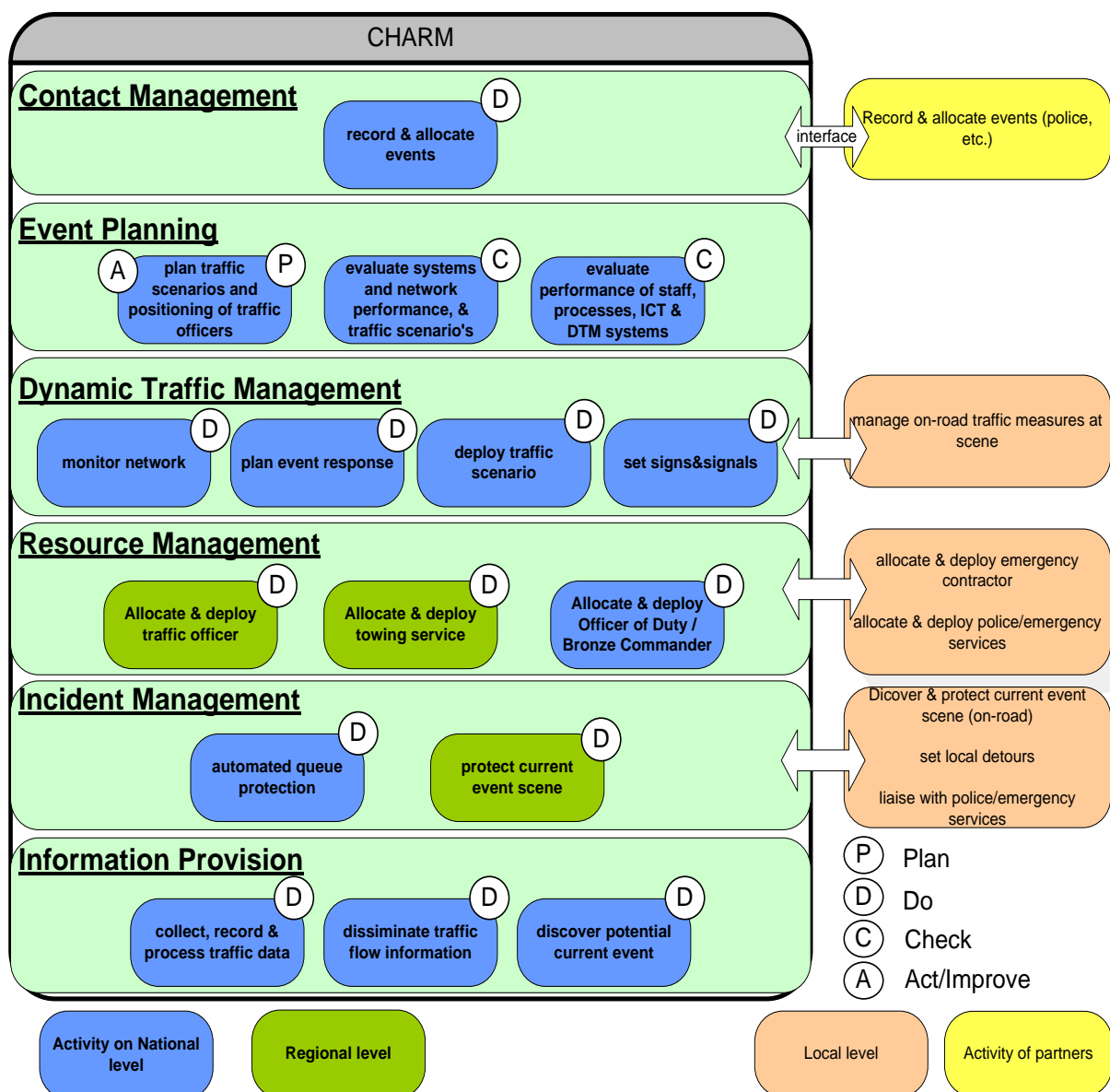
Rijkswaterstaat itself is undergoing a change programme, implementing a new business model by 2015 (Dutch: “Ondernemingsplan”, OP2015). The OP2015 is delivering a number of key changes to the way the HA operates its network and as such has been an important input into the analysis that supports this document.

A more complete view on future developments within and outside Rijkswaterstaat is described in Annex G.

3. CHARM Combined Business Model

3.1 Summary

The diagram below is a high-level view of a common (valid for both the HA and RWS) business model developed during the earlier comparison exercise⁷ and refined during the development of this business specification. It describes the activities performed by both RWS and the HA, grouped by core and supporting capabilities that CHARM aims to support. A more detailed model can be found in Annex C. The activities performed within the capabilities are described in Activity Descriptions (ADs) in section 3.2.



⁷ A comparison of the HA and RWS was performed to assess if the two organisations were similar enough to continue with CHARM and define a new generation of traffic management systems that could be jointly procured.

The business processes and activities in the business model are specified and aligned according to the Deming-cycle (Plan-Do-Check-Act/Improve) to improve the business services and outcomes to the road users. Also the PDCA-cycle is implemented to be able to act on changing circumstances such as policy changes and customer needs. The activities to improve the business are the “cement” between the capabilities and are an important issue in the scope of CHARM.

3.2 Capabilities and Activities

The section below describes the activities defined in the CHARM common model (see Annex C) that will be supported by CHARM (i.e. in scope), each activity has been grouped by the 6 core and supporting capabilities.

Furthermore a list of the activities within the common model that fall outside the scope of CHARM can also be found in Annex C.

3.2.1 Contact Management

A supporting capability required for the management of (all) contacts with HA-RWS. For the HA this includes contacts about forecast and current events. For RWS this includes only the forecast events. Contact about current events is in addition handled by the National police.

Activity	Name	Definition
CM01	Record (S)RW Forecast Event Information	Gather all information (type of work/planning) about forecast road works (building and maintenance works, +2 years) in the whole network, including significant works of stakeholders (e.g. other road authorities or railways/bus operators).
CM02	Allocate (S) RW Forecast Event	For allocating a Schedule Road Work Forecast Event to the business unit responsible for coordinating the response.
CM03	Record CG Forecast Event Information	Recording information about crowd generating forecast events as required to support the needs of information consumers, such as event planning, strategic traffic operations, regional traffic operations, the National Traffic Information Centre, and police
CM04	Allocate CG Forecast Event	For allocating a Crowd Generating Forecast Event to the business unit responsible for coordinating the response.
CM05	Record EW Forecast Event Information	Recording information about extreme weather forecast events as required to support the needs of information consumers, such as event planning, strategic traffic operations, regional traffic

Activity	Name	Definition
		operations, roadside operations, the National Traffic Information Centre and Police
CM06	Allocate EW Forecast Event	For allocating Extreme Weather Forecast Events to the business unit responsible for coordinating the response.
CM07, 10	Record Current Event Information	Recording information about current events as required to support the needs of information consumers, such as strategic traffic operations, regional traffic operations, the National Traffic Information Centre, and police or emergency services
CM09	Allocate Current Event	For allocating Current Events to the appropriate recipients to respond and manage the Current Event.

3.2.2 Event Planning

A supporting capability required for the co-ordination of activities to manage the HA-RWS response to forecast events.

Activity	Name	Definition
EP01	Determine Capacity Network	Calculate the number of vehicles that can traverse a given road segment per hour for the entire network.
EP02	Forecast Demand	For Forecasting the future Demand on the Strategic Road Network at different times of day, days of week, months of the year and seasons.
EP03	Determine Bottlenecks (Dem > cap)	Identify parts of the network where the intensity-capacity ratio is between 85-100% (critical I/C), in combination with known congestion locations. Identify segments of the road network having spare capacity (< 85%).
EP04	Plan Normality Traffic Scenarios	<p>Define, test and implement a collection of traffic scenarios along with rules when they are activated (Triggers).</p> <p>These are sets of combined traffic management measures, to be deployed when speed and flow reaches identified thresholds, for the period needed to decrease the intensity at the given road segment again. Priority of roads is taken into account.</p>
EP05	Determine (S)RW	For assessing the impact (delay on the network) of

Activity	Name	Definition
	Forecast Event Impact	a Schedule Road Work on the rest of the Road Network.
EP06, 09, 12	Determine Forecast Event Stakeholders	For identifying the relevant stakeholders, both in internal and external who can aid the planning of the RWS's Traffic Management Response to <ul style="list-style-type: none"> - the Schedule Road Work Forecast Event. - The crowd generating Forecast event - Extreme Weather Forecast event
EP07, 10, 13	Plan Forecast Event Traffic Scenarios	Define, test and implement a specific traffic scenario along with rules when it will be activated (Triggers). Scenarios are sets of combined traffic management measures, to be deployed when speed and flow reaches identified thresholds, for the period needed to decrease the intensity at the given road segment again. Priority of roads is taken into account.
EP08	Determine CG Forecast Event Impact	For assessing the impact (delay on the network) of a Crowd Generating Event on the rest of the Road Network.
EP11	Determine EW Forecast Event Impact	For assessing the impact (traffic flow, likelihood of incidents, resource deployment) of an Extreme Weather Forecast Events on the rest of the Road Network.
EP14	Plan Traffic Forecast	Provide a forward static view of the state of the road network in terms of road works, crowd-generating events, weather forecast, expected congestion, the impact of these on traffic flow and the reason for that impact. Expected traffic flow categorised according to severity. Information provided to traffic operators, general public and for resource planning (traffic officers, traffic operators, vehicles and equipment).
EP15	Plan Positioning Traffic Officers on the Network	Using intelligence about expected and known conditions on the road network, a forward view of where On Road Traffic Officers and their Vehicles and equipment are required nationally to ensure adequate coverage at all times.
EP16	Evaluate Traffic Scenarios	To evaluate the effect of a Scenario based on Expert judgement, Analysis and historic data; making recommendations for areas of improvements.

Activity	Name	Definition
EP17	Evaluate Network Performance	<p>To measure the performance of the road network in relation to pre-determined reference values, the performance of RWS as network operator (and any stakeholders) and to identify the cause of any identified problems/issues.</p> <p>Reporting both “upwards” to strategic level and “downwards” to support operations.</p>
EP18	Evaluate System Performance	<p>To measure the performance of the traffic management system including processes, people and technology to pre-determined reference values and to identify and rectifying the cause of any identified problems/issues.</p> <p>Reporting both “upwards” to strategic level and “downwards” to support operations when required.</p>

3.2.3 Dynamic Traffic Management

A core capability required for the management of demand and capacity on the road network through influencing or directing the behaviour of road users and to ensure that traffic flow across the road network is as close to optimal as possible at all times and to protect people on the network.

Where events occur on the road network that cause traffic flow to deviate from normality (Current or Forecast Events, including routine congestion), Dynamic Traffic Management is employed to ensure that road users both locally near the scene of the incident and across the wider road network are able to continue their journeys with as little disruption as possible.

Activity	Name	Definition
DTM01	Close Lanes for Road Works	<p>Closing lanes to create a safe working space, and to guide traffic along road works safely.</p> <p>Before closing lanes for road works there is a check on the current status of the network (e.g. on possible current events or unexpected high level of traffic density). When these events may occur, the road works may be postponed.</p>
DTM03	Monitor & Anticipate Network Conditions	<p>Monitoring the network in order to spot abnormality in traffic flow, which may be caused by a current event.</p> <p>Undertaking simulations of the effect of traffic management measures.</p>
DTM05	Allocate Traffic Scenario	Select scenario according to traffic conditions and forecast event and reference values

Activity	Name	Definition
DTM06, 17, 19	Verify On Road Conditions	TO who are out on the network to provide confirmation of on-road conditions against expected/predicted conditions. Against certain references, check of: <ul style="list-style-type: none"> - Traffic flow - Road surface conditions - Weather - Notify traffic operator
DTM07	Deploy Traffic Scenario	Activate several measures in order to manage demand and capacity, both manual and automated in accordance with the selected traffic scenario. The traffic operator has the possibility to adjust the scenario within the framework of the scenario and has to motivate his decision.
DTM08, 18	Manage Demand and Capacity	Setting dynamic traffic management measures such as manage speed limits, hard shoulders and ramp metering and deployment of Traffic Officers either based on traffic scenarios or on a more responsive basis.
DTM10	Discover Potential Current Event	To discover that an event (time, location, type) has occurred
DTM11, 12	Determine Current Event Impact	Determine whether the event occurred at a hazardous location (such a place is where the event could cause follow-up incidents or damage to the infrastructure), impact on the network (will cause a traffic queue, possibly also in other parts of the network), etc.), time until normality will be restored. Determine the impact on the network that the event will cause against agreed priorities.
DTM13, 16	Plan Current Event Response	<ul style="list-style-type: none"> - Plan which traffic management measures and (finally) signs and signals to mitigate the event impact on the rest of the network - Plan which other responder organisations to involve to resolve the event - Determine whether a TO has to be allocated and deployed - Plan level of command & control (escalation) based on business rules - Plan level of stakeholder communication
DTM14	Manage National Diversions & On-Road Messages	Implementing diversions on national road network away from the current event.
DTM15	Manage Regional Diversions & On-Road	Implementing off-network diversions to divert traffic away from the current event and re-route it through

Activity	Name	Definition
	Messages	secondary road network or on regional motorway network.
DTM20	Remove Traffic Management Measures	All traffic management measures are removed. Roadside resource is redeployed. Status 'normality' is communicated stakeholders and to NTC to inform information providers.
DTM22	Debrief (RTO)	For debriefing when a significant event has occurred to identify compliance with procedure, any performance improvements when responding to similar events and to monitor the welfare of staff involved.

3.2.4 Resource Management

A supporting capability for the management of people and physical resources to ensure sufficient coverage of the priority areas of the road network based on road network intelligence.

Activity	Name	Definition
RM00	Briefing	To inform Traffic Officers on: <ul style="list-style-type: none"> - Expected situations that might affect operations during the upcoming shift. - Their initial Park Up Point locations - The Activities they are to perform during the upcoming shift.
RM01, 03, 07	Allocate Traffic Officer	Select the traffic officer who is: <ul style="list-style-type: none"> - qualified to handle the current event effectively and will be there in time; - qualified/planned to handle a traffic scenarios (forecast-event) Ensuring that at other potential current event scenes of higher priority still a qualified traffic officer in time can be deployed.
RM02, 04, 08	Deploy Traffic Officer	Direct the traffic officer to the event scene, brief details about current or forecast event (forecast event: actions required when on scene), Travel to the Scene and monitor time of arrival (current event).
RM05	Allocate Towing Service	For allocating the correct towing service, vehicle and equipment to tow the damaged vehicle HA: once the need for a towing service has been identified, normally by the Traffic Officer present at

Activity	Name	Definition
		Scene Or by the vehicle owner through their own private vehicle recovery. RWS: pro-active, no waiting for identification
RM06	Deploy Towing Service	The allocated towing service is deployed to the event scene by a national contractor. Time of arrival is monitored and reported.
RM11	Allocate On-Road Team Manager	<p>In specific Current Events an On-road team manager (RWS: Officer of Duty) will be required at Scene to speed up clearance time.</p> <ul style="list-style-type: none"> - Incidents with great impact on traffic flow - Incidents with a truck with hazardous goods/fluids and life stock. - Incidents with casualties (dead, multiple heavy wounded. - Incidents with on-duty RWS/HA personnel involved - Incidents with large costs for property - Incidents with trucks where there are alternatives to towing etc. <p>The Activity of allocating a Team Manager (Officer on Duty) will be performed using the “Allocate Traffic Officer”</p>
RM12	Deploy On-Road Team Manager	Direct the On Road team manager to the event scene, brief details about current or monitor time of arrival
RM13	Allocate Emergency Contractors	For allocating a Current Event to the Emergency Contractor who is responsible for undertaking emergency repairs the damaged road network infrastructure caused by this Current Event
RM14	Deploy Emergency Contractors	For directing the Emergency Repair Contractor (MAC) to attend the event scene along with providing brief details about event and actions required when on scene

3.2.5 Incident Management

A core capability required for the management of activities which are undertaken where an event occurs on a live carriageway that causes traffic flow to deviate from normality or occurs off-network with an impact on the network. Incident management requires an on-road response to restore the network to normality. Additionally, the setting of signs and signals warning road users of an incident is considered part of Incident Management activity.

Activity	Name	Definition
IM05	Protect Current Event Scene (Signs & Signals)	The setting of signs and signals to protect the event scene (e.g. lane closures, lane redirections and speed limits on managed motorways, warnings on VMS).
IM02	Automated Queue Protection	For automatically identifying potential current events have occurred and alerting traffic upstream with warnings and speed limits (matrix signalling).

3.2.6 Information Provision

A core capability required for the management of activities that provide information about the state of the road network. Information is provided to internal consumers such as operational colleagues and to external operational partners (such as the emergency services or service providers) to enable HA-RWS to fulfil their role as network operator.

HA also provides information to the general public, both pre-trip and on-road, as well as to third party organisations and the media.

RWS provides information, via the National Data Warehouse, to value-added service providers who provide traffic information to the general public.

Activity	Name	Definition
IP00, 03, 06, 08, 10	Disseminate Traffic Flow Information	The National Traffic Information Centre will distribute tailored information using agreed standards regarding the past, current and future state of the network to: <ul style="list-style-type: none"> - operational information customers for their use (internal), - road users (RWS: only via VMS) - value added service providers (RWS: via NDW) (RWS does not disseminate real-time Traffic Information to the general public other than through VMS)
IP01	Collect & Record Traffic Flow Information	For Collecting and recording near real time Traffic Flow data from a variety of internal and external sources covering the Road Network For example Speed, Volume, Vehicle Type
IP02, 05, 07, 09	Process Traffic Data	Adding Forecast Event data (Traffic Forecast) and Current Event data to collected current Traffic Flow data from a variety of internal and external sources covering the Road Network with the aim to produce predicted and actual traffic information.

Activity	Name	Definition
IP04	Discover Potential Current Event	To discover that an event (time, location, type) has occurred
IP11	Collect Forecast Event Information	For automatically collecting the latest information on Forecast Events, from trusted parties/stakeholders, that will impact the road network of interest from a variety of internal and external sources.

4. Business Requirements

4.1 Key Business Requirements (Functional)

The section below describes the key functional requirements that CHARM must support the delivery of.

4.1.1 Information Provision

It must be possible to provide information to both internal and external information consumers to enable the road authority to fulfil their role as a network operator. Specifically:

- It must be possible to collect real time traffic data from a variety of internal and external sources.
- It must be possible to predict traffic information based on historic, current and forecast event data.
- It must be possible to distribute historic, current and predicted information regarding the state of the road network to internal and external information consumers.

4.1.2 Dynamic Traffic Management

It must be possible to manage demand and capacity on the road network through management of planned and unplanned events. By influencing and directing the behaviour of road users to ensure that the road network is optimal operated to agreed service levels and KPIs. Specifically:

- It must be possible to have a constant and real-time overview of planned and unplanned events and their status, including status change and their effect on the capacity of the carriageway and travel times on the network.
- It must be possible to identify when traffic conditions are different to expected and to calculate the future effect on traffic conditions of a specific traffic management response⁸.
- It must be possible to identify and deploy the most appropriate response or group of responses to manage the traffic on the national road network.
- It must be possible to increase or reduce the capacity of the national road network by activating traffic management measures⁹.
- It must be possible to identify that a current event has potentially occurred that may potentially impact traffic on the national road network.
- It must be possible to determine if a current event that has occurred is likely to have a detrimental impact on traffic conditions, cause further current events and infrastructure damage.
- It must be possible to implement diversions away from a (current) event using the national road network or a secondary road network.
- It must be possible to identify any performance improvements when responding to similar events.

⁸ Response can be a single measure, a group of measures (a scenario) or a working procedure.

⁹ See document "Handbook Sustainable traffic management" AVV, Transport Research Center, nov 2003, ISBN 903693625 X

4.1.3 Incident Management

When current events occur on the road network, it must be possible to protect the scene of the current event, restore the capacity of the network by removing any debris or damaged vehicles and repair any damage to the road infrastructure. Specifically:

- It must be possible to protect an event scene using dynamic traffic management measures.
- It must be possible to plan how to respond to a current event. Including planning which other responder organizations to involve, determining if on road traffic officers need deploying and the required level of escalation of command and control.

4.1.4 Event Planning

It must be possible to plan and co-ordinate the activities of the road authority's response to forecast events required to mitigate the impact on the road network. Specifically:

- It must be possible to define a collection of traffic management measures that can be deployed when traffic conditions exceed tolerances.
- It must be possible to define a collection of traffic management measures that can be deployed to reduce the impact on traffic conditions and safety for forecast events.
- It must be possible to provide a forward static view of the expected traffic conditions and events for both internal and external information consumers.
- It must be possible to plan a forward view of where on-road resources (people, requirement, vehicles) are required to ensure appropriate coverage at all times.

4.1.5 Resource Management

It must be possible to manage resources (people, vehicles and equipment) to ensure sufficient coverage of the priority areas of the road network are in place to fulfil the road authority's responsibilities as a network operator. Specifically:

- It must be possible to inform traffic officers of their initial park up point locations and the expected situations that might affect operations during their upcoming shift.
- It must be possible to select the most appropriate traffic officer with the right skills, equipment and experience to handle a current / forecast event effectively.
- It must be possible to direct a traffic officer to the event scene, brief them on the activities they are to perform and to monitor when the traffic officer arrives at scene.
- To be able to shift the operations real time within and between traffic management centres while remaining to be operational.
- To be able to optimize the workload between operators within traffic management centre.
- To be able to optimize the workload between traffic management centres
- To be able to work on parts of working processes (tasks) on different desks and/or locations
- To be able to work parallel on (parts of) working process on the same/different desks and/or locations.

4.1.6 Contact Management

It must be possible for the appropriate road authority to be notified of current and forecast events by external information providers such as the emergency services, road users and event organizers. Specifically:

-
- It must be possible to record information about a Current Event provided by the emergency services and road users.
 - It must be possible to record information about a Forecast Event provided by the event planners and other information providers.
 - It must be possible to represent, log and change the crisis level and represent the situation and response in the SITRAP (situation report).
 - It must be possible to inform, update and communicate freely with NTIC and VNCL/NDW and dedicated stakeholder (-groups).

4.2 Key Business Requirements (Non-Functional)

The following section describes the Usability, Availability and Performance, and the Design and Implementation requirements for CHARM needed to deliver the functional requirements described in the previous section.

4.2.1 Usability Requirements

- To provide one standard and consistent and integral user interface (in look and feel), including one user login procedure, one geographical representation and audio/video.
- To provide a user interfaces that is customizable with respect to the current operator's activity.

4.2.2 Availability and Performance requirements

- To be continuously operational in accordance of the service levels and kpi's.
- To be able to deliver the availability of all system functions in accordance of the service levels and KPIs, (for example with a maximum of 5 failures per year that must be restored within 4 hours)¹⁰.
- To be able to deliver real time responses to operator commands¹¹.
- To be able to monitor the performance of staff, systems and processes performed within the traffic management centre.

4.2.3 Design and Implementation Requirements

- To be easily configurable at one single point (and reflected across entire system) to satisfy agreed service levels and Key Performance Indicators (KPIs)'
- To be at least configurable for:
 - o services, service levels and KPIs
 - o working processes
 - o scenarios with triggers, information and decisions (and rules)
 - o measures
 - o data
 - o Events and messages.
- To be only notified of system failures which effect operations and to be able to take mitigating actions.
- To allow for the migration and integration¹² with legacy traffic management centre systems and existing external/roadside systems.

¹⁰ The specific values of the required availability will be known at design time.

¹¹ The specific values of the required response times will be known at design time.

¹² Remind there will be a migration and implementation strategy for CHARM.

-
- To be able to tolerate errors and failures at different system levels to minimize the impact on the whole CHARM system, such as:
 - o Communication failures both within CHARM and between CHARM and its information providers and consumers, including roadside monitoring equipment.
 - o Data inconsistencies provided by several information providers, including roadside monitoring equipment.
 - In response to a failure of an entire traffic management centre, another traffic management centre shall be able to take control over the network area controlled by the failed traffic management centre with minimum disruption.
 - To be able to be configured to implement selected functionality both within national and/or regional traffic management centres.
 - To support business changes with a flexible IT architecture
 - To be able to support training on the job at a (non-operational) desk/during an operator's shift).
 - To allow for testing of systems/new functions without impacting the performance of the system.
 - To provide a single point of documentation, protocols, etc. incl. support and maintenance
 - To be able to support external communication requirements, as described in the context of paragraph 'Boundary and stakeholders' and 'Exclusions and future developments'
 - o To be able to interact with Roadside systems, Tunnel and Movable Bridge Management systems and External systems that provide or use information and services, e.g. Weather information, Law enforcement, Public transport, and Urban and Secondary road Traffic management systems
 - To be able to adhere in external communication standards¹³ with respect to data representation
 - IT interfaces are developed in line with the business process (-information and -flows)

4.3 IT management services and requirements

It is envisaged that the CHARM IT solution described by the requirements sections above and in other areas of this business specification must be supported by efficient and effective IT management services (ITMS) in order to deliver the core aims of CHARM; enabling operational resilience, reducing the total cost of ownership, enabling functional development and preventing vendor lock-in. Furthermore, business wants to be relieved from IT care.

The required IT management services (ITMS) for CHARM are described below along with the specific service frameworks that are currently being considered:

- Business Information Services (business responsibility, demand, control/interaction IT).
 - o Business Information Service Library, see www.aslbisfoundation.org
- IT application management services (IT responsibility, supply).
 - o Application Service Library, see www.aslbisfoundation.org
- IT Infrastructure management services (IT responsibility, supply).
 - o IT Infrastructure management Library v0.3

¹³ The required standards are still to be defined.

-
- IT lifecycle management (Business and IT responsibility, supply).
 - o IT Infrastructure management Library v0.3
 - Other IT related services (Business and IT responsibility, supply). Such as: integration, architecture management, project/program management, IT training, business continuity management
 - o BS25999, ISO/DIS 22301
 - information security
 - o ISO27001.

The service groups represent important parts of the total lifecycle activities and therefore key to delivering a reduction to the total cost of ownership over the lifespan of CHARM.

Although it has not yet been decided which ITMS, what service levels and KPIs, organisation, ITMS IT-support and ITMS standards to adopt, the following list states the requirements for IT management support.

- To be designed and implemented in such a way as to allow for changes and maintenance to the system whilst being fully functional
- To allow for maintenance and configuration of the system to be done by 'any' third party
- To support minimize¹⁴ the contact by the traffic operator with IT-support/IT helpdesk in the event of a system failure.
- To be able to extend/limit CHARM functionality as business requirements and needs change
- To support business changes with a flexible ITMS architecture.
- Maintain the ICT infrastructure for CHARM solution(s) including the required equipment, servers, networks, software, data collection etc to ensure they are continually available for use.
- To support the application management services by ensuring the correct versions of CHARM are on the correct infrastructure for that version and that there are sufficient resources available for the application to run
- Maintain the CHARM application(s), ensuring they are to the correct version, are performing optimally, have sufficient capacity to run, are continuously available and when not incidents are managed;
- Enhance and adapt CHARM as change occurs such as a result of changes to the organizational structure, policy, contracts, suppliers and as new products become available.

4.4 Additional Business Requirements to RWS

Important business services of RWS are Tunnel management, coordinated traffic management with regional and local road authorities and crisis management. These services lead to additional requirements. Furthermore, several developments within and outside RWS can lead to additional requirements. These developments are described in annex G and have to be assessed on the impact on the requirements for CHARM.

Tunnel Management and control:

- CHARM has to interface with the tunnel control systems, according to “Standard Interface for tunnel with TMCs” (in progress, Dutch)

¹⁴ The aspiration is to have a single point of contact for the operational, tactical and strategic level in the supply chain (from road to control centers).

-
- The user interface of CHARM is aligned with the user interface for tunnel management

Coordinated traffic management:

- to be able to control, interact and cooperate with regional and local operational partners, including authorization of different roles
- Traffic management measures, traffic scenario's and systems can be operated on a national, regional and local level simultaneously and by two or more traffic management centres by CHARM

Crisis management

- a common operational picture of the status of the network and activities is shared with operational partners
- It must be possible to represent, log and change the crisis level and represent the situation and response in the SITRAP (situation report).

5. Assumptions

This section identifies all the assumptions the CHARM Program has made during the development of this specification.

- a. RWS continues to operate their network from 5 regional and one national traffic management centre (VCNL);
- b. HA continues to operate their network from 7 regional and one national traffic management and information centre (NTIC);
- c. The national traffic management centre (VCNL) is also the national traffic information centre. The services to disseminate traffic information are within scope of CHARM;
- d. CHARM has standardized interfaces to external systems and actors, these interfaces are in scope of CHARM;
- e. CHARM supports RWS's Uniform Business Process (UPP) for traffic management;

6. Annex A – Summary of the Highways Agency and Rijkswaterstaat

6.1 Highways Agency

In England the Strategic Road Network (SRN) consists of approximately 7,000 kilometres of motorways and all-purpose trunk roads. It makes up 3% of the total roads in England, yet carries nearly a third of all road traffic and two-thirds of large goods vehicle traffic. It is the single largest physical asset owned by central government in England, with an estimated value of approximately £99 billion.

This network is a key enabler of economic prosperity, productivity and social wellbeing. Roads carry over 91% of passenger transport in the UK.

The HA is the executive agency of the Department for Transport (DfT) responsible for the maintenance, operation and enhancement of the SRN on behalf of the Secretary of State.

The Agency has approximately 3,500 employees, consisting of over 1,800 office-based staff and around 1,700 in the Traffic Officer Service. Its workforce is spread across England, including a corporate centre in London, seven regional offices, one National Traffic Operations Centre, seven Regional Response Centres and 32 outstations.

The Traffic Officer Service performs incident and traffic management activities, clearing on average 26,500 Incidents per month and forms a significant part of the Traffic Management Directorate of the HA.

The HA's Traffic Management Directorate (TMD) performs the majority of traffic management activity on behalf of the HA.



6.2 Rijkswaterstaat

The Dutch Rijkswaterstaat (RWS) is the road authority for the national strategic road network in the Netherlands. It manages, maintains and improves about 3000 km's of highways, mainly motorways, but also some dual carriageways and trunk roads. RWS deals with about 110,000 incidents and 40,000 queues annually.

On 1600 km of the network the motorway traffic management system (MTM) is installed to control traffic. Furthermore RWS operates 22 tunnels, 80 hard shoulder lanes, around 100 ramp meters and over 400 VMS's.

Rijkswaterstaat operates the network from 5 regional traffic management centres (TMCs) and 1 national traffic management centre. The national traffic management centre, called "Verkeerscentrum Nederland" (VCNL) also provides traffic information. The division that is responsible for the operation of the network has a staff of about 750. Typical staff are traffic operators (200) and on road traffic officers (400).



7. Annex B – HA / RWS Current Business Services¹⁵

<u>Product</u>			
<i>To deliver a safe journey on the strategic road network</i>			
<u>Business service</u>	<u>event to respond to</u>	<u>KPI</u>	<u>Capability</u>
Dynamic traffic warnings	current event	x minutes in case of on coming traffic	DTM, IP
Control traffic (e.g. speed signals, AID)	queues		IM
Protect event scene (IM)	current event	15 minutes to the scene (TO)	DTM, RM, IM
Crisis management	current event, forecast event		DTM, RM, IP
Operate tunnels	current event	x minutes for a full-stop	
Control traffic around tunnels	queues	No queues in the tunnel	DTM
Operate hard shoulder lanes	current event	Detect and protect current event in 60 seconds	DTM, IM
Safe road works	forecast event (rw)		DTM
Maintain safety in case of technical and infrastructure failures			DTM, IM

<u>product</u>			
<i>To deliver a reliable and smooth journey on the road network</i>			
<u>Business service</u>			
Set national and regional detours	current event, forecast event	Decision within 15 minutes, deploy within 30 minutes	DTM, IP
IM (clear road as soon as possible)	current event	15 minutes to the scene (for TO's)	DTM, RM, IM
Deploy traffic scenario's	current event, forecast event	15 hotspots on the network	DTM
Crisis management		hinderklasse 3 for road works	DTM, RM, IP
Set traffic management measures			DTM
Operate hard shoulder lanes		When traffic volume exceeds 1350 veh/h	DTM
To limit the disturbance of road works		MiHi pin?	DTM
Functional maintenance of traffic management systems			??
Maintain the function of the road network in case of failures and blockades			DTM, RM, IP

<u>product</u>			
<i>To deliver reliable and useful information to the road users</i>			
<u>Business service</u>			
Traffic management messages	Current event Queues Forecast event	Broadcast within x minutes	IP

¹⁵ Some of these business services, service levels and kpi's are current, some are imminent and influenced by developments.

Traffic information through VASP's and dedicated channels	Current event Queues Current event Queues	kwaliteit, levertijd? x% incidenten heeft restduur	IP
Information via VMS and other roadside equipment	Forecast event		DTM
Information on road works	Forecast event Current event	x procent staat op Van A naar Beter	IP
Information through social media	Forecast event		IP

<u>product</u>			
<i>Operate the road network in a sustainable way</i>			
<u>Business service</u>			
Dynamic speed control			DTM

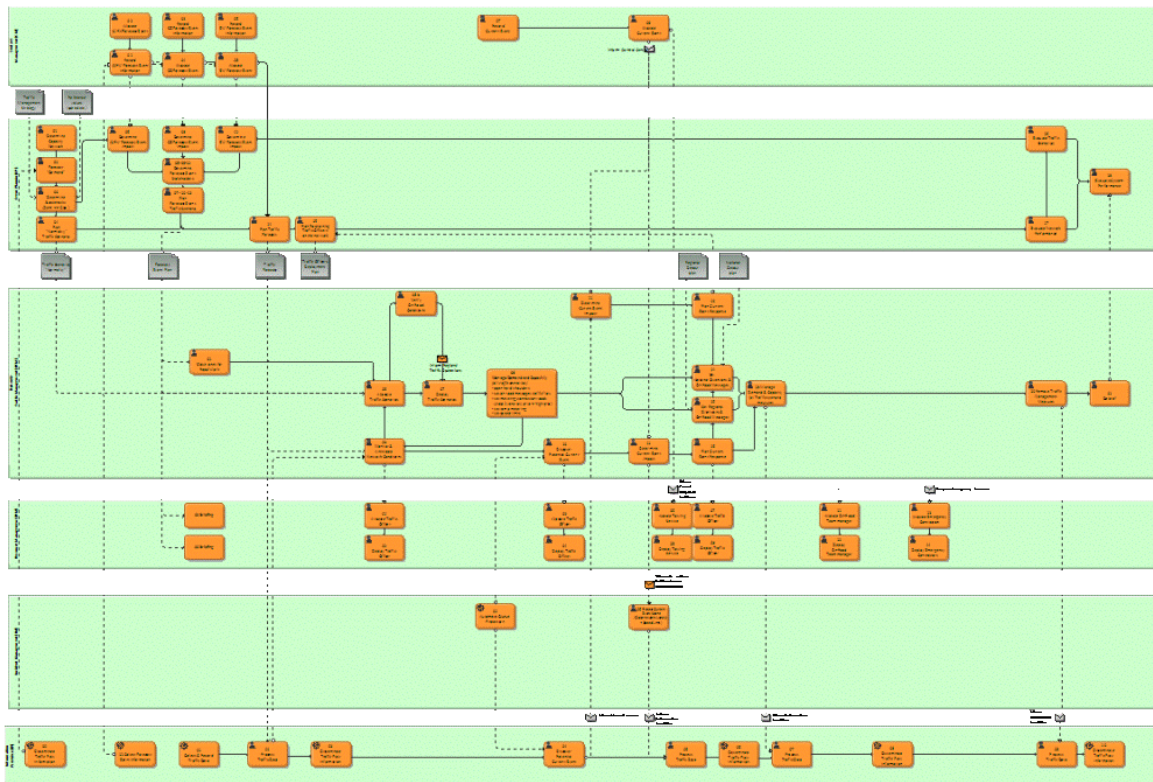
8. Annex C – CHARM Common Model and Activity Definitions

The drawing below represents a business model that RWS and the HA share and that falls within the scope of CHARM. Each activity shown within the model below has common definitions; these can be found in section 3.2 above.

The drawing below is just to aid understanding to the reader as to what the model contains however a PDF version of this can be found here:



CHARM Common Model.pdf



Below is a list of the Activities that although are performed in order to operate the HA or RWS strategic road network fall outside the scope of CHARM.

Contact Management

Activity Reference	Activity Name	Activity Description
CM12	Record Information Request	For receiving and answering queries from the general public and third party organisations. Typically these will include queries about: - Roadworks - Traffic Conditions - Road Schemes - Planning Applications - Vehicle Recovery - Police National Computer Bureau checks.
CM13	Allocate Task	For allocating any type of task (Queries and Information Requests) to

Activity Reference	Activity Name	Activity Description
		the most appropriate business function within the Highways Agency (that cannot be answered at the first point of contact).
CM14	Respond to Request	For responding Customers to their queries and Information Requests

Dynamic Traffic Management

Activity Reference	Activity Name	Activity Description
DTM02	Verify Roadblock Safety	At random check whether roadblock is executed according to guidelines of CROW 96ab. Traffic Officer takes appropriate action if road works are not according to the guidelines and he reports about his findings. The HA doesn't do this check and has no plans of doing so in the future
DTM04	In Position Regional Network	Observing local state of the road network information to monitor traffic flow and identify abnormalities. This may be performed either parked-up or patrolling a designated route as described below: Current event: - network with monitoring: stay at park-up point until get call - network without monitoring: patrolling the network Forecast event: patrolling the regional network - crowd generating event (perform specific tasks) - weather conditions (monitor road) - road works (monitor state of traffic measurements) Checks against normality and reports back to regional traffic centre.
DTM09	Manage On Road Traffic Scenario Measures	The traffic officer being deployed to inform road users using mobile VMS and emergency traffic management.
DTM17	Verify On Road Conditions	Traffic Officers who are out on the network to provide confirmation of on- road conditions against expected/predicted conditions. Against certain references, check of: - Traffic flow - Road surface conditions - Weather - Notify traffic operator
DTM19	Verify On Road Conditions	Traffic Officers who are out on the network to provide confirmation of on- road conditions against expected/predicted conditions. Against certain references, check of: - Traffic flow - Road surface conditions - Weather - Notify traffic operator
DTM21	Debrief (RSO)	For debriefing when a significant event has occurred to identify compliance with procedure, any performance improvements when responding to similar events and to monitor the welfare of staff involved.






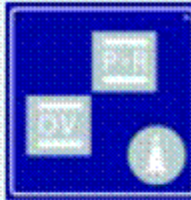






Incident Management





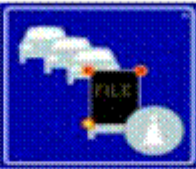





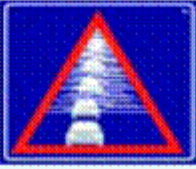
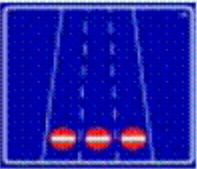
Activity Reference	Activity Name	Activity Description
IM01	In Position Regional Network	Observing local state of the road network information to monitor traffic flow and identify abnormalities. This may be performed either parked-up or patrolling a designated route as described below: Current event: - network with monitoring: stay at park-up point until get call - network without monitoring: patrolling the network Forecast event: patrolling the regional network - crowd generating event (perform specific tasks) - weather conditions (monitor road) road works (monitor state of traffic measurements) Checks against normality and reports back to regional traffic centre.
IM03	Discover Current Event	Roadside Operations resource in the course of their duties may identify current events on the road network.
IM04	Verify Current Event Information	Against existing current information, verify as required: - Location - Type of Current Event - Casualties - Vehicles involved - Impact on Traffic flow - Hazardous substances - Debris - Notify traffic operator - Advice for safe access to the scene - Emergency services present or required - Details of any risks that need to be considered
IM06	Protect Current Event Scene (Fend Off + Cones)	The TO secures the event scene by placing his vehicle in fend-off position, coning-off between his vehicle and the incident (employing emergency traffic management measures) or implementing rolling road blocks. In addition, the TO estimates the clearance time of the incident.
IM08	Liaise with Police / Emergency Services	At police-led incidents, Traffic Officers will be responsible for acting as Highways Agency Incident Managers or, in significant incidents; this role will be taken over by Team or Operations Manager. They will liaise with the police commander to establish the details of when any closed carriageway or lane will reopen and when other specialist resource under the command of the Agency is required to be deployed. Roadside Operations will also liaise with service provider resource on-scene to oversee restoration of the road to normality.
IM14	Verify Road Clear	For providing verification as required that the road is clear (of blockages, debris, hazardous substances and other network incursions) and that the infrastructure is safe in preparation for the removal of all traffic management measures.
IM15	Debrief	For debriefing when a significant event has occurred to identify compliance with procedure, any performance improvements when responding to similar events and to monitor the welfare of staff involved


9. Annex D – CHARM Traffic Management Measures





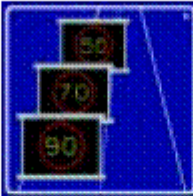





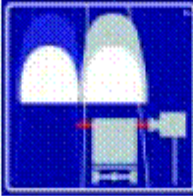

This Annex describes the traffic management measures that are required to be deployed by both organisations via Variable Message Signs







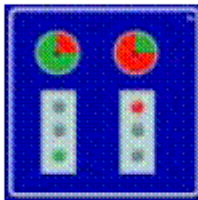
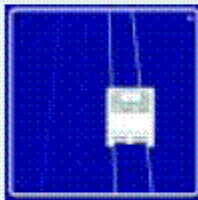
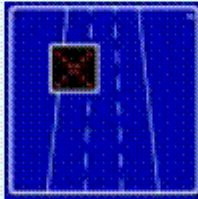
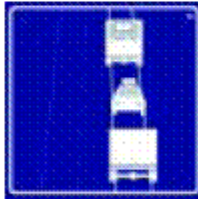

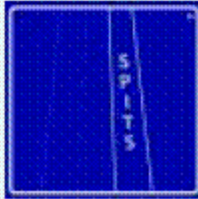
Next to each measure a red or green status is displayed for each organisation to state which organisation has this requirement. Those measures with Amber show where further agreement is needed for that specific measure.





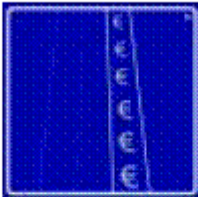

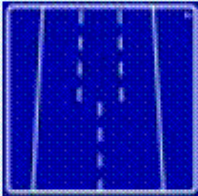





 		Appendix C - Basic Measures Book		 	
		Measure group - 1. Information/Advice			
&	&	1.1 Radio traffic information (congestion information) Radioverkeersinformatie (file-informatie) 	1.5 Park & Ride and public transport information P+R en OV-informatie 	?	&
&	&	1.2 Radio traffic information (bad weather warnings) Radioverkeersinformatie (weerswaarschuwing) 	1.6 Parking directions system Parkeerverwijzing 	?	&
&	&	1.3 Radio traffic information (oncoming vehicles) Radioverkeersinformatie (spookrijderwaarschuwing) 	1.7 Variable Message Signs (local and permanent, mobile) Wisselbewegwijzering (lokaal en vast, mobiel) 	&	&
&	&	1.4 Congestion/travel time information, local and permanent File/reistijdinformatie, lokaal en vast 	1.8 Incident information (roadside) Incidentinformatie (lokaal) 	X	X





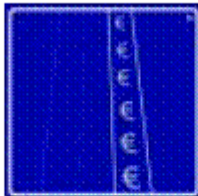
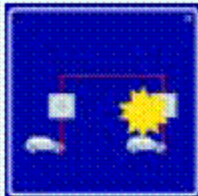
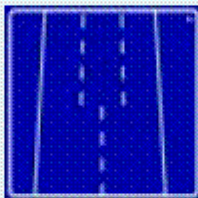





					
&	&	<p>1.9 Congestion information (roadside and broadcast) File-informatie (lokaal en mobiel)</p> 	<p>2.4 High wind warning Windwaarschuwing</p> 	&	&
&	X	<p>Measure group - 2. Warnings</p> <p>2.1 Congestion warning (local and permanent) Filewaarschuwing (lokaal en vast). RWS: automatic roadside, function not in TMC</p> 	<p>2.5 Oncoming vehicles warning Spookrijderwaarschuwing. RWS: only in tunnels, not for road network (blocked)</p> 	&	&
?	&	<p>2.2 Congestion warning (supralocal and permanent) Filewaarschuwing (bovenlokaal en vast) RWS: Automatic Incident Detection MTM</p> 	<p>2.6 Open bridge warning Brugopeningswaarschuwing</p> 	?	&
&	&	<p>2.3 Fog warning Mistwaarschuwing</p> 	<p>Measure group - 3. Direct and control</p> <p>3.1 Major blocking/priorities Grootschalig weren/prioriteiten</p> 	&	&

 		Measure group - 3. Direct and control		 			
&	&	3.2 Close off and divert Afsluiten en omleiden		3.6 Homogenise i.e. smoothing flows Homogeniseren		&	&
&	&	3.3 Blanket speed limit (regional) Snelheidsdeken (regionaal)		3.7 No overtaking for lorries (semi-static) Inhaalverbod vrachtverkeer (semi-statisch)		?	&
X	X	3.4 Move on Opzwaaien		3.8 No overtaking for lorries (dynamic) Inhaalverbod vrachtverkeer (dynamic)		?	&
&	X	3.5 Convoys, rolling roadblocks Blokrijden. <i>RWS: only speed regulation is included, see measure 3.6</i>		3.9 Keep in lane Keep your lane		&	X

 		Measure group - 3. Direct and control		 	
&	&	3.10 Dynamic speed limits Dynamische snelheidslimieten 	3.14 Ramp metering Toeritdoseren 	&	&
X	&	3.11 Semi-static speed limits Semi-statische snelheidslimieten. <i>RWS: think on measure related to measure 3.25 'Rush hour lane'</i> 	3.15 Lane metering at merge points Doseren bij rijbaansamenvoegingen 	&	&
X	X	3.12 Secondary congestion screen Kijkfilescherm 	3.16 Buffer at intersection Bufferen bij knooppunt. <i>RWS: done before, not any more. Relevant function in future.</i> 	?	&
tunnel not in scope	&	3.13 Height detection before tunnels Hoogtedetectie bij tunnels <i>RWS: more specific measures to be added; alignment with tunnel-programm 'LTR' (EU law)</i> 	3.17 Buffer at slip road Bufferen bij toerit 	&	&

 		Measure group - 3. Direct and control		 	
X	&	<p>3.18 Buffer at exit</p> <p>Bufferen bij afrit</p> 	<p>3.22 Oncoming traffic at road works</p> <p>Tegenverkeerssystemen werk in uitvoering</p> 	X	&
&	&	<p>3.19 Modify traffic light systems at connections</p> <p>Aanpassen VRI's bij aansluitingen</p> 	<p>3.23 Bus on hard shoulder</p> <p>Bus op vluchtstrook</p> 	X	&
&	&	<p>3.20 Cross off, i.e. close lanes</p> <p>Afkruisen rijstroken</p> 	<p>3.24 Special services lanes / bus lane</p> <p>Doelgroepstrook/busbaan</p> 	&	&
Tunnel not in scope. Road; &	&	<p>3.21 Oncoming traffic (in tunnels), tidal flow</p> <p>Tegenverkeer (in tunnels)</p> <p><i>RWS: more specific measures to be added; alignment with tunnel-programm 'LTR' (EU law)</i></p> 	<p>3.25 Rush hour lane</p> <p>Spitsstrook</p> 	&	&

		Measure group - 3. Direct and control			
					
?	?	3.26 Toll lane Betaalstrook <i>RWS: strategic issue, question.</i>		3.30 Joint road safety teams, road monitoring GVT, trajectcontrole	
X	?	3.27 Dynamic road section <i>Dynamisch dwarsprofiel</i> <i>RWS: strategic issues, question.</i> <i>Think on pilot</i> <i>'dynamische markering'.</i>		3.31 Streetlights (dynamic) Wegverlichting (dynamisch)	
X	&	3.28 Two-way lane Wisselstrook		3.32 Ice warning/control, black ice Gladheidsmelding/bestrijding (*): on VMS and information panels	
X	&	3.29 Enforcement Handhaving <i>RWS: think on 80km zones/emmissie, SLA SG-DG.</i>		3.33 Incident management Incidentmanagement	

		Measure group - 3. Direct and control					
							
?	?	3.26 Toll lane Betaalstrook <i>RWS: strategic issue, question.</i>		3.30 Joint road safety teams, road monitoring GVT, trajectcontrole		X	&
X	?	3.27 Dynamic road section <i>Dynamisch dwarsprofiel</i> <i>RWS: strategic issues, question.</i> <i>Think on pilot</i> <i>'dynamische markering'.</i>		3.31 Streetlights (dynamic) Wegverlichting (dynamisch)		&	&
X	&	3.28 Two-way lane Wisselstrook		3.32 Ice warning/control, black ice Gladheidsmelding/bestrijding (*): on VMS and information panels		& (*)	& (*)
X	&	3.29 Enforcement Handhaving <i>RWS: think on 80km zones/emmissie,</i> <i>SLA SG-DG.</i>		3.33 Incident management Incidentmanagement		&	&

10. Annex E – HA TMD FOM Alignment

This Annex lists each of the Highways Agency's Traffic Management Directorate Future Operating Model's Processes, along with the CHARM identified business activities that have been identified in the CHARM Common Model.

This is presented to inform the Highways Agency of the aspects of the TMD FOM that will, in the future be totally, partially or not supported by CHARM Technology, this level of support is presented in a Red, Amber Green Scale.

Further, activities that are out of scope of CHARM but within the scope of the TMD FOM are shown in grey, these are typically processes performed either at roadside or by others within the Highways Agency.

Capability Name	TMD FOM Process Group Name	TMD FOM Process Sub Group Name	TMD FOM Process Name	(RAG)	CHARM Activity Reference	CHARM Activity Name
Contact Management	Customer and Partner Management	Event Notification	Allocate Event		CM02	Allocate (S)RW Forecast Event
Contact Management	Customer and Partner Management	Event Notification	Allocate Event		CM04	Allocate CG Forecast Event
Contact Management	Customer and Partner Management	Event Notification	Allocate Event		CM06	Allocate EW Forecast Event
Contact Management	Customer and Partner Management	Event Notification	Allocate Event		CM09	Allocate Current Event
Contact Management	Customer and Partner Management	Event Notification	Record Information		CM01	Record (S)RW Forecast Event Information
Contact Management	Customer and Partner Management	Event Notification	Record Information		CM03	Record CG Forecast Event Information
Contact Management	Customer and Partner Management	Event Notification	Record Information		CM05	Record EW Forecast Event Information
Contact Management	Customer and Partner Management	Event Notification	Record Information		CM07	Record Current Event Information

Capability Name	TMD FOM Process Group Name	TMD FOM Process Sub Group Name	TMD FOM Process Name	(RAG)	CHARM Activity Reference	CHARM Activity Name
Contact Management	Customer and Partner Management	Event Notification	Record Information		CM10	Record Current Event Information
Contact Management	Customer and Partner Management	Query Management	Allocate Task		CM13	Allocate Task
Contact Management	Customer and Partner Management	Query Management	Request Agency Information		CM12	Record Information Request
Contact Management	Customer and Partner Management	Query Management	Respond to Request		CM14	Respond to Request
Dynamic Traffic Management	Traffic and Event Management	Event Identification	Discover Current Event		DTM10	Discover Potential Current Event
Dynamic Traffic Management	Traffic and Event Management	Event Identification	Monitor Network		DTM03	Monitor Traffic Flow Network
Dynamic Traffic Management	Traffic and Event Management	Event Identification	Monitor Network		DTM04	In Position Regional Network
Dynamic Traffic Management	Traffic and Event Management	Event Identification	Verify Current Event		DTM06	Verify On Road Conditions
Dynamic Traffic Management	Traffic and Event Management	Event Identification	Verify Current Event		DTM17	Verify On Road Conditions
Dynamic Traffic Management	Traffic and Event Management	Event Identification	Verify Current Event		DTM19	Verify On Road Conditions
Dynamic Traffic Management	Traffic and Event Management	Event Management	Manage Current Event Response		DTM07	Deploy Deployment Traffic Scenario
Dynamic Traffic Management	Traffic and Event Management	Event Management	Manage Current Event Response		DTM20	Restore Normality
Dynamic Traffic Management	Traffic and Event Management	Event Management	Manage Current Event Response		DTM09	Manage On Road Traffic Scenario Measures
Dynamic Traffic Management	Traffic and Event Management	Event Management	Manage Current Event Scene		DTM02	Verify Roadblock Safety
Dynamic Traffic Management	Traffic and Event Management	Event Management	Manage Debriefing		DTM22	Debrief (RTO)

Capability Name	TMD FOM Process Group Name	TMD FOM Process Sub Group Name	TMD FOM Process Name	(RAG)	CHARM Activity Reference	CHARM Activity Name
Dynamic Traffic Management	Traffic and Event Management	Event Management	Manage Debriefing		DTM21	Debrief (RSO)
Dynamic Traffic Management	Traffic and Event Management	Event Planning	Determine Event impact		DTM11	Determine Current Event Impact
Dynamic Traffic Management	Traffic and Event Management	Event Planning	Determine Event impact		DTM12	Determine Current Event Impact
Dynamic Traffic Management	Traffic and Event Management	Event Planning	Plan Current Event Response		DTM13	Plan Current Event Response
Dynamic Traffic Management	Traffic and Event Management	Event Planning	Plan Current Event Response		DTM16	Plan Current Event Response
Dynamic Traffic Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		DTM01	Close Lanes for Road Works
Dynamic Traffic Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		DTM05	Allocate Traffic Scenario
Dynamic Traffic Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		DTM08	Manage Demand and Capacity
Dynamic Traffic Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		DTM14	Manage National Diversions & On-Road Messages
Dynamic Traffic Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		DTM15	Manage Regional Diversions & On-Road Messages
Dynamic Traffic Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		DTM18	Manage Demand and Capacity
Event Planning	Operational Support	Procedures Management	Manage Lessons Learnt		EP16	Evaluate Traffic Scenarios
Event Planning	Resource Management	Operational Resource Management	Manage National Roster		EP15	Plan Positioning Traffic Officers on the Network
Event Planning	Traffic and Event Management	Event Planning	Determine Event impact		EP05	Determine (S)RW Forecast Event Impact
Event Planning	Traffic and Event	Event Planning	Determine Event		EP08	Determine CG Forecast Event Impact

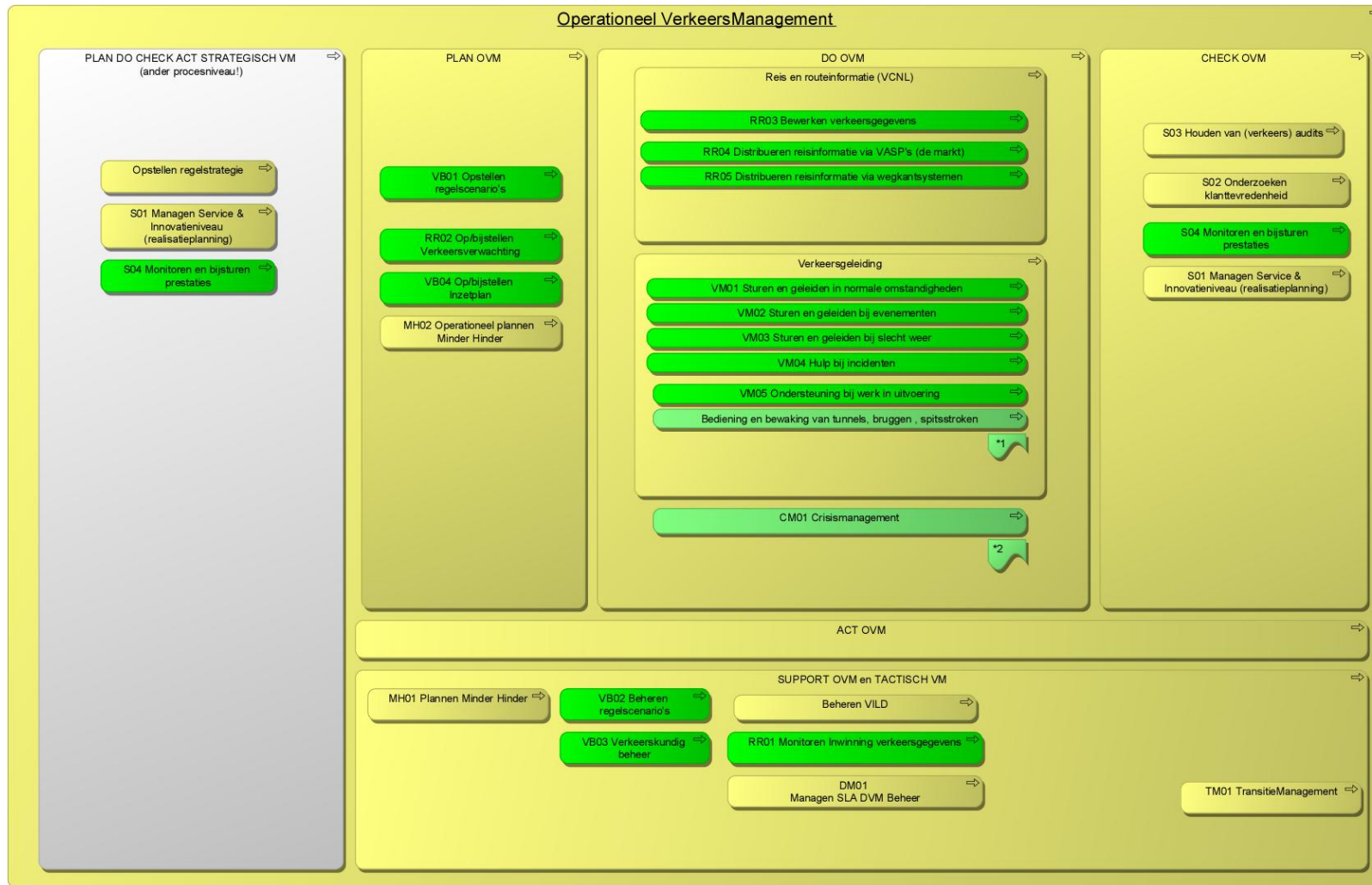
Capability Name	TMD FOM Process Group Name	TMD FOM Process Sub Group Name	TMD FOM Process Name	(RAG)	CHARM Activity Reference	CHARM Activity Name
	Management		impact			
Event Planning	Traffic and Event Management	Event Planning	Determine Event impact		EP11	Determine EW Forecast Event Impact
Event Planning	Traffic and Event Management	Event Planning	Plan Forecast Event Response		EP04	Plan Normality Traffic Scenarios
Event Planning	Traffic and Event Management	Event Planning	Plan Forecast Event Response		EP06	Determine (S)RW Forecast Event Stakeholders
Event Planning	Traffic and Event Management	Event Planning	Plan Forecast Event Response		EP07	Plan (S)RW forecast Event Traffic Scenarios
Event Planning	Traffic and Event Management	Event Planning	Plan Forecast Event Response		EP09	Determine CG Forecast Event Stakeholders
Event Planning	Traffic and Event Management	Event Planning	Plan Forecast Event Response		EP10	Plan CG forecast Event Traffic Scenarios
Event Planning	Traffic and Event Management	Event Planning	Plan Forecast Event Response		EP12	Determine EW Forecast Event Stakeholders
Event Planning	Traffic and Event Management	Event Planning	Plan Forecast Event Response		EP13	Plan EW forecast Event Traffic Scenarios
Event Planning	Traffic Information Management	Event Information Collection	Collect Asset Information		EP01	Determine Capacity Network
Event Planning	Traffic Information Management	Event Information Processing	Analyse Historical Information		EP02	Determine Demand
Event Planning	Traffic Information Management	Event Information Processing	Predict Traffic Characteristics		EP03	Determine Bottlenexks (Dem > cap)
Event Planning	Traffic Information Management	Event Information Processing	Predict Traffic Characteristics		EP14	Plan Traffic Forecast
Event Planning	Traffic Information Management	Performance Management	Operational Performance and Business Intelligence		EP17	Evaluate Network Performance
Event Planning	Traffic Information Management	Performance Management	Operational Performance and		EP18	Evaluate System Performance

Capability Name	TMD FOM Process Group Name	TMD FOM Process Sub Group Name	TMD FOM Process Name	(RAG)	CHARM Activity Reference	CHARM Activity Name
			Business Intelligence			
Incident Management	Traffic and Event Management	Event Identification	Discover Current Event		IM03	Discover Current Event
Incident Management	Traffic and Event Management	Event Identification	Monitor Network		IM01	In Position Regional Network
Incident Management	Traffic and Event Management	Event Identification	Verify Current Event		IM04	Verify Current Event Information
Incident Management	Traffic and Event Management	Event Management	Manage Current Event Scene		IM08	Liaise with Police / Emergency Services
Incident Management	Traffic and Event Management	Event Management	Manage Current Event Scene		IM14	Verify Road Clear
Incident Management	Traffic and Event Management	Event Management	Manage Debriefing		IM15	Debrief
Incident Management	Traffic and Event Management	Event Management	Protect Current Event Scene		IM02	Setting Signs and Signals (automatically)
Incident Management	Traffic and Event Management	Event Management	Protect Current Event Scene		IM05	Protect Current Event Scene (Signs & Signals)
Incident Management	Traffic and Event Management	Event Management	Protect Current Event Scene		IM06	Protect Current Event Scene (Fend Off + Cones)
Information Provision	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		IP04	Discover Potential Current Event
Information Provision	Traffic Information Management	Event Information Collection	Collect Forecast Event Information		IP11	Collect Forecast Event Information
Information Provision	Traffic Information Management	Event Information Collection	Collect Traffic Data		IP01	Collect Traffic and Record Traffic Data
Information Provision	Traffic Information Management	Event Information Dissemination	Publish Personalised Information		IP00	Disseminate Traffic Flow Information
Information Provision	Traffic Information Management	Event Information Dissemination	Publish Personalised Information		IP03	Disseminate Traffic Flow Information

Capability Name	TMD FOM Process Group Name	TMD FOM Process Sub Group Name	TMD FOM Process Name	(RAG)	CHARM Activity Reference	CHARM Activity Name
Information Provision	Traffic Information Management	Event Information Dissemination	Publish Personalised Information		IP06	Disseminate Traffic Flow Information
Information Provision	Traffic Information Management	Event Information Dissemination	Publish Personalised Information		IP08	Disseminate Traffic Flow Information
Information Provision	Traffic Information Management	Event Information Dissemination	Publish Personalised Information		IP10	Disseminate Traffic Flow Information
Information Provision	Traffic Information Management	Event Information Processing	Event Information Processing		IP02	Process Traffic Flow Information
Information Provision	Traffic Information Management	Event Information Processing	Event Information Processing		IP05	Process Traffic Flow Information
Information Provision	Traffic Information Management	Event Information Processing	Event Information Processing		IP07	Process Traffic Flow Information
Information Provision	Traffic Information Management	Event Information Processing	Event Information Processing		IP09	Process Traffic Flow Information
Non-Operational Capability	Operational Support	Change Management	Manage Programme		NA	Not Applicable
Non-Operational Capability	Operational Support	Change Management	Manage Project		NA	Not Applicable
Non-Operational Capability	Operational Support	Financial Management	Manage Budgets		NA	Not Applicable
Non-Operational Capability	Operational Support	Procedures Management	Develop and Maintain Operational Procedures		NA	Not Applicable
Non-Operational Capability	Operational Support	Procedures Management	Maintain Corporate Data		NA	Not Applicable
Non-Operational Capability	Operational Support	Procedures Management	Manage Health & Safety		NA	Not Applicable
Non-Operational Capability	Operational Support	Procedures Management	Manage Procedural Compliance		NA	Not Applicable
Non-Operational Capability	Operational Support	Supplier Management	Manage Contracts		NA	Not Applicable

Capability Name	TMD FOM Process Group Name	TMD FOM Process Sub Group Name	TMD FOM Process Name	(RAG)	CHARM Activity Reference	CHARM Activity Name
Non-Operational Capability	Operational Support	Supplier Management	Manage Services		NA	Not Applicable
Non-Operational Capability	Operational Support	Supplier Management	Monitor Technology		NA	Not Applicable
Resource Management	Traffic and Event Management	Event Management	Manage Briefing		RM00	Briefing
Resource Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		RM01	Allocate Traffic Officer
Resource Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		RM02	Deploy Traffic Officer
Resource Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		RM03	Allocate Traffic Officer
Resource Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		RM04	Deploy Traffic Officer
Resource Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		RM05	Allocate Towing Service
Resource Management	Traffic and Event Management	Traffic Management	Manage Demand & Capacity		RM06	Deploy Towing Service

11. Annex F – RWS VWM UPP Alignment



12. Annex G – RWS Developments

	Development	Foreseen impact on Traffic Management Centres (TMCs)
1	PCP, tranche 4 of CHARM	<p>The PCP proposal in tranche 4 of CHARM defines the development of the top level architecture as the first deliverable. This architecture will be placed in a public domain and enable the partners to procure a new generation of open, modular, flexible TMCs. A total of nine Traffic Management Centres will have to be renovated in the next decade and this generates sufficient volume for the industry to join in this development of the high level architecture.</p> <p>This architecture will be the starting point of the development of innovative modules that significantly improve the effectiveness of Traffic Management and hopefully decrease the operational cost, namely:</p> <ol style="list-style-type: none"> 1. Advanced distributed network management; to realise a module which provides automated (decisions) support for management of large national-size traffic networks 2. Advanced traffic predictions; to realise a module that provides real time, near future prediction of traffic conditions using simulation and modelling techniques 3. the support of co-operative ITS functions; to realise a module that supports the implementation of cooperative systems services requiring a participation of intelligent infrastructure. <p>During the development of the innovations, the architecture will constantly be challenged by comparing the required data and generic modular functions from the perspective of the innovations. At the end of the project the innovations will be tested in an operational TMC, procured with the new architecture.</p>
2	National Data Warehouse (NDW) for traffic and road data	<p>At present there are several data feeds from the Dutch NDW, third parties and local road authorities that are combined in the RWS TMCs. In the near future this will possibly be done outside the TMCs. Furthermore, there will be National data warehouses for parking, public transport and goods transport from which data can be available in TMCs. Different type of traffic data will be received and delivered, so there has to be flexibility in data fusion in CHARM.</p>
3	Geo location	<p>The topology of the Dutch road network will be derived from the “National Wegenbestand (NWB)”.</p>
4	Cooperation with other road authorities	<p>A strong development in the Netherlands is the close cooperation between road authorities for coordinated traffic management. This will mean that more roadside equipment will be managed from the TMCs. CHARM also will deliver the support to do the coordinated management of the road network, e.g. by workflow management and authorisation of actors within the business processes.</p> <p>The cooperation between TMCs will require that the technical environment is more separated from the business functions. Independent of the location of the IT it will be possible to operate business functions by other TMCs or road authorities.</p> <p>Furthermore environmental issues/criteria will have impact on the operation of the network.</p>

5	Configuration management	The large amount of road side equipment will require a solid configuration management, supported by CHARM
6	Automated traffic scenario's	The network performance will be optimised by deploying traffic scenarios on a more strategic level. On a local level the operation will be mostly automated and autonomous. CHARM will support this and will perform the automated operation of traffic scenarios that deal with flexible combinations of several measures on the network.
4	Easyway deployment guidelines	tbd
9	RWS Business Continuity plan TMCs, including security	tbd
13	Dutch national tunnel policy (e.g. tunnel legislation, procedures)	tbd
51	Open data policy (EU, digital agenda)	tbd
53	Positioning paper Incident Management in the Netherlands	tbd

13. Annex H – Contributors

Name	Role	HA / RWS
Mick Rothwell	CHARM Principal Business Analyst	HA
James Lowth	Head of Regional Control Centres	HA
Maggie Carter	Operations Manager	HA
Dominic Haydon	Operations Manager	HA
Erwin de Graauw	Business Architect/Business Representative	RWS
Erick van den Hoogen	Business Architect/Business Representative	RWS
Andre Ingelse	Business Representative	RWS
Ary Koot	Business Representative	RWS
Sukhvinder Ubhi	Network Services	HA
Phil Proctor	Network Services	HA
Mark Austin	Head of Technology Development	HA
Mark Pellowe	Traffic Technology	HA
Jan Vytupil	Functional specialist	RWS
Ruud Derksen	Business-IT alignment specialist	RWS
Hans Spek	IT architect	RWS

14. Annex I – Glossary

Abbreviation	Term	Description
	Access Partner-Owned Information	The process for accessing information from partner organisations as required to undertake processes e.g. the Police National Computer (PNC).
ATM	Active Traffic Management	A series of traffic control measures to cope with congestion and incident management on the network.
HA	Agency	The organisation responsible for building, maintaining and operating the Strategic Road Network in England
APTR	All Purpose Trunk Road	A non-motorway road which is part of the Strategic Road Network.
	Allocate Current Event	For allocating an event to the business unit that is responsible for initiating the response to that event
	Allocate Forecast Event	For allocating a forecast event to the business unit that is responsible for planning the response to that event
	Allocate Task	For allocating any type of task (Queries and Information Requests) to the most appropriate business function within the organisation (that cannot be answered at the first point of contact)
	Assess Current Event Scene	For assessing the impact of a current event on the flow of traffic in the proximity of the event
	Atlas Pro	Provided by the Highways Agency's NTCC; a registered web service providing information to aid journey planning
ANPR	Automated Number Plate Recognition	Automatic Number Plate Recognition camera, systems and supporting infrastructure provide a means to "read" vehicle registration marks of moving vehicles. These systems are currently used by the Highways Agency to determine average journey times over links.
	Capability	A combination of Process, Organisation, Technology and Information required to deliver an organisations objectives
	Central Contact Centre	Under the Agency's TMD Future Operating Model, a new business unit within National Traffic Operations which acts as the central point of contact for people to notify the Agency of information including current event information, forecast event information and general queries in order to improve efficiency and consistency when communicating with customers and partners.
CHARM	Common Highways Agency Rijkswaterstaat Model	A Programme of cooperation between the Highways Agency and Rijkswaterstaat to define, with a view to jointly procure a new generation of traffic

		management systems.
CCTV	Closed Circuit Television	Closed Circuit Television, being a system of television cameras, connected to a control room, used by the HA and RWS for monitoring traffic conditions and supporting incident management
	Closure of carriageways	Again, either undertaken by physical restrictions, signs and signals or a combination of both
	Closure of lanes	Undertaken either by physical coning off of road lanes where an incident scene needs to be protected or by setting signs and signals to inform drivers about lane closures
C&C	Command and Control	<p>a series of computer systems operated by the Agency's Regional Response Centres, to manage their operations, log and store details regarding both traffic and non traffic related information.</p> <p>It also allows the electronic sharing of information with the police via a connection to CJX (a police equivalent of the GSI)</p>
	Contact Management	management of all contact with an organisation (in this case the HA and RWS). Primarily handling notification of current and forecast events and responding to general queries.
	Current Event	Anything likely to have a significant consequence on traffic movements.
	Current Event Notification	<p>Notifications of events on the network that have occurred and require a response. They are received from members of the general public and via system interfaces. Examples of current events include:</p> <ul style="list-style-type: none"> - Road traffic Collisions; - Debris on the live carriageway; - Spillages; - Vehicle fires; - Pedestrians on the road network; - Animals on the road network; - Breakdowns
	Deploy Resource	For deploying human, physical or technological resources to safely and effectively respond to an event

	Deployment of resources	The deployment of Traffic Officers or other responder organisations to secure the scene of an incident, liaise with police and emergency services and, with the support of service providers, to manage the clear up of the carriageway, repair of any damaged infrastructure and the restoration of the carriageway to normality
DBFO	Design, Build, Finance, Operate	Design Build Finance Operate, being a form of contract between the Secretary of State for Transport and a DBFO Operator for the design, building, financing and operation of part or parts of the Strategic Road Network
	Determine Event Impact	For assessing the impact of an event on the rest of the road network
	Develop and Maintain Operational Procedures	For developing procedures in line with operational policy
	Discover Current Event	For identifying that an event has occurred;
	Discovery	The initial manual or automated identification of a potential incident by an organisation, one of its staff members or by technology
	Dynamic Traffic Management	That activity which is undertaken to manage demand and capacity on the road network through influencing or directing the behaviour of road users and to ensure that traffic flow across the road network is as close to optimal as possible at all times and to protect people on the network.
ERT	Emergency Response Telephones	Telephones situated at regular intervals along the road network that can be used by road users to contact the Agency's Response Centres if they are in need of assistance
	Event	an occurrence located on or off the SRN with the potential to have a Material Effect on the SRN; Events include Current Events and Forecast Events
	Event Information Collection	Encompasses all those processes required to manage the collection of Event-related data and information from internal and external sources.
	Event Information Dissemination	Encompasses all those processes required to manage the dissemination of Event-related data and information to internal and external subscribers.
	Event Information Processing	Encompasses all those processes required to manage the analysis and processing of Event-related data and information from internal and external sources.
	Event Management Update	On-going updates relating to a Current Event from those involved on-road at the scene of the Event.

	Event Planning	the co-ordination of activities to manage the response to forecast events
ERMS	Event Response Management Subsystem	Part of the Agency's NTCC Instation; the system for managing information about events on the network.
FMS	Fault Management System	Part of the Agency's NTCC Instation; the system for monitoring faults in technology.
	Forecast Event	A forecast event is defined as anything likely to have a significant consequence on expected Traffic Data about which there is reasonably accessible prior knowledge.
	Forecast Event Notification	<p>Notifications of future events that are likely to have an impact on the effective operation of the road network that require the Highways Agency to plan and/or co-ordinate a response. They are received from partner and stakeholder organisations via system interfaces. Examples of forecast events include:</p> <ul style="list-style-type: none"> - Weather forecasts; - Routine congestion; - Abnormal load movements; - Road works; - Crowd-generating events; - Non-HA works on the road network; - Construction schemes near the road network
	Forecast Event Plan	A plan outlining the traffic management activities that need to be undertaken in order to mitigate any predicted increase in demand, events or reduction of capacity as a results of a forecast event.
FOM	Future Operating Model	A view of the processes, organisation, technology and information required to deliver an organisations core and supporting capabilities in the future.
	Future Resource Plan	A forward notification of the required resource available to meet expected demand over the coming months. This will typically include information about numbers of staff and required roles at particular times and shifts.
GPRS	General Packet Radio Service	Packet oriented Mobile Data Service available to users of Global System for Mobile Communications.
HABiT	Highways Agency Business Information Technology	The Agency's Business Information Technology solution.
HATMS	Highways Agency Traffic Management System	A set of systems used in the Agency's Regional Control Centres to undertake traffic and incident management activity.
	Implement Current Event Response	For implementing the planned response to any current event

	Implement Forecast Event Response	For implementing the planned response to any forecast event. This will comprise preparation activities prior to the event occurring and implementation of plans when the event occurs
	implementation of diversions	Setting of signs and signals to divert traffic away from problem areas of the road network. Diversions are either strategic (from one part of the organisation road network to another) or tactical (diversion across "local" roads);
	Incident Management	That activity which is undertaken where an event occurs on a live carriageway that causes traffic flow to deviate from normality or occurs off-network with an impact on the network. Incident management requires an on-road response to restore the network to normality (a Current Event).
ISU	Incident Support Unit	ISU crews perform a variety of roles working from strategically placed depots to help keep drivers moving. After an accident they may be deployed to sweep up broken glass, mop up fuel spills or effect repairs on a damaged safety fence. They also assist traffic officers get drivers away from major accident scenes - for example setting up diversion routes around an incident scene. The ISU is the Agency's primary response team in all areas where the Traffic Officer Service is not operational.
	Information and Training Group	The current organisational unit responsible for managing the NTCC contract and delivering operational training.
	Information Provision	That activity which provides information about the state of the road network to any of the Highways Agency's internal or external information consumers.
	Information Request	Received from the general public on any aspect of the Highways Agency's business. Examples of information requests include: <ul style="list-style-type: none"> - Queries about road works; - Queries about traffic conditions; - Queries about road schemes; - General switchboard queries
	Initial Response	The deployment of resources appropriate to the reported need, to make the operational environment safe for all involved in the response or the travelling public to prevent escalation, to stabilise the situation, to provide immediate first aid for casualties and support for those involved
ICCS	Integrated Communications Control System	The Agency system used to control communications (both telephony and radio) between the on-road Traffic Officers, RCCs and the Police.
JTMS	Journey Time Monitoring Subsystem	Part of the Agency's NTCC Instation; the system for monitoring journey times using Automated Number

		Plate Recognition (ANPR) cameras
KPI	Key Performance Indicator	a Performance Measure for which performance below the Target Service Level leads to the accrual of Service Points by the Service Provider
	Maintain Corporate Data	For ensuring a common data definition to support TMD's capabilities
	Maintain Customer/Partner Information	The process for maintaining information about our Customers and partner organisations that is required to undertake other processes
	Manage Briefing/Debriefing	For undertaking pre-shift briefing, immediate post-shift debriefing and longer term "cold" debriefings
	Manage Budgets	For managing the budget to deliver the operational service
	Manage Contracts	For developing and managing contracts with the supply chain;
	Manage Current Event Response	For safely and effectively managing the response to an event that has been discovered
	Manage Current Event Scene	For managing the safe restoration of a current event scene to normality including assessment of progress of police investigations and of required clear up responder resource
	Manage Demand	For understanding where demand on the network will increase and initiating an appropriate response
	Manage Health & Safety	For ensuring that the welfare of staff is paramount in all operational processes and procedures. The direct implementation of health and safety procedures will be managed through line management
	Manage Information Channel	For maintaining communication channels with the general public and partner organisations and disseminating information through them
	Manage National Roster	For managing the allocation of resources (people, vehicles and equipment) to support the organisation's capabilities. This includes, but is not limited to, national management of resource allocation across the estate based on knowledge of the current and future state of the road network, management of shift patterns, management of patrol strategies etc
	Manage Network Capacity	For understanding where capacity on the network will decrease and initiating an appropriate response
	Manage Procedural Compliance	For ensuring that operational activity complies with agreed standards, processes and procedures
	Manage Programme	For managing programmes of projects delivering change
	Manage Project	For managing projects delivering change
	Manage Services	For managing the services provided by the supply

		chain
	Manage Strategic Current Events	For managing current events that have a strategic impact on the state of the road network
MAC	Managing Agent Contractor	Combination of Managing Agent and Term Maintenance Contractor forming a single operating company to maintain the network and its structures on behalf of the Agency.
	Meteorological Devices	Roadside devices to monitor weather conditions such as fog and wind
	Monitor Network	For monitoring conditions on the road network in order to identify deviations from normality
NILO	National Incident Liaison Officer	National Incident Liaison Officer, being operatives who are based at the Agency's NTOC and receive and disseminate information about critical and major incidents to senior managers
	National Roster	The national pool of resource that is employed in order to undertake an organisation's core and supporting capabilities. It includes, people, vehicles and equipment.
NTCC	National Traffic Control Centre	The Agency's National Traffic Control Centre, which delivers information about network conditions to customers (both road users and within the Agency) through identified delivery channels
NTIC	National Traffic Information Centre	A business unit within National Traffic Operations that is responsible for managing the collection, processing and dissemination of information about events on the road network and other aspects of Highways Agency business.
	National Traffic Operations	the Agency's organisational unit based within the National Traffic Operations Centre (NTOC) that is responsible for undertaking contact management, traffic management, incident management, information provision at a strategic level and event planning at both strategic and tactical levels. National Traffic Operations comprises four subsidiary business units; the Central Contact Centre, Strategic Traffic Operations, the National Traffic Information Service and Operational Planning
NTOC	National Traffic Operations Centre	The location at which centralised operational activity is undertaken.
	Non-Operational Support	All activity undertaken to support TMD but that is neither operational nor directly supports operational activity.
	Normality	The situation when the road network is operating within expected profiles of traffic flow (including routine congestion).
	Operational Performance	For providing information about the performance of the organisation in delivering its core and supporting capabilities

	Operational Planning	An Agency business unit within National Traffic Operations that is responsible for planning the Highways Agency's response to forecast events.
	Operational Support	An Agency organisational unit responsible for undertaking operational support activities such as resource management and delivery of business changes to the operational service.
	Partner organisations	Any organisation with which the Highways Agency or RWS has a working relationship.
	Plan Current Event Response	For identifying the appropriate response to an event that has been discovered.
	Plan Forecast Event Response	For planning the response to an event notified (via Customer and Partner Management) that will occur in the future
	Predict Current Events	For using historical information about the state of the road network to predict the occurrence of events that will reduce capacity, increase demand or risk the safety of road users;
	Protect Current Event Scene	For ensuring that the scene of a current event is safe and that traffic is diverted around the scene
	Recovery	The recovery of vehicles, loads, obstacles and debris from the carriageway and the carrying out of essential repairs to the infrastructure
RCC	Regional Control Centre	Regionally based traffic operations control rooms responsible for managing incidents and ensuring the smooth operation of the motorway network and trunk roads.
	Regional Response Centres	he locations from which regionally based operational activity will be undertaken
	Regional Traffic Operations	The Agency's organisational unit responsible for undertaking tactical traffic and incident management and deploying on-road resource.
	Repair Infrastructure	For undertaking emergency repairs to damaged road network infrastructure (carried out by service provider resource)
	Report Current Event	For reporting events on the road network
	Report Forecast Event	For reporting events that are planned to occur in the future
	Request Agency Information	For receiving and answering queries from the general public and third party organisations
	Resource Deployment	Information required to deploy all types of on-road resource, including details of locations of an event, vehicles involved, infrastructure damage, injuries and required specialist vehicles, equipment or skills.

	Resource Management	the management of people and physical resources to ensure sufficient coverage of the priority areas of the road network based on road network intelligence
	Restoration to Normality	The return of traffic flow and the infrastructure to expected pre-incident standards and levels (normality).
RWIS	Road Weather Information System	An Agency ICT system used to provide information about weather conditions on the road network.
	Roadside Operations	The Agency's organisational unit responsible for providing a fit for purpose on-road resource service for deployment to events on the road network to undertake operational traffic and incident management.
RWS	Rijkswaterstaat	The organisation responsible for building, maintaining and operating the Strategic Road and canal network in the Netherlands
	Scene Management	The management of those activities that need to be completed at the scene before the incident location can be cleared, such as the protection of the scene by implementation of diversions or other traffic management measures when required, the relief of trapped traffic, further treatment and evacuation of casualties, the removal of hazardous chemicals, the investigation of the incident and the collection of evidence
SRW	Schedule Of Road Works	Authorised maintenance and repair works carried out to the highway, or maintenance and repair works carried out to the highway by other Operational Partners. This also refers to the Agency system in which road works are recorded
	Set Signs & Signals	For managing the setting of signs & signals to influence driver behaviour and manage traffic flow and routes
	Setting of Signs and Signals	Using roadside technological devices to deliver on-road messages to road users. These include textual messages informing road users of impending road conditions or safety information, changes to speed limits to minimise congestion, pictorial information, information about lane closures and carriageway layouts
	Signals	Providing speed limit, message, lane closure and other information to influence road users. Both automated in response to data from loops but can be manually set;
	State of the Road Network	A bespoke view of the state of the road network including information about traffic flow, traffic speed, journey times, current, forecast and predicted events, hotspots, CCTV images and footage etc.
SRN	Strategic Road	All roads maintained and operated by the

	Network	organisations
STO	Strategic Traffic Operations	An Agency business unit within National Traffic Operations responsible for undertaking dynamic traffic management and incident management at a strategic level.
	System	A logical entity that could be comprised of extant applications as-is, enhancements to existing applications, new applications, shared components/common services between multiple systems or any combination thereof.
TDCMS	Traffic Data Collection and Monitoring Subsystem	Part of the Agency's NTCC Instation; the system for monitoring traffic flow using on-road sensor loops
	Traffic England	Provided by the Agency's NTCC; a publicly available website providing information about traffic flow conditions on the road network and details of any incidents that may affect journeys
TiS	Traffic Information Services	A special purpose company, wholly owned by Serco, that was established to deliver the Agency's NTCC.
TM	Traffic Management	The combination of semi-automated control of traffic signs and signals, application of demand management techniques (including traffic cones), and traffic Information and advisories to achieve an optimal traffic flow throughout a defined management area.
TMD	Traffic Management Directorate	(from Feb 2010) An Agency directorate, comprising of the 7 traffic officer service regions, plus a national group incorporating the NTCC plus HAIL, NILO and support to traffic officer operations, with responsibility for delivering a world class Traffic Management service to all customers through traffic information, active management of traffic flows and incident response.
TMU	Traffic Management Unit	A system, used by the Agency's NTCC, comprising of loops to collect Traffic Data.
	Traffic Radio	Provided by the Agency's NTCC; radio broadcasts of event information using information from NTCC systems (although this service will not be continuing
VMS	Variable Message Sign	Variable Message Signs, being electronic roadside signs that convey messages
	Verification	The clarification and confirmation of the location, extent and key details of the incident as far as is possible so that appropriate resources can be deployed
	Verify Current Event	For confirming the details of the event
	Virtual Patrolling	The use of technology to identify events occurring on the network.