

## **SMP DESIGN FIX 1**

### **DETAILED BRIEF FOR OPERATIONAL CONCEPT**

**MAY 2017**

This document will be used for these schemes (which could be known as Tranche 6)

- M1 J35a-39
- M1 J19-23a
- M5/M42 B'ham Box Phase 4

## **DETAILED TECHNICAL BRIEF**

### **1. Explanatory Note**

1.1 The overarching technical specification is provided in the CDF contract documents.

1.2 This document (the Detailed Technical Brief, “this Brief”) provides detail of what is required for reaching DF1 (in operational regime terms).

1.3 Suppliers shall work collaboratively to further develop a common viewpoint on deliverables and how they are delivered across packages. Specific attention is drawn to previous technical deliverable examples for Tranche 5 (5 No. Schemes announced for RIS1 in Autumn Statement 2014) that are held on Business Collaborator.

1.4 There are strong inter-connections between workstreams for Operations, Infrastructure and Assessment. This Brief only informs the first of these, but liaison with other workstreams is essential. Other work packages are underway or expected for traffic modelling and survey.

### **2. Brief Explanation**

2.1 The services are to deliver assessment of potential operational interventions within the Smart Motorways Programme (SMP).

2.2 In order to progress the interventions within SMP, the most appropriate operational solution at each mainline and junction location needs to be developed, based on given issues and constraints. Outline Operational Concepts have not been developed, but the baseline schemes and timelines shall be taken from the scheme descriptions in the Roads Investment Strategy (RIS). Any variance in RIS scope shall be treated through Change Control.

2.3 The purpose of this work is to:

- Provide “Design Fix 1” outputs based on Interim Advice Note (IAN) 161 ‘*Smart Motorways*’ (IAN161), DMRB, and current Major Project Instructions and IANs.
- Engage early with key operational stakeholders to ensure that the operating regime is suitable and to ensure that infrastructure requirements, and extents, are identified as early as possible.
- Develop a communications plan and engage with a limited set of external stakeholders on a needs assessment basis.
- Ensure that the overall route operating regime is suitable both to meet customer expectations and takes account of the wider route corridor context beyond the currently defined scheme limits.
- Further to above, recommend amendments to RIS commitments only where appropriate.
- Determine the necessary extents of junction improvements that should be

included in the main design work packages, taking into account Operations Directorate (OD) and Local Highway Authority schemes already planned.

- Identify where land take may be required, and whether Statutory Procedures (e.g. Development Consent Order, or Orders under the Highways Act 1980). It is highly desirable that these are avoided, but it is recognised that where unavoidable there may be long term benefit of removing isolated constraints that otherwise would impose an operational disbenefit on the network.

2.4 SMP Design Guide, with its Technical Annexes on Business Collaborator provides best practice advice.

### **3. Key Staff**

3.1 As a minimum, the following key staff are anticipated:

- Operational Lead
- Safety Lead
- Technology and Systems Lead
- Highways Lead
- Structures Lead
- Geotechnics Lead
- Traffic Lead
- Maintenance lead
- Project Manager

3.2 It is expected that these roles would work in an integrated way with the SMP Technical Leads to deliver the Package Orders in an efficient, consistent, collaborative way.

3.3 Unless notified to the contrary, Highways England shall be Principal Designer for DF1 stage and shall complete F10 forms.

### **4. Stakeholder Management and Meetings**

4.1 Suppliers shall develop a stakeholder engagement approach to deliver the specification.

4.2 External stakeholder engagement shall be required with local authorities and also other non-environmental bodies in some cases (e.g. Network Rail). This is encouraged on the basis that it shall be focussed on specific issues, but only where agreed by the Package Order Manager.

4.3 Internal stakeholder engagement with HE Directorates, including the relevant area teams, and their maintenance service providers (e.g. Asset Support Contractors, NRTS/NRTS2) shall be required. A strong emphasis shall be placed on routing contracts and decisions through HE OD so that the senior user is fully engaged in the development of potential outcomes.

4.4 Meetings shall include:

- Inception meeting
- Progress meetings (monthly)
- Project Safety Control Review Group (two meetings)
- Liaison meetings with Safety, Engineering and Standards specialists
- Maintenance Service Provider meetings
- Operations Directorate meetings (Assets and TOS)
- Emergency Services Meetings (if requested by emergency services)
- Operations Technical Leadership Group meeting
- Operations Surgery
- Discipline “scoping” meetings with SMP leads (one per discipline within 3 weeks of commencement of services)
- Schedule meeting to discuss milestones, key meeting dates and programme logic
- Risk workshop to define emerging risks to delivery, appropriate mitigations, and residual risk provision
- Order of Magnitude “Form 303” meeting with Cost Estimation team
- Local Highway Authority meetings (where requested)
- Stakeholder meetings for specific high ranking risk issues (e.g. Network Rail, HS2)

## 5. Technical Deliverables

5.1 In addition to project management deliverables, technical deliverables for each SMP scheme (NB: not for each package of schemes) are required as follows:

- **Technical Notes** that respond specifically to individual issues or combinations of issues. The standard of technical notes would be that expected of PSCRG/NSCRG submissions to demonstrate all feasible options, recommended option(s) with reasons. The Supplier shall recommend where the list given in the Appendix should be extended to include other identified issues. The Supplier shall seek approval after advising the reasons for inclusion of such issues, based on the overall objectives of this work package.
- Early notice in writing of any issues that may be deemed as "Type C" features as defined in IAN191.
- Early notice in writing of potential scheme extent changes or other scope changes that require authorisation by Project Board.

- 5.2 In developing all deliverables please be aware that there are existing templates for many of the deliverables. SMP Technical Leads shall be consulted and met with at scoping stage.
- 5.3 In developing all deliverables, Suppliers are reminded of their responsibilities as designers (CDM Regulations 2015) and the programme level desire to raise the bar for Health and Safety by designing to the principle of ERIC for maintenance/operation liabilities and capital construction works. Each deliverable must contain consideration of safety of each population.
- 5.4 It is also recognised that there is a linkage between proposed operating regimes and the likely benefit to cost ratio (BCR). Where two or more different (but substantive) operating regimes are considered valid, then these shall be identified along with outline costs, quantified benefits and quantified disbenefits to allow SMP to determine the effect on BCR (calculation performed by others). For example, if a major structure prevented ALR on a link then an option to reconstruct the structure may affect the cost and economics substantially. Although the default position is that avoiding Orders or landtake is desirable, this is not a mandatory requirement.
- 5.5 Deliverables shall be submitted using the Common Data Environment (CDE) of Business Collaborator (BC), <https://smpbim.withbc.com/> ["Get Access" button for new users]. Except for PCF products, all other DF1 submissions shall be saved in the appropriate meta-data folder of '*project/* General Documents/ Ops Concept/ 7. DF1 Outputs/ *sub-folder*'; PCF products have a similar folder structure.

## **6. BIM (Building Information Modelling / Better Information Management)**

- 6.1 The Employers Information Requirements (EIR) is to be followed, and requires Suppliers to deliver a BIM Execution Plan (BEP) covering pre-contract and post contract stages.
- 6.2 In developing all deliverables, Suppliers are reminded to:
- a. Use available HE Asset Information Group systems (e.g. HAGDMS,

HADDMS, HAPMS, IAMS etc., AVIS (training is required) and Digital Terrain Model (DTM) (based on processed drone / aerial & driven Lidar datasets).

- b. Use the SMP Digital Component Library.
  - c. Use Rapid Engineering Model (REM) (provided) tool/process for scheme development.
  - d. Generate a 3D BIM model for scheme to EIR requirements, leading to:
    - i. Virtual Reality (VR) Immersive Model.
    - ii. Drive/Fly through (3D visualization).
  - e. Inventory (quantities, schedules with GIS location of key infrastructure assemblies (e.g. ERA, gantry by type, technology, etc).
- 6.3 In delivering the service, Suppliers are reminded of the requirement to capture and disseminate lessons learnt in the Lessons Learnt Log. This will aid the improvement and evolution of the Operational Concept workstream, and subsequent project delivery.

## APPENDIX: TECHNICAL DELIVERABLES LISTS

Technical Notes			
Deliverable	Description	AS14 Template exists?	Consultees
TN1 - Accident Summary	<p>5 year accident summary, analysis, identification of any clusters and commentary on how the design addresses these clusters.</p> <p>Include one link either side of core notional scheme.</p> <p>Include roundabout and interchange junction accidents but disaggregate in reports (with particular mention of NMU injuries)</p>	Yes	<p>PSCRG</p> <p>Environment workstream (mainly for NMU issues)</p>
TN2 - Network Analysis - Congestion & Traffic Flow Summary	<p>A Technical Note to describe the current traffic conditions, including adjacent links, with assessment for the potential for queuing and extent of queuing (opening year and design year) at the nose of off-slips, with junction specific recommendations to reduce any queue risk. Locations with mainline queuing risks due to mainline or slip road congestion shall be linked to a "seed point" with descriptions of potential remedies.</p> <p>Daily &amp; weekly profiles, peak hour flows, congestion points, high level forecast of flows, identified HE improvement schemes.</p> <p>Include loop data graphical summary and real time floating data summary. Include CCTV analysis where other sources suggest greater understanding is required.</p> <p>Include assessment of turnaround TOS times based on existing junctions and bespoke turnarounds.</p> <p>Consider AQMA</p>	Yes	<p>Local TOS/RCC Rep</p> <p>Senior User</p> <p>PSCRG</p>
TN3 - Proposed Operating Regimes for Junctions	<p>Confirm what works shall be required, if any, to ensure <u>suitable</u> performance at design year. High level report only. Microsim not required unless case made.</p> <p>ARCADY/PICADY or similar capacity type tests may be warranted if there is uncertainty of queuing risk to mainline.</p> <p>Confirm what improvements are already in OD pipeline, with timings.</p> <p>Consider AQMA issues at junctions</p> <p>Note: where appropriate off network improvements to remote LHA junctions may need to be brought into scope with Project Board agreement</p> <p>RAG status of junctions to be included.</p>	Yes	<p>Local TOS/RCC Rep</p> <p>Senior User</p> <p>PSCRG</p>
TN4 – Highways Design Strategy Record (DF1)	<p>To include: -</p> <p>Proposed and Existing Junction Layouts - TD 22 (with IAN161) review including proposed departures (TN4)</p> <p>Proposed gantry spacing including Departure summary - Datums, ADS sign positions, signalling</p>	Yes	<p>SES Safe Road Design team for Departure issues only</p>
TN5 - Note on scheme safety risk classification	<p>Complete IAN 191 Matrix with main purpose of identifying any Type C features and mitigation of type C features;</p>	Yes	<p>By exception Jo Goulding (SES)</p>

			PSCRG
TN6 - Land requirements	Report any options requiring land, licenses and agreements including existing legal rights of usage. Define the extent of the development (Red Line Boundary (RLB)). HE legal (General Counsel) will need to determine whether the scheme is a Nationally Significant Infrastructure Project (NSIP), and consequent requirement for a DCO. Requirements of DCO Toolkit to be followed to enable early determination.	Yes	DCO & Statutory Processes Team (Will Spencer)  Lands team by exception
TN7 - Lighting Assessment	This shall require early acquisition of 5 year detailed accident records from the data held by the service provider. A full IAN161 compliant assessment is not required, but the level of assessment shall follow AS14 examples and be sufficient to understand the likely outcome of full assessment of both dark and lit areas with due cognisance of where existing lighting is likely or unlikely to be disturbed by other ALR enablers e.g. concrete barrier.	Yes	PSCRG  ASC/MAC or AD team OD  Stuart Beale (SES)
TN8 - Location specific maintenance concerns and Maintenance Access Review	Access to special features – Transmission Stations (TS), Maintenance compounds. Location of FTP's, any offsite access routes (Power & Technology)). Location specific maintenance needs and challenges. Concerns/issues raised by the civils and technology maintainers, what aspects have been identified that shall assist with maintenance of the asset with ALR.  Identify ERAs that could also offer access.	Yes (also advice note)	ASC/MAC OD
TN9 - Technology & Systems Overview	Carry out review and produce list of existing technology provision, including: <ul style="list-style-type: none"> <li>• NRTS level of network provision and longitudinal cabling, details of all existing road side equipment and its location, and TS locations.</li> <li>• Commentary on existing constraints for siting new technology, such as narrow verges, tunnels, long elevated structures, ducts through structures.</li> <li>• Commentary on currency and accuracy of the MCY drawings.</li> <li>• Existing Power provision and commentary on likely additional supply requirements and associated constraints to its provision.</li> </ul>	Yes	TechMAC/RTMC, NRTS, OD area team
TN10 - Structures Overview Report	The objective of this Technical Note is to review the available information on the structures and determine: <ul style="list-style-type: none"> <li>• If the capacity of the underbridges meet the requirements of the ALR</li> <li>• Adequacy of the existing carriageway width between the parapets to accommodate the proposed ALR cross-section</li> <li>• Adequacy of the existing containment at the structures locations to meet the proposed ALR</li> <li>• Adequacy of the headroom clearances required for ALR</li> <li>• Verge widths of underbridges</li> <li>• Condition of the structure and other structural elements such as joints, wearing courses, etc.</li> <li>• Strengths of the existing structural elements</li> <li>• Any unusual features in the central reserve or on the structures which might require strengthening work</li> <li>• Any positive or negative impacts on NMU users.</li> </ul> <p>The report shall include plans and cross-section to demonstrate issues and compliance and any departures. Where construction work is required to modify a structure then key structure sketches must be included to show proof of concept only including any necessary landtake and options for highway departures that reduce or eliminate structures work.</p>	Yes	SES structures team
TN11- Maintenance Renewal Report and Survey Recommendations	Scheme specific maintenance renewals. Review and summary produced of Area team and HE central databases for asset condition, summary of planned schemes (renewal and improvements), Proposed interventions that are asset enablers and other asset proposals up to 5 years post SM opening.  This TN must reflect the requirements of SMP Programme Management Instruction 025 ('Fixing Scope for Asset Renewals', dated Feb 2017), and clarify works as Asset Enablers or Asset Renewals.	Yes (also advice note)	ASC/MAC or AD team OD

	This TN must also flag where specific surveys (that vary SMP Survey Guide generic requirements) are desirable, with timing recommendations.		
TN100, 101 etc onwards - Scheme specific High Priority Issue	Identify specific constraints and options to resolve [Note must use this numbering format]	Yes	Depends on subject matter

<b>Reports</b>			
<b>Deliverable</b>	<b>Description</b>	<b>Template exists?</b>	<b>Consultees</b>
Product Checklist (PCF)	PCF Products produced at PCF Stage, and status under Operational Concept workstream	Yes	Project Sponsor Project Manager
Project Schedule (PCF)	Detailed delivery schedule, by PCF Stage, aligned to Work Breakdown Schedule and Cost Breakdown Schedule. Detailed template provided by SMP Head of Planning, with Supplier reviewing and advising on logical links, durations and key interdependencies.	Yes	SMP Head of Planning
[Interim] Combined Operating Regime PCF product - interim (PCF)	<b>Interim PCF product for “Combined Operating Regime”</b> suitable for PCF Stage 3, based on the PCF quality criteria and template on the PCF section of the supply chain portal, covering the mainline, junctions and tie-ins. Note that whilst the format shall be produced to match the PCF combined product for “Operating Regime, Compliance Strategy and Implications on Core Responders”, the chapters relevant to the latter two topics should be limited in scope at this stage and should only serve to highlight particular local risks or difficulties that would not be commonly experienced on a typical SM intervention. Liaison with enforcement authorities shall be undertaken at a later stage. For this reason the product shall be considered as Interim and shall not be subject to formal sign-off at DF1. However a robust level of consultation, including demonstration of OD/TOS input and liaison shall be required before endorsement by the Operations TLG is possible. The full assessment of safety issues requires the parallel production of other safety related PCF products and so whilst the safety of recommended solutions must be considered, there is no current requirement in this interim stage to produce those products; however identification and commentary for PIA cluster sites is within scope.	Yes	Local TOS/RCC Rep Senior User
Safety Plan (PCF)	See PCF guidance. Produce towards end of DF1 work once intervention is better understood	Yes	PSCRG

NMU Context Report	NMU Context Report to HD42 requirements – this as a minimum shall take account of junctions and also bridge crossings of the network	Yes (also Design Guide annex)	OD
EDIT report (Equality, Diversity, Inclusion Tool)	Use EDIT tool to produce first stage report	Use Tool	SES (EQI team)
Ops TLG Summary Paper and Powerpoint Slides	Summary of package order outcomes. See MPI 31.	Yes	Operations TLG
External facing Powerpoint Slides	Non-technical slide deck for general use	Yes – see M40/M42 and A1M external presentations	N/A
Communications plan	This aspect includes: <ul style="list-style-type: none"> <li>- Developing and sending a number of variant stakeholder letters</li> <li>- Logging responses in a suitable database</li> </ul>	Yes	SMP Comms team Members of Parliament HE liaison team

<b>Drawings</b>			
<b>Deliverable</b>	<b>Description</b>	<b>Template exists?</b>	<b>Consultees</b>
Schematic Layout - SM Features	A3 size schematic drawing(s) showing existing and proposed Design Fix 1 features: these include merge/diverge datum points, local junction improvements, gantries, signs, signals, ERAs, retained hard standings and similar features that have an operational purpose (e.g. abnormal load bays), works units and turnarounds, fixed taper points (but excluding remote controlled TTM signs). The format of this drawing must be the same for each Supplier and this format shall be agreed using established templates. The drawing format must include identification of unavoidable land take and also zones where placement of features is to be avoided due to sensitive receptors, overhead cables or other identified constraints such as narrow verges. The constraints plan must have a Red Amber Green (RAG) status.	Yes	NRTS, OD
Highway Layout plans	Proof of Concept - Plans and model needed to measure intervisibility, gradient if available, Horizontal radii, ERA fit within highway boundary, carriageway widening if available, environmental issues identified etc.	Yes	Highways Peer Group
3D Visualisation	A 3D 'drive/fly-through' visual concept of the proposed scheme layout, signs and signals to show complex issues and constraints and their interaction. Of particular interest are the junction areas and the interaction of signalling and ADS gantry infrastructure, i.e. the driver experience.		Highways Peer Group agree before Ops TLG

<b>Lists/Forms</b>			
<b>Deliverable</b>	<b>Description</b>	<b>Template exists?</b>	<b>Consultees</b>

Departures List	Using standard Template, an initial list of key Departures from Standard using standard templates for Departure Reporting, with high level descriptions and risk ranking	Yes	Highways peer group agree then SES Safe Roads Design
PSCRG proposed attendees	Agree with SMP safety lead the range of core and non-core members	Yes	By exception Jo Goulding SES
Incoming Site Information List	LiDAR info, Area team info, Stats, Highways England database info Include known environmental constraints  NB: for SU information – initial source shall be maintainers.	Yes	N/A
Carriageway widths & crossfall report schedule	Identify existing paved area, adverse camber, crossfall % etc.  Designers are expected to make use of AVIS for this deliverable and it's linkage to Structures TN10 and shall include staff who are already trained to use the system.	Yes	N/A
Future schemes list	A list, with descriptions, of potential HE OD schemes, any developer led proposals and major renewal schemes.	Yes	OD ASC/MAC or AD team
Structures Listing	Need for assessments, maintenance issues etc Identifies all structures on the schemes, giving type of work needed for the next stages of the design process, e.g. whether assessment, REAF etc required, further headroom/cross section confirmation, requested maintenance works etc. all gathered from information review and liaison with OD/Area teams	Yes	SES structures team
Order of Magnitude Estimate (PCF)	a. Completion of standard “303” forms and descriptive commentary, including a meeting with HE team who will produce the estimate based on the information provided by suppliers. b. Produce high level quantity tables for general use across SMP	Yes	HE Cost Estimation team
Motorway Signal visibility list	Using IAN161 requirements, provide achieved visibility values (accurate to the nearest 10m) for new and retained signals derived from preliminary 3D assessment. The 3D images may be requested by Highways England to support the list.  A reasonable estimation for summer vegetation shall be included.	No	N/A but make use of peer groups to develop suitable methods.
Risk Register (PCF)	Standard risk register for SMP schemes, with quantification of risks including addition of new risks specific to project. Updated monthly.	Yes	As required
Lessons Learnt Log	Standard formats to be used and populated on a monthly basis	Yes	

