

# Transport Business Case Report

## Kent Strategic Congestion Management Programme

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## **1 Introduction**

### **1.1 Overview**

1.1.1 Amey have been commissioned by Kent County Council (KCC) to develop proportionate business cases for various South East Local Enterprise Partnership (SELEP) schemes being promoted by Kent to be funded by the South East Growth deal as part of the Government's Local Growth Fund (LGF).

### **1.2 Kent Strategic Congestion Management Programme (KSCMP)**

- 1.2.1 The KSCMP is a continuation of improvements being made by KCC to maximise the efficiency of the local highway network as traffic levels increase in line with development. The Programme is to be delivered between the financial years 2015/16 and 2020/21 and the total Programme value is £4.8million. KCC is entering the third year of its KSCMP, with this business case applying for £0.8million for financial year 2017/18.
- 1.2.2 The KSCMP strategy incorporates a methodology of assessing areas or road links that suffer from congestion and unreliability. The strategy uses a number of criteria to score road links that are then assessed in more detail to establish the worst performing links. The new Local Transport Plan adopts this approach to tackle unreliable sections of the road network as a way of supporting economic growth.
- 1.2.3 For the 2017/18 KSCMP funding allocation, two such hotspots have been identified and schemes developed. These are:
- A225 Princes Road/ Darenth Road junction, Dartford; and
  - A2500 Lower Road/ Barton Hill Drive junction, Sheppey.
- 1.2.4 In addition to the two above hotspot schemes, funding from SELEP will be used to provide an extension to a pan-European project to introduce a Connected Intelligent Transport System (C-ITS) corridor from Blackfriars in London to the Port of Dover in Kent via the M2 and A2. It is KCC's aim to integrate the project seamlessly into the Kent road network by extending the project onto the A229 which connects the M20 and M2 motorways and forms a key corridor in the event of a major disruption on the strategic road network. Increasing automation will increase efficiency, reduce crashes and reduce congestion.
- 1.2.5 Figure 1-1 shows the 2017/18 scheme locations.





**Figure 1-1: Scheme Locations**

1.2.6 The implementation of the KSCMP will enable the creation of an estimated 2,000 jobs and 2,300 additional homes for the SELEP region within the six-year course of the programme, which is consistent with the length of the SELEP Strategic Economic Plan. It will help to provide a transport environment which makes it easier for businesses and employees to travel to, and for work. Around 10% of the planned housing across the SELEP region relies on the KSCMP, which if delivered could provide significant increases in Gross Value Added (GVA) for the region.

1.2.7 Without the investment required to both improve sustainable transport and to mitigate the existing and forecast levels of congestion in Kent, there is concern that the viability of the ambitious employment and residential development, required to fulfil the strategic economic growth objectives of the SELEP sub-region, will be hampered.

### **1.3 Area Description**

1.3.1 KCC and its 12 district councils administer most of the traditional county of Kent, a total of 3,352 km<sup>2</sup>. The Medway Towns Council (MTC) is a unitary authority which administers the remainder (192 km<sup>2</sup>) consisting of the urban agglomeration of Gillingham, Chatham, Rochester and Strood amongst others. Together, KCC and MTC have around 300 town and parish councils.

- 1.3.2 With regards to transport, Kent is well connected as High Speed 1 operates through the county offering frequent services from Ebbsfleet and Ashford International stations to a range of northern European destinations via the Channel Tunnel. It is home to the country's busiest and most successful ferry port at Dover, which is undergoing a £130 million expansion in 2016/17 to meet growing demand for cross-Channel freight. Kent is a major employment centre with over 56,000 businesses providing around 575,000 jobs.
- 1.3.3 The two major road corridors in Kent are the M2/A2 route from Dartford to Dover via the Medway Towns and Canterbury, and the M20 from south-east London to Folkestone via Maidstone and Ashford. Other trunk routes in the county include the A249 Sittingbourne to Sheerness, the A2070/A259 route from Ashford towards Hastings in East Sussex, and the A21 from Sevenoaks also towards Hastings.
- 1.3.4 Kent also has more motorways by distance than any other county in the UK, totalling 173km. In addition to the M2 and M20 discussed above, part of the M25 runs through Kent, between Westerham and Dartford. The M26 motorway provides a short link between the M25 at Sevenoaks and the M20 near Wrotham.

#### **1.4 Socio-Economic Characteristics of Study Area**

- 1.4.1 The 2011 census indicates that the area administered by KCC has a population of around 1.51 million. The socio-economic characteristics of Kent include the following:
- Of residents aged 16 to 74, 78.6% (almost 720,000 people) are economically active; whilst 5.0% of the workforce is unemployed (compared to 6.0% across England);
  - Kent's average household size is 2.34 people per household which compares to 2.4 in England;
  - 6.6% of Kent residents aged 16 and over hold no qualifications, below the national average. An above average percentage (13.8%) hold Level 1 qualifications, with higher than average possession of higher levels;
  - 20% of households do not own a car. Of those that do, single car ownership is slightly more common in Kent (43%) than across the rest of the nation (42%).

## **1.5 Background to the KSCMP Business Case**

- 1.5.1 The UK Government's Local Growth White Paper, published in October 2010, set out the roles that local enterprise partnerships (LEPs) can play depending on their local priorities. The Chancellor of the Exchequer announced the first 11 zones in the 2011 Budget. The government has now created 39 LEPs.
- 1.5.2 Following a report by Lord Heseltine entitled "No Stone Unturned"; a new approach to funding local major transport schemes that are to be constructed in England (outside London) during the 2015-2021 period was established. At its heart is a powerful case for decentralising economic powers from central government to local areas and leaders, as those best placed to understand and to address the opportunities and obstacles to growth in their own communities.
- 1.5.3 On 18 March 2013 the government published its response to the Heseltine review, accepting in full or in part 81 of Lord Heseltine's 89 recommendations. Each of the LEPs was invited to submit a Strategic Economic Plan (SEP) by 31 March 2014, outlining their local priorities to maximise growth.
- 1.5.4 In July 2014, the government negotiated a Growth Deal with all 39 LEPs, which awarded them a significant proportion of the £12 billion LGF.
- 1.5.5 The SELEP brings together key leaders from business, local government, further and higher education with the goal of creating the most enterprising economy in England through exploring opportunities for enterprise while addressing barriers to growth. The SELEP area covers greater Essex, Kent and East Sussex; it is the largest strategic enterprise partnership outside of London.
- 1.5.6 SELEP has secured £442.2 million in funding from the Government to boost economic growth from 2015/16 to 2020/21, with a particular focus on transport schemes that will bring new jobs and homes. This includes £358.2 million for new growth schemes on top of £74 million already committed for large transport projects, of which the Kent and Medway Economic Partnership, the local arm of SELEP, will receive an allocation of £104 million.
- 1.5.7 The Growth Deal resulted in £84.1 million invested in the SELEP area in the financial year 2015/16, and over the length of the funding deal 35,000 jobs, 18,000 new homes and over £100 million in private investment are expected to be delivered.



## **1.6 Purpose of this Document**

1.6.1 The purpose of this document is to provide an evidence-based Business Case to secure £4.8m from SELEP's LGF allocation to progress the KSCMP.

1.6.2 Guidance for the preparation of Business Cases for Transport Schemes has been published by the Department for Transport (DfT), based on HM Treasury's advice on evidence-based decision making as set out in the "Green Book: Appraisal and Evaluation in Central Government".

1.6.3 This document is a Transport Business Case and as such uses the best practice "five case" model approach. This approach assesses whether schemes:

- Are supported by a robust case for change that fits with wider public policy objectives – the 'strategic case';
- Demonstrate value for money – the 'economic case';
- Are commercially viable – the 'commercial case';
- Are financially affordable – the 'financial case'; and
- Are achievable – the 'management case'.

1.6.4 The evidence gathered as part of the business case preparation process has been prepared using the tools and guidance provided by the DfT, most notably the transport appraisal guidance published in WebTAG. This approach ensures that the evidence produced is robust and consistent.

1.6.5 For the KSCMP it is proposed that a business case is submitted annually detailing only those elements of the scheme due to go forward in the following year. Therefore, a separate business case was published for both the 2015/16 and 2016/17 spending rounds and this business case will deal only with those elements of the scheme to be implemented in 2017/18. This is because there are no definitive plans for which measures will be implemented and in which locations beyond 2017/18; these will only become apparent as schemes are identified and mitigation, feasibility work and prioritisation are undertaken.

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## **1.7 Structure of the Document**

1.7.1 This report is structured in accordance with “The Transport Business Cases”, the DfT guidance on transport scheme appraisal, as updated in January 2013. Following this introduction, the remainder of the document is structured as following:

- Chapter 2 provides a description on the scheme design;
- Chapter 3 states the Strategic Case;
- Chapter 4 presents the Economic Case including the Value for Money Statement;
- Chapter 5 outlines the Financial Case;
- Chapter 6 details the Commercial Case; and
- Chapter 7 provides the Management Case.

## 2 KSCMP Detailed Scheme Description

### 2.1 Background

2.1.1 The Kent Strategic Congestion Management Programme (KSCMP) is a series of projects or interventions to improve the efficiency of the road network. Hotspot schemes are identified using a methodology derived from data obtained about the road network from a range of sources including journey time reliability, crash record, flow and bus reliability.

2.1.2 The first year of the Programme (2015/16) identified two hotspot junction improvements and an enhancement to the Highways Management Centre. The second year of the programme (2016/17) identified three hotspot junction improvements and support for the extension of a Connected Intelligent Transport System (C-ITS) pilot study in Kent along the A229 corridor.

2.1.3 The intention was to develop and deliver schemes at these locations that can bring about improvements to journey reliability and support unlocking growth. The following sections provide a summary of the component schemes within the KSCMP.

### 2.2 2015/2016 Scheme Update

2.2.1 The following provides a summary of the component schemes delivered during 2015/16 and Table 2-1 below contains a summary of requested funds against actual spend.

1. **HMC Technology Refresh** – A full in-depth assessment of the operation of the HMC identified a range of improvements including database management, CCTV and network coverage of Variable Message Signs (VMS) and as a result all have been upgraded.
2. **A229 Bluebell Hill, Medway Approach and northbound off slip** – KCC engaged with Highways England (HE) and sought to develop a suitable scheme that improved the crash record, meeting the needs of the HE and the objectives of the KCSMP. As the scheme was developed it was evident that while this initial scheme had merit, supported by the initial modelling work with HE, it was clear that a bigger scheme could unlock greater growth potential. It is now intended to complete this expanded investigation and submit a separate business case for an improvement scheme to be funded within later years of the KSCMP.

3. **A229/A274 Wheatsheaf Junction, Maidstone** - This corridor was identified using the KSCMP methodology and is a priority intervention area. The scheme was taken through consultation and was not supported by County and District members. As a priority corridor for growth a scheme to investigate the whole corridor was taken forward and this junction has been included into the Maidstone Integrated Transport Package LGF scheme.

Cost Category	Requested	Actual Spend	Comments
<b>HMC Technology Refresh</b>			
Database development	£106,000	£95,000	
CCTV	£132,000	£267,000	CCTV refresh increased in cost following procurement exercise. Increased cost incurred for the decommissioning of the existing system and unforeseen need to implement on site equipment at camera locations.
Variable message signs	£265,000	£391,000	Increased number of VMS installed due to increased scope to tackle the implication of Operation Stack. Changes in location due to site surveys resulted in the need for protection and installation of barriers.
<b>Total</b>	<b>£503,000</b>	<b>£753,000</b>	-
<b>A229 Bluebell Hill</b>			
Design	£22,000	£43,000	Scheme design identified a larger scheme and will be taken forward as a separate business case.
Civils and signing	£60,000	-	
Signals	£20,000	-	
<b>Total</b>	<b>£102,000</b>	<b>£43,000</b>	-
<b>A229/A274 Wheatsheaf Junction</b>			
Design	£10,000	-	The scheme has been added to the wider Maidstone Integrated Package.
Civils and signing	£30,000	-	
Forward scheme identification and design for 2016/17	£88,000	£67,000	-
<b>Total</b>	<b>£220,000</b>	<b>£67,000</b>	-
<b>Total Base Cost 2014 prices</b>	<b>£733,000</b>	-	-
<b>Inflation Risk Allowance</b>	<b>£22,499</b>		-
<b>Total Scheme Costs</b>	<b>£755,499</b>	<b>£67,000</b>	
	<b>£831,048</b>	<b>£863,000</b>	

Table 2-1: 2015/16 Scheme Spend Update

## 2.3 2016/2017 Scheme Update

2.3.1 The following provides a summary of the component schemes delivered during 2016/17 and Table 2-2, below, contains a summary of requested funds against actual spend.

1. **A229 Extension to C-ITS Corridor** – The A229 C-ITS scheme has not started due to delays in the wider project in Europe. This means the 2016/17 funding on the project will now move into this 2017/18 business case with a new spend profile. This project is a national pilot being led by the Department for Transport with Highways England and Transport for London.
2. **A292 Ashford Junctions** – Both junctions have been designed and implemented in the first 2 quarters of the year following the detailed design carried out in 2015/16. The A292 is the main corridor for accessing Ashford, linking growth sites between the north and south of Ashford. The costs for the scheme have increased due to the cost of moving utility plant. A significant fibre optic cable had to be moved to facilitate the improvements.
3. **A229 Loose Road, Maidstone** – This intervention has been included in the wider programme of measures taking place in Maidstone (Maidstone Integrated Transport Package LGF scheme) as it links directly with the wider study into unlocking growth to the south of Maidstone.

Cost Category	Requested	Actual Spend	Comments
A229 Extension to CITS Scheme	£300,000	-	This project has been delayed following the delay in submitting the bid to Europe. It was successful and it is intended to roll it into the next year's programme of works.
A292 Mace Lane/ Wellesley Road, and Somerset Road/ Canterbury Road junctions	£300,000	£510,000	Increased construction cost due to utility diversion and the use of a pilot temporary Traffic Management System.
A229 Loose Road, Maidstone: Armstrong Road and Sheal's Crescent junctions	£100,000	-	The scheme has been added to the Maidstone Integrated Transport Package LGF Scheme.
Forward Design		£110,000	
<b>Total Base Cost 2015 prices</b>	<b>£700,000</b>		
<b>Inflation</b>	<b>£17,860</b>	<b>Estimated at</b>	The £300,000 underspend due to the delay of the C-ITS scheme will be carried over into financial year 2017/18.
<b>Risk Allowance</b>	<b>£71,787</b>	<b>£620,000</b>	
<b>Final Scheme Costs</b>	<b>£789,657</b>		

**Table 2-2: 2016/17 Scheme Spend Update**



## **2.4 2017/2018 Proposed Schemes**

2.4.1 The following section outlines the component schemes being put forward for funding in this Business Case for 2017/18.

### ***A229 C-ITS Scheme***

2.4.2 The delayed A229 C-ITS scheme will be carried forward into the 2017/18 financial year as part of this business case and be included in this year's spend along with the additional funding required to complete the scheme. The total contribution for the project will be £600,000: £300,000 carried over from the 2016/17 financial year into 2017/18 and £300,000 in 2018/19. The project will be completed in 2018/19.

2.4.3 KCC have identified a number of new ITS initiatives (the A229 extension being one) that link with the corridor proposal and with the HMC technology refresh (realised as part of this KCSMP scheme in financial year 2015/16) and it provides an opportunity to align the initiative to bring additional benefits to the residents of Kent.

2.4.4 The C-ITS scheme will improve the Kent Thameside and Maidstone corridors. The scheme will provide better information of issues on the road network straight into vehicle's navigation systems, improving journey time reliability and reducing the risk of crashes. Both corridors are within extensive growth areas and form a link to the heavily congested Dartford area. Bluewater is a major generator of traffic on the corridor and the C-ITS scheme will enable direct dissemination of information enabling better management of the road network. Kent will benefit directly due to the many links between the growth areas and the strategic road network.

2.4.5 The C-ITS scheme is an innovative pilot project which, if successful, will be rolled out nationally on the country's roads. One of the project's aims is to provide a blueprint for future roll-out and disseminate the findings of this real world trial across member states, enabling EU members to build on the learning of this trial thereby fast tracking the development of C-ITS across Europe.

### ***A225 Princes Road/Darenth Road Hotspot Scheme***

2.4.6 KCC and Highways England (HE) are working in partnership to implement a number of schemes around the Dartford Crossing to improve network performance and reduce congestion. The first year of the activities identified the causes for congestion in the area, and the project team have developed a catalogue of options which could be taken forward to improve the congestion and allow the network to recover more

effectively from incidents.

- 2.4.7 Dartford's close proximity to the Thames Crossing and the new development in and around the area (predominantly the 10,000 dwellings around the Ebbsfleet Garden City development) is intensifying the impact of congestion on the local network. This hotspot scheme is aimed at keeping the local road network as free flowing as possible, improving journey time reliability and enhancing the bus rapid transit network in the area (Fastrack).
- 2.4.8 The Fastrack bus network serves the Kent Thameside area enabling access to local jobs, education and services for the community.
- 2.4.9 Short term interventions are currently being progressed between KCC and HE under the banner of 'Dartford Local Network Improvements' (DLNI). The collaborative DLNI indicated the junction of A225 Princes Road/ Darenth Road was a contributing factor to local network congestion and has previously been identified as a congestion hotspot in a Highways England report prior to the DNLN.
- 2.4.10 This junction has a priority system for the Fastrack Bus Rapid Transit System route and has seen an increase in vehicle numbers due to the rat running effect caused by the Traffic Management Cell issues around Junction 1a.
- 2.4.11 The dedicated Fastrack arm approach on the junction is perceived to create delays to the rest of the junction. As such the technology of the bus detection system, the configuration and signal equipment shall be reviewed with a view to bringing them up to standard.
- 2.4.12 The improvements to the junction are three fold:
- Upgrading the signals method of control to Microprocessor Optimised Vehicle Actuation (MOVA), this will improve the capacity of the junction during peak periods and help cater for the more unpredictable periods caused when the TM Cell is activated.
  - In addition to installing MOVA the bus priority system at this site requires modernising, the system currently in situ causes unnecessary delays to the network. By increasing the effectiveness of this system, the staging sequences for non-bus movements can be refined to allow quicker changes between movements. This would have the overall impact of reducing unnecessary delays to all vehicular movements.
  - The implementation of puffin pedestrian crossing facilities. The site

accommodates a large number of school children and parents during peak periods. With the current set up a significant amount of time is wasted during the pedestrian stages, this can be significantly reduced through the use of near-sided red/green man signals. This system cancels unnecessary pedestrian demands and adjusted the green man according to the walking/ crossing speed of the pedestrian improving vehicular throughput. This type of pedestrian control required the site to be upgraded to LED equipment due to the age and obsolescence of the current equipment.

- 2.4.13 MOVA responds dynamically to live traffic flow arrival data and there is no analytical technique to accurately predict in advance of improvements. This is documented in a technical paper released by JCT Consultancy<sup>1</sup>, developers of the traffic signal modelling software Linsig. Modelling the junction for the benefits of MOVA would therefore prove fruitless. The JCT Consultancy technical paper estimates that MOVA alone decreases the mean peak period delay by up to 9.5%.
- 2.4.14 While the specific benefits of the proposed improvements at this site cannot be accurately estimated, experience of implementing MOVA at other sites in the County allow the benchmarking of likely levels of benefits it could bring. Such an example is that of the A229 Linton Road / B2163 Heath Road, Maidstone.

***A2500 Lower Road/Barton Hill Drive junction, Sheppey***

- 2.4.15 KCC has been working with stakeholders and the local community to address a long standing issue with traffic congestion on the A2500 Lower Road in Sheppey. The traffic signal junction Lower Road with Barton Hill Drive experiences severe delays to the local community as it has reached its design capacity and is struggling to cope with increasing traffic flows, especially during the seasonal holiday periods.
- 2.4.16 KCC developed a feasibility report for short term 'quick win' options to address these congestion issues in the interim of any larger long term solution is brought online. The options were presented to stakeholders and a decision was made to implement a trial junction arrangement with modified traffic signals. Journey times would be monitored as part of the trial in order to assess the junction modifications benefits to the local network.
- 2.4.17 The junction is a relatively simple 'T' junction with 3 stages. The predominant traffic

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<sup>1</sup> Modelling MOVA Control: We know it's good, but how good is it? - D. Meehan (JCT), September 2003

flow is on the A2500; heading west in the AM peak and east in the PM peak. Options were limited but one proposal was to simplify the junction further by removing some of the permitted traffic movements. This would increase green times to the congested arms and reduce the number of times it would have to stop to let opposing movements go green. A series of diversionary signs were used to redistribute flows. This system was implemented using temporary measures that could be deployed rapidly.

- 2.4.18 The results of the trial indicate the journey times have reduced by an average of 15% through the area and as such there is a view to make the set up permanent, while the long term solution is formalised.

## **3 Strategic Case**

### **3.1 Introduction**

3.1.1 This section sets out the 'case for change', by explaining the rationale for making investment and presenting evidence on the strategic policy fit of the proposed scheme. This section also sets out the scheme options under consideration.

3.1.2 The Strategic Case establishes the:

- Context for the business case, outlining the strategic aims and responsibilities of KCC;
- Transport-related problems have been identified, using evidence to justify intervention and examining the impact of not making the investment;
- Specific, Measurable, Achievable, Realistic and Time-bound (SMART) objectives that solve the problem, identified through alignment with KCC's strategic aims and responsibilities;
- Measures for determining successful delivery of the objectives;
- Scheme scope, determining what the project will and will not deliver;
- Analysis of constraints and opportunities for investment on the KSCMP;
- Breakdown of interdependencies on which the successful delivery of the scheme depends;
- Details of main stakeholder(s); and
- Evaluation of the options considered.

### **3.2 Strategic Context**

#### ***National Transport Priorities***

3.2.2 The Government has long-term objectives aimed at improving the economy, environment and society. These are the three tenets against which major transport infrastructure projects are assessed, and will continue to be assessed in future.

3.2.3 In its National Infrastructure Plan 2014, the Government presented its vision for the UK transport system:

- Transport infrastructure can play a vital role in driving economic growth by improving the links that help to move goods and people around and by supporting the balanced, dynamic and low-carbon economy that is essential for



future prosperity;

- Local transport systems must enable suburban areas to grow. The transport network must support good value and rapid movement of goods around the country. The transport system must be efficient but also resilient and responsive to infrequent and unexpected pressures; and
- Airports and ports are the gateways to international trade and the Government will work to improve the road and rail connectivity to major ports and airports.

3.2.4 These elements of the vision can be seen as being of direct relevance to the KSCMP scheme, which aims to improve journey time reliability, air quality, safety, bus punctuality and enable growth in Kent. The C-ITS corridor in particular is an example of the Government's desire to improve road connectivity to major ports from which Kent stands to benefit.

### ***Regional Transport Priorities***

#### South East LEP: Growth Deal and Strategic Economic Plan 2014

3.2.5 In March 2014, SELEP submitted their Strategic Economic Plan (SEP). Within the six year period covered by the SEP (2015/16 to 2020/21) several considerable developments are planned within Kent, including:

- Ebbsfleet Garden City (10,000 homes and 20,000 jobs);
- Paramount Park, Swanscombe Peninsula (27,000 jobs);
- Lodge Hill (5,000 homes and 5,000 jobs);
- Kent Science Park (3,000 jobs);
- Discovery Park Enterprise Zone (1,300 jobs);
- London Gateway container port (12,000 direct and 20,000 indirect jobs).

3.2.6 The SEP document outlines the case for investment into infrastructure, enterprise and employment that is required for the South East region's economy to continue its successful upward trajectory.

3.2.7 The Kent and Medway Growth Deal forms part of the SEP and indicates the intention to invest over £80 million each year over the six-year SEP plan, in order to:

- Substantially increase the delivery of housing and commercial developments;
- Deliver transport and broadband infrastructure to unlock growth;
- Back business expansion through better access to finance and support; and
- Deliver the skills that the local economy needs.

- 3.2.8 Strategic congestion management in the form of the KSCMP is established as a country-wide priority in the SEP. Traffic congestion is highlighted as a significant constraint to growth in the Canterbury district and in the town centres of Maidstone, Tonbridge, Tunbridge Wells and Sevenoaks. Therefore, Kent stands to benefit from the fulfilment of the criteria of the Kent and Medway Growth Deal.

### ***Local Transport Priorities***

- 3.2.9 Kent is South East England's fastest recovering economy and has great potential for successful economic growth. In the last 20 years, Kent has seen 100,000 more people living in the county, housing stock increase by over 60,000 homes and 130,000 more cars on the road. This pace of change is set to accelerate further over the next 20 years with a projected 8 per cent population increase, accompanied by the presence of two of the UK's four Growth Areas in Thames Gateway and Ashford.
- 3.2.10 Local growth is predicted to result in 250,000 extra journeys on Kent's roads by 2026. Coupled with a forecast increase in international traffic this leads to tackling congestion being regarded as one of the main priorities for Kent.
- 3.2.11 KCC's framework for regeneration "Unlocking Kent's Potential" defines what Kent should look like in 20 years' time and includes 1 of its 5 priorities "delivering growth without transport gridlock" – by designing communities that will encourage walking, cycling and healthy leisure activities. Based on this "Growth without Gridlock: A transport delivery plan for Kent" establishes transport priorities for the next 20 to 30 years to support Kent's Environment Strategy target of reducing greenhouse gas emissions by 20% by 2020 and 80% by 2050.

### **Growth without Gridlock**

- 3.2.12 "Growth without Gridlock" recognises that road transport is responsible for around 30% of Kent's greenhouse gas emissions and that the way forward is to provide low carbon transport options allied with better planning to reduce the need to travel, which in turn will support economic growth, housing growth and tackle climate change.
- 3.2.13 The Plan outlines the growth expected within the Thames Gateway area of Kent. The Thames Gateway area covers the majority of the districts of Dartford, Gravesham and Swale including the main urban areas of Dartford, Gravesend, Northfleet, Sittingbourne and Sheerness. It joins up with Medway, South Essex and parts of East London to form the Thames Gateway Growth Area. There is a target to develop 52,340 new homes

and 58,000 jobs over the period 2006-2026.

- 3.2.14 The Plan recognises the Thames Gateway area has good road links, being located on the M2/A2 corridor, however major congestion at the Dartford Crossing is limiting growth across the whole area. North south links are also highlighted as poor, which results in congestion on the main inter-urban routes to Maidstone and Tonbridge/Tunbridge Wells. This section of the report concludes 'this new growth will put pressure on local roads and therefore sustained investment in new infrastructure is necessary.'
- 3.2.15 The key transport challenge recognised in 'Growth without Gridlock' for Swale, and that relates to the A2500 Lower Road/ Barton Hill Drive scheme as part of this business case, is 'securing the necessary infrastructure to open up key development areas for housing and employment.' The current configuration of the Barton Hill Drive junction is causing delay to traffic particularly in the peak periods. A number of development sites are located close to this junction and so it is important to improve the efficiency at this location in order to support the future growth in this area. The Plan states: "the private car will continue to remain the most popular and dominant form of transport for our residents and these expectations and demands increase pressure on our transport network, on our environment and on us as individuals. This reliance is also the reason why our road network is congested and in response our vision is to create a high quality integrated transport network which will create opportunities for real transport choice as well as enabling economic growth and regeneration". Some of the key transport challenges identified by the Plan are:
- Transferring existing and new car trips onto public transport, walking and cycling, especially for short journeys;
  - Tackling congestion hotspots;
  - Integrating rail services and improving connectivity between stations; and
- 3.2.16 Providing sufficient transport infrastructure to mitigate the impact of the planned development including walking and cycling routes. The planned growth in Dartford 'will increase the borough's population by over 40%' therefore the Plan highlights the importance of a high quality public transport network, including the Fastrack Bus Rapid Transit (BRT) network; which will continue to provide a vital direct route from development to key services. The DLNI scheme proposed at A225 Princes Road/Darenth Road as part of this business case has a priority system for the Fastrack BRT which is perceived to create delays to the other arms of this junction. In addition

to the recent increase in vehicles using this junction, due to the frequency of the Traffic Management Cell being triggered at the Dartford Crossing, it is vital to improve the efficiency of the traffic signals so as not to cause detriment to the operation of Fastrack.

- 3.2.17 The schemes detailed in this business case, as part of the 2017/18 KSCMP, align with the policies in 'Growth without Gridlock' as they are located in areas undergoing growth and will contribute to creating a more efficient transport network within Kent.

Local Transport Plan for Kent 2011-2016

- 3.2.18 Kent's third "Local Transport Plan (LTP3), 2011-16" sets out KCC's Strategy and Implementation Plans for local transport investment in the short term. It proposes a new approach to prioritising investment in transport infrastructure in order to support housing and employment in Kent's Growth Areas and Growth Points, make Kent a safer and healthier county, improve access to jobs and services especially in disadvantaged areas, and cut carbon emissions.
- 3.2.19 Its planned measures are prioritised under five themes: Growth without Gridlock, A Safer and Healthier County, Supporting Independence, Tackling a Changing Climate and Enjoying Life in Kent. Under each theme the Plan priorities a range of sustainable transport initiatives by area and by mode. Whilst some of these initiatives have already been put in place or are in progress, a number of them provide a basis for the proposals prioritised by the SELEP for capital investment support, including all those for sustainable transport. These initiatives have also subsequently been aligned with the local area development and regeneration plan produced or in the process of being produced by the 12 District or Borough Councils in the County.
- 3.2.20 The success of Fastrack is recognised in this document and patronage has exceeded expectations. It is extremely important for Dartford and Gravesham to continue this success with Fastrack in order to provide an attractive and sustainable alternative to car travel considering the level of growth planned within the area.
- 3.2.21 LTP3 identifies Dartford's AQMA and KCC outlines its commitment to assisting the districts with their Air Quality Actions Plans and consider appropriate mitigation measures. Fastrack BRT System was a successful measure identified in LTP2 as contributing to improve air quality within the Dartford area. The A225 Princes Road/ Darenth Road scheme aims to improve any delay caused by the BRT priority without being detrimental to the bus service being provided. This will reduce vehicle idling

times at this junction and therefore contribute to improvements in air quality in Dartford.

3.2.22 In relation to the A2500 Lower Road/Barton Hill Drive junction improvement scheme, LTP3 states new housing and employment in Swale will be focused around Sittingbourne and Sheppey. The scheme proposed will improve the operation of this junction and go some way to providing for future growth in this area.

3.2.23 The component schemes outlined in this business case as part of the KSCMP align strongly to these local strategies and priorities by:

- aiming to deliver growth and alleviate congestion;
- providing infrastructure to mitigate the anticipated transport effects of growth;
- showing a commitment to safety and sustainability through innovative use of ITS; and
- Delivering the enhancements required to drive jobs and growth for the county as a whole.

### **3.3 Problem Identified**

3.3.1 This section of the report will outline the existing problems encountered across Kent and provide evidence as to why the scheme is required in order to support future development within the county. Crash statistics and MIDAS journey time data have been obtained for the A229 in regards to the C-ITS corridor project and is summarised below.

#### ***Existing Situation***

3.3.2 The 'key issues' for Kent, as identified by KCC's LTP3, are:

- Traffic congestion;
- Supporting economic growth;
- The need to improve access to jobs and services;
- The need for a resilient network;
- Importance as a UK gateway; and
- A safer and healthier county.

#### ***Traffic Congestion***

3.3.3 Kent's LTP3 identified a number of challenges for Kent. Key areas of concern are as follows:



- In a DfT study, 23% of adults said congestion was a problem most or all of the time on their general road journeys;
- In the South East people travel further on average than any other region, at over 8,300 miles per person per year;
- The region has a larger proportion of the UK's road traffic than any other, at 16%.
- Kent's dispersed settlement pattern makes the car the most suitable mode of transport;
- Kent's international traffic has an impact; and
- The housing growth planned for Kent could result in an extra 250,000 car journeys on the County's roads every day.

#### A229 C-ITS Corridor Scheme

- 3.3.1 The A2/M2 suffers from peak time congestion focused on the linkages with the M25, Bluewater shopping centre and the conurbations that stretch along Kent Thameside. The corridor, including the strategically important A229, provides an alternative link with the channel crossings. The Bluewater Shopping Centre is a big generator of traffic movements and in the run up to Christmas the Bean Interchange suffers from extensive queues to access the Shopping Centre. To try and alleviate this congestion a contra flow is used to manage the ingress and egress from the centre. While this Traffic Management provides a small improvement more dynamic information that drivers receive could make significant differences to driver choice. The information supplied by Bluewater on peak demand could be used to improve how vehicles are dynamically managed using in car technology.
- 3.3.2 The A229 is often used as a strategic diversion route when incidents occur on either the M20 or M2. Junction 3 suffers from congestion during the peak traffic period often resulting in lengthy queues on the off slips. The impact of the Dartford Crossing results in extensive queues back onto the A2 resulting in increased safety risk and air pollution.
- 3.3.3 The corridor is a unique link between the rest of the UK and the Channel ports and consists of different road categories from Motorway to single carriageway on the approach to Dover. The corridor was selected by the Department for Transport as the pressure from the planned developments will only increase the challenges for managing this important corridor.

A225 Princes Road/Darent Road Hotspot Scheme

- 3.3.4 The implementation of Dart Charge at the Dartford Crossing by Highways England has improved journey times on the strategic road (A282/M25), however, this has had an impact on the local road network due to the frequent use of a Traffic Management Cell that results in queues at J1a.
- 3.3.5 The Traffic Management Cell is triggered when an over-height lorry is using lanes 1&2 for the western bore tunnel rather than lanes 3&4 for the eastern bore tunnel which has a greater height limit and it is used frequently. The new road layout restricts vehicles entering from Junction 1a to only lanes 1&2 towards the western bore tunnel.
- 3.3.6 The Traffic Management Cell therefore has to be triggered if an over-height lorry has entered from Junction 1a, or failed to get into the correct lane in time. The TM Cell has to extract these vehicles, sending them back to Junction 1b. This process causes significant queues on the slip road.
- 3.3.7 The regular occurrence of incidents either on the Essex side of the river or in the tunnel causes significant congestion and delay on the Kent side which normally impacts on the whole of Dartford.
- 3.3.8 There has been considerable work within the last few months to develop interventions which can be implemented in the short term. Additionally, feasibility studies and benefit analysis are being completed for longer term options.
- 3.3.9 Short term interventions are currently being progressed between KCC and HE under the banner of 'Dartford Local Network Improvements', these include:
- Journey time sensors on key corridors of the Dartford and strategic network. This will provide operators with visibility of congestion across the network and enable optimisation of key corridors through the development of joint strategies which will be implemented on both the local and strategic network. The sensors will be deployed around the network, collecting data which will feed into future strategies;
  - The development of joint Urban Traffic Management Control strategies between KCC and HE is to be made possible by the journey time sensors. The data from these sensors will be used to create strategies which will reduce the congestion and recover the network more effectively from incidents;
  - Signal timings are in the process of being reviewed at Junction 1a which will improve the efficiency of the junction under normal operating conditions.

Similar work is being carried out at Junction 1b and 2 and should be completed by Christmas 2016;

- Clearance plans are being created for the first time at Junction 1a, which will allow both KCC and HE operators to respond to congestion at Junction 1a, helping the junction to recover more effectively from incidents;
- Yellow boxes will be implemented at Junction 1a to reduce junction blocking which is often seen there, and by doing so reducing the congestion at the junction. The boxes are anticipated to be in place by the end of November 2016;
- The signal timings and white lining have been reviewed around all three of the strategic junctions near Dartford. Where required, the signing and lining will be updated to reduce lane changing and the number of incorrect routes being taken, the implementation of this will fall into the long term interventions which are also part of this scheme; and
- The cost and the benefits of signalling Junction 1b have been reviewed, and it was determined that there could be significant benefit from fully signalling the junction; however, this will not be completed as part of this scheme of works.

3.3.10 The longer term interventions which are currently at various stages of design are:

- The detection and deterrent of over height vehicles using Junction 1a to access the tunnels. This will reduce the number of Traffic Management Cell activations and by doing so improve the congestion at Junction 1a;
- The implementation of new signing and lining at Junction 2 to enable easier decision making for drivers and reduce the number of lane changes seen at the junction;
- The implementation of red light enforcement cameras will improve safety and reduce junction blocking; and
- The implementation of adaptive control for traffic signals at Junction 2 will improve the efficiency of the junction.

3.3.11 The full scheme of works in the Dartford Local Network Improvements (DLNI) is intended to be delivered by December 2017.

#### A2500 Lower Road/ Barton Hill Drive

3.3.12 Following increased pressure from the local community KCC were requested to look into options that could be swiftly implemented to alleviate congestion on the local road

caused by the increased volumes of traffic due to the seasonal holiday park traffic. Locals voiced their concerns via their local Parliamentary representative and Parish Councils; convening with KCC to formulate a way of addressing localised issues speedily.

- 3.3.13 A series of packages were developed and presented to the local community. A number were then deployed via trial methods to improve and increase the consistency of the journey times. The method with the greatest effect and favoured by the community has since been extended in duration and KCC are seeking to convert the trial to a permanent measure. Onsite observations by transportation professionals, members of the public and professional drivers have all indicated the improvement of the scheme to date. However as it has been installed as a temporary trail using temporary traffic management measures it is not suitable for increased periods so a design and build exercise is required to formalise the arrangement.
- 3.3.14 The Barton Hill improvements will improve journey time reliability on an arterial route, enhancing access for the community and ensure that the growth already identified is able to access the strategic A249. The area also experiences substantial traffic flow increases due to its proximity to several holiday parks. This interim scheme will improve journey times and allow the implementation of developments (for example 620 dwellings on Barton Hill Drive). This development will be supporting the full scheme, but due to the release of triggered funding points this interim scheme will enable access to employment.

### ***Supporting Economic Growth***

- 3.3.15 Sustainable economic growth and regeneration is reliant on comprehensive and resilient transport networks. These networks are essential to increasing business efficiency by generating time savings and improved reliability for business travellers, freight and logistics operations. They support clusters of economic activity, expand labour market catchments, and facilitate business-to-business interactions.
- 3.3.16 Kent's economy is not as prosperous as other parts of the South East, with a Gross Value Added (GVA) per head of population (£18,994) well below the regional average (£25,843), and relatively high unemployment rates in some areas. These problems are particularly acute in areas of East Kent and around the coastal fringe, which until recently have suffered from relatively poor road and rail links.
- 3.3.17 In order to achieve the scale of economic growth necessary to support sustainable

development in the County's Growth Areas and the regeneration of its coastal towns, it is vital that business and retail sites are well connected to reliable and integrated multi-modal transport networks.

### ***Improving Access to Jobs and Services***

- 3.3.18 Relative disadvantage is the capacity to participate in or have access to the forms of employment, occupation, education, recreation, family and social activities which are enjoyed by the majority of the population. Poverty exists all over Kent and is not confined to specific areas. Nevertheless, it is most strongly associated with the County's coastal areas. There are significant pockets of disadvantage in the Kent Thameside boroughs of Dartford and Gravesham, as well as the East Kent coastal towns, interspersed with some localised areas of high affluence.

#### A225 Princes Road/Darenth Road

- 3.3.19 The A225 Princes Road/Darenth Road junction is located between Dartford Railway Station and the Darent Valley Hospital. Improving the efficiency of this junction for both vehicles and Fastrack bus services will increase the access to these services for a variety of the population. These services also provide employment for the community.

#### A2500 Lower Road/Barton Hill Drive

- 3.3.20 Current delay surrounding this junction hinders access to the east of Sheppey where pockets of employment are located. This is exacerbated when the coastal resorts are in high demand. Improving the journey times through this junction will improve access to employment and social activities in the area.

### ***The Need for a Resilient Network***

- 3.3.21 A resilient network is one that can withstand and respond to disruption and incidents. This can be in reaction to a sudden event such as an accident or structural failure, long term changes due to climate change, or gradual deterioration of the network due to a lack of maintenance. There was a National Indicator (NI 168) which measures the percentage of principal roads (motorways and trunk roads) where maintenance should be considered. For 2009-10, 6% of Kent's principal roads qualified, identical to the national average.

#### A229 C-ITS Corridor Scheme

- 3.3.22 The A229 corridor between the M20 and M2 motorways is recognised as a County

Primary Route in Kent's LTP3 and links the major urban centres of Maidstone and the Medway Towns. It is vulnerable to incidents affecting either of the motorways. The extension of the European C-ITS along the A229 from the A2/M2 corridor will provide valuable information to the vehicles using these routes through Kent and aims to re-direct traffic should significant incidents occur. This scheme aims to be a front runner in providing a resilient network across Kent, and potentially linking to other areas of the UK and Europe.

#### A225 Princes Road/Darenth Road

- 3.3.23 The issues in the Dartford area resulted from an independent review by the consultancy Atkins who were commissioned by Highways England. The review consisted of site surveys and reviews along a number of corridors in Dartford. The review resulted from pressure from Dartford Borough Council following the implementation of the Dart Charge scheme. Dartford started to suffer from congestion and delays as a direct result of the scheme. The review consisted of queue length and delay surveys focussing on junction 1a, 1b and 2 of the M25.
- 3.3.24 The Darenth Road junction was identified during the review as suffering from peak time delays. The review suggested modifications to the operation of the junction including improved benefits for the Fastrack bus service.

#### ***UK Gateway***

- 3.3.25 The Port of Dover is Europe's busiest Roll-on Roll-off (Ro-Ro) ferry port for both freight and passenger traffic. Over the past two decades, the number of road haulage vehicles using the Port has more than doubled to over 2.3 million units. With 2.9 million tourist vehicles also passing through Dover each year and as the UK's second busiest cruise port, this equates to almost 14 million passengers per annum.
- 3.3.26 Both the Port of Dover and the Government have forecast substantial growth in Ro-Ro freight traffic of up to 85% between 2005 and 2030. To facilitate this, the port is undergoing a £140m expansion in 2016-17.

#### ***A Safer Healthier County***

- 3.3.27 Key areas of concern are as follows:
- Some 23.4% of Kent's residents are obese, which is higher than the national average, and 31% of the County's children are overweight;
  - The South East mean temperature rose by between 1.4 and 1.8°C in the period

1961 to 2006;

- Kent has the largest total carbon emissions of any County, with 11,879 kilotonnes of CO<sub>2</sub>;
- Many of Kent’s roadside air quality sites failed to meet the annual mean NO<sub>2</sub> objective; and
- There are significant health inequalities within Kent.

A229 C-ITS Corridor Scheme

3.3.28 The A229 corridor is one of the County’s primary routes linking major urban centres including Maidstone to both the M2 and M20 motorways and on to the Medway towns. LTP3 identified two crash clusters on this corridor, one at the Royal Engineers Road roundabout and the other at the M20 roundabout. Crashes over the past three years (not including the M20 roundabout junction) have been summarised below in Table 3-1 and casualties in Table 3-2.

	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Total</b>
Fatal	0	1	0	1
Serious	1	7	4	13
Slight	40	49	51	142
Total	41	57	55	156

**Table 3-1: A229 Crashes (1<sup>st</sup> January 2013 - 31<sup>st</sup> December 2015)**

	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Total</b>
Fatal	0	1	0	1
Serious	1	7	4	12
Slight	48	65	77	190
Total	49	73	81	203

**Table 3-2: A229 Casualties (1<sup>st</sup> January 2013 - 31<sup>st</sup> December 2015)**

Barton Hill Drive/A2500 Lower Road

3.3.29 Table 3-3 shows the journey times on A2500 Lower Road between the A249 and Barton Hill Drive. It highlights that the journey times have improved since the implementation of the trial signal junction configuration. Across the surveyed week the average percentage reduction in journey times was 15%.

<b>Sep 2014</b>	<b>15th</b>	<b>16th</b>	<b>17th</b>	<b>18th</b>	<b>19th</b>
Journey Time (secs)	211	191	177	205	232
<b>Sep 2016</b>	<b>12th</b>	<b>13th</b>	<b>14th</b>	<b>15th</b>	<b>16th</b>
Journey Time (secs)	166	0	149	172	218
% difference	-21	-100	-16	-16	-6



Sep 2014	15th	16th	17th	18th	19th
Average JT Reduction (%)	-15				

**Table 3-3: A249 to Barton Hill Drive Typical Journey Times comparison**

3.3.30 Whilst this journey time data has been collected through this junction, a quantitative assessment of this junction, as part of this Business Case, has not been undertaken due to the small scale of the scheme.

### 3.4 Impact of Not Changing

3.4.1 Growing the local and regional economy through the creation of employment opportunities and providing new housing are key drivers identified by the Government, the SELEP and KCC.

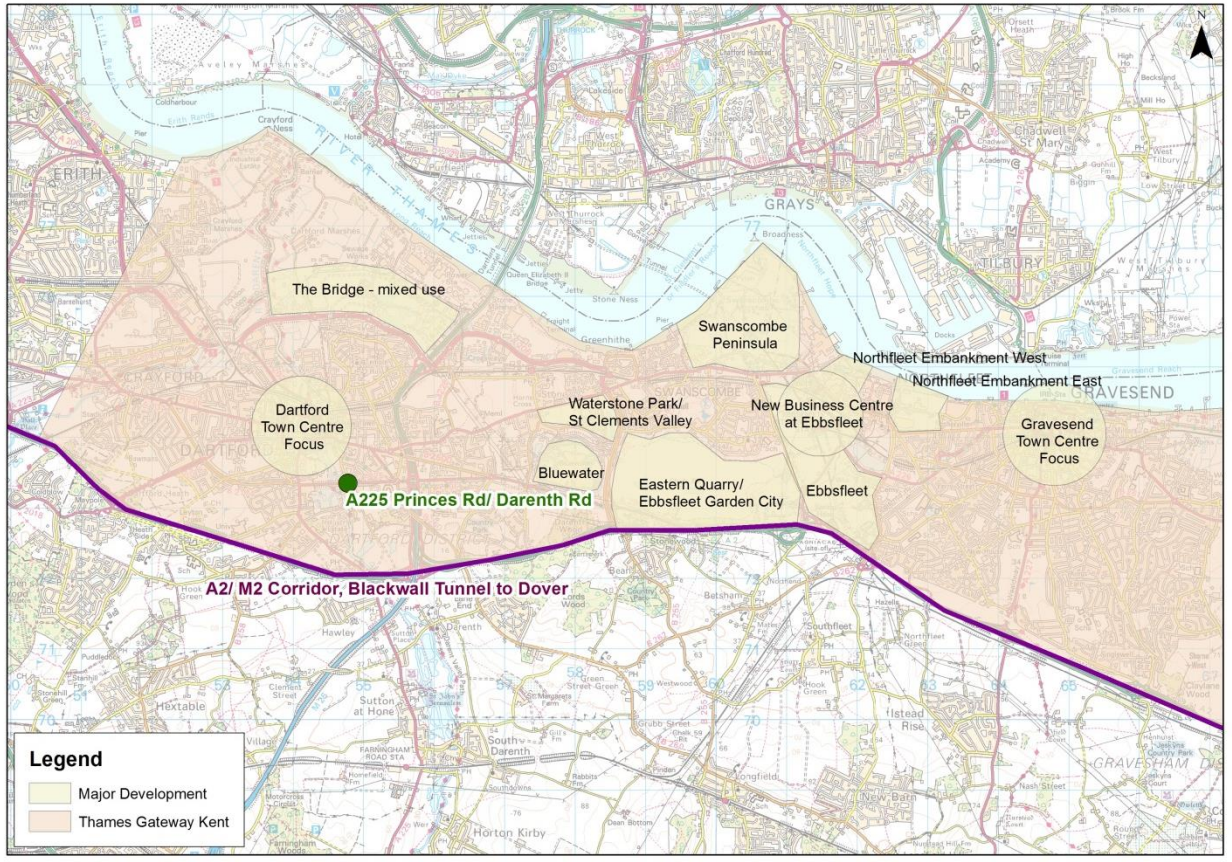
3.4.2 Substantial housing and employment growth is planned for Kent and the South East. The County contains two of the country’s four Growth Areas at Thames Gateway Kent and Ashford and two Growth Points at Dover and Maidstone. The South East Plan included a target to provide over 128,000 new homes and over 165,000 jobs in Kent by 2026 and KCC estimates that, if delivered, this growth could result in an extra 250,000 car journeys on Kent’s roads every day. The KSCMP is therefore essential to support these new jobs and houses without causing the transport network to grind to a halt. Specific do nothing outcomes will include:

- The constraints of the existing transport conditions will act as an inhibitor to growth with private sector investment attracted to other areas with better accessibility;
- The network will not be resilient enough to respond to disruption and resilience to incidents will continue to weaken without the scheme;
- The significant pockets of disadvantage in Kent will worsen;
- Kent’s reputation as the UK’s front door may be damaged without effective highway management; and
- The ongoing Air Quality issues will be exacerbated without the mitigation afforded by the scheme.

#### A225 Princes Road/Darenth Road

3.4.3 Figure 3-1 displays the scheme location in relation to the growth that is occurring in the nearby areas of Dartford and Gravesham. The significant development planned for this area of Kent will put significant pressure on existing infrastructure. The scheme has been identified as currently experiencing problems in peak periods and so needs to

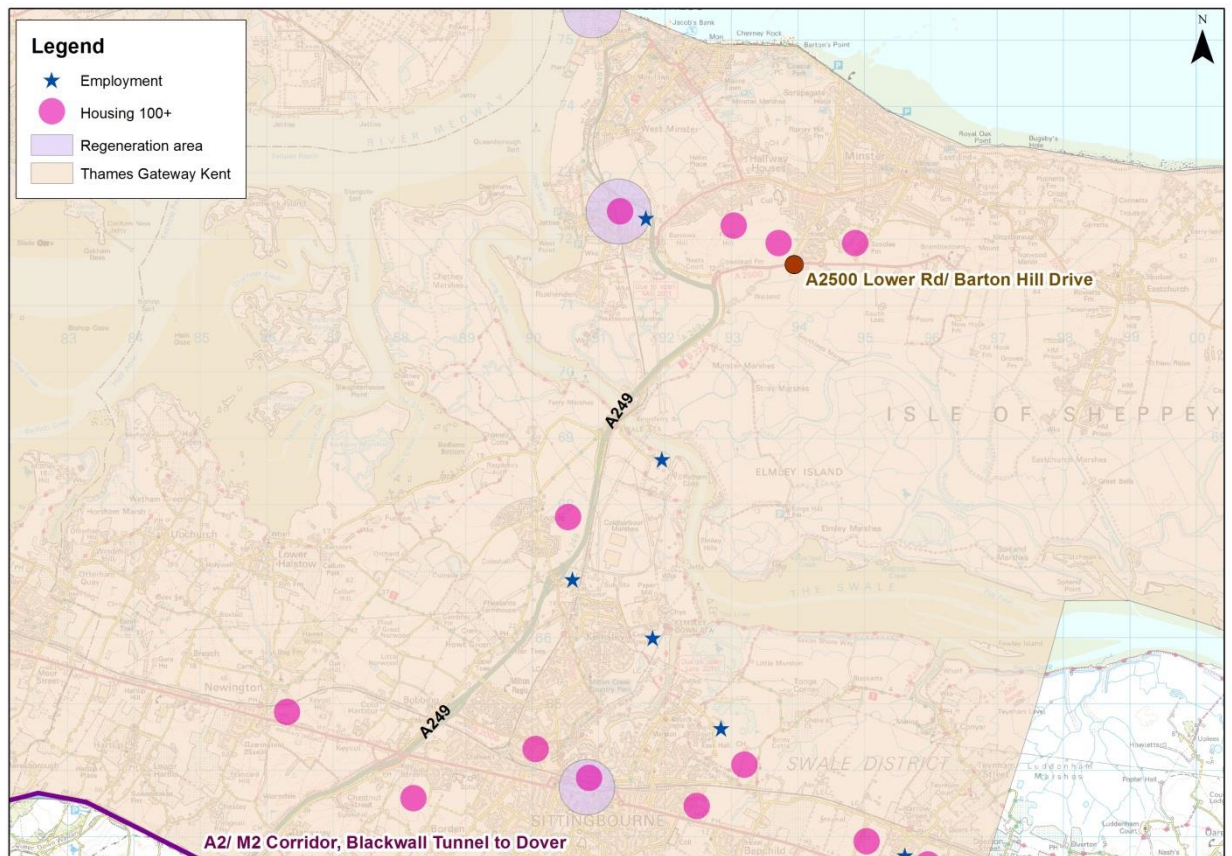
be addressed in order to be able to accommodate future traffic growth this area.



**Figure 3-1: Scheme Location and Major Development Locations, Dartford and Gravesham**

A2500 Lower Road/Barton Hill Drive

3.4.4 Figure 3-2 highlights the major future developments planned for Swale. The scheme is located close to three housing developments and already experiences congestion during peak periods. If no change were to occur at this location, no additional traffic growth could be comfortably accommodated and existing residents frustrations would continue.



**Figure 3-2: Scheme Location and Major Development Locations, Swale**

A229 C-ITS Corridor Scheme

3.4.5 Much of the significant development is planned across Kent Thameside and Mid-Kent is anticipated to impact upon the A229 as an important corridor within the heart of Kent.

**3.5 Internal Drivers for Change**

3.5.1 A key delivery strand of “Growth without Gridlock” outlines how economic growth and regeneration can be delivered in a sustainable way and what infrastructure is needed to deliver an integrated transport network which is fit for purpose in the 21<sup>st</sup> Century. If Kent is to accommodate this growth, its transport network must be well managed and have sufficient capacity and resilience to provide for efficient and reliable journeys.

**3.6 External Drivers for Change**

3.6.1 Journey reliability is fundamentally the primary driver and the planned growth of housing and jobs across the South East supports the assertion that the existing problems are likely to worsen in the future.



### 3.7 Objectives

- 3.7.1 The scheme objectives have been defined to address directly the problems discussed earlier in this chapter. They align closely with the business strategies for the scheme promoters, SELEP and for Central Government – most obviously in terms of the Government’s broad goals for transport.
- 3.7.2 The desired outcomes from each objective have been considered and are shown in Table 3-4.

<b>Objective</b>	<b>Desired Outcome</b>
Alleviate congestion by allowing better flow of traffic	Improve car journey times
Supporting economic development in Kent	Improve journey time reliability
To promote accessibility to jobs and services for all	Increase public transport modal split and reduce public transport journey times
Provide a resilient network that is able to respond to disruption and incidents	Improvement of the ability of the transport system to function during adverse conditions and quickly recover to acceptable levels of service after an event
Improve air quality	Reduce carbon dioxide and other greenhouse gas emissions

**Table 3-4: Objectives and Desired Outcomes**

### 3.8 Measures of Success

- 3.8.1 Successful delivery against the scheme objectives will be monitored as part of the post construction monitoring and evaluation, details of which are discussed in Chapter 7 (the Management Case) of this report.
- 3.8.2 A programme of monitoring will be put in place prior to construction, then again at one-year and five-year post construction. It is envisaged that monitoring will include before and after conditions in relation to:
- Average daily traffic by peak/ non-peak periods;
  - Average AM and PM journey times on key routes; and
  - Day to Day travel time variability.

### **3.9 Constraints**

- 3.9.1 The M2 Connected ITS Corridor will have engineering works associated with it; however, there are few examples of this kind of innovative implementation to benchmark against. Its deliverability also relies on support from the IT sector and from car manufacturers in providing the vehicles and equipment that can communicate with and report from the corridor. Much of the funding for the project also originates from other bodies; all of these factors are out of the direct control of KCC. As the C-ITS scheme is ultimately a laboratory test bed to inform a future cost-benefit analysis, there will be potential unknowns with regards to costs and timescales.
- 3.9.2 All of the proposed schemes are anticipated to be within the public highway boundary and therefore no planning permissions will be required.

### **3.10 Inter-dependencies**

- 3.10.1 There are internal and external factors upon which the successful delivery of the KSCMP is dependent. The proposed schemes conform to priorities set by the national, regional and local policy environments. Successful delivery will require continued alignment with policy priorities and subsequent political support.
- 3.10.2 With regards to the C-ITS, the interdependencies with manufacturers, technology operators and other road authorities have been described amongst the Constraints above in Section 3.8.
- 3.10.3 A list of risks has been prepared as part of The Management Case (Chapter 7). The delivery of the KSCMP is dependent on these risks either not arising or being sufficiently mitigated so that scheme delivery remains unaffected.
- 3.10.4 For the purposes of this section of the business case, therefore, it is sufficient to summarise the key areas of risk/dependency.
- 3.10.5 The key inter-dependencies can be summarised under the headings of project delivery and project funding, namely:

#### Project Delivery

- Concurrency with multiple suppliers;
- Teething problems with operations;
- Competent staff;
- Any land acquisition/ CPO procedures taking longer than allowed for;

- Unforeseen Statutory Services;
- Unexpected difficulties during construction; and
- Increased environmental requirements.

#### Project Funding

- Changes/uncertainty over funding streams;
- Project overspend; and
- Political changes of direction.

### **3.11 Stakeholders**

- 3.11.1 Consultation with the community, members, and local representatives is a vital part of a scheme's development. If undertaken successfully and inclusively, consultation can ensure the success of a project and enables great certainty of delivery to both time and budget.
- 3.11.2 The communications and stakeholder management strategy for the project is outlined in The Management Case (Section 7).
- 3.11.3 As each of the individual hotspot schemes progresses, and a work plan for delivery of each is developed, stakeholders such as local bus operators and nearby businesses and residences will be consulted as to the nature of the works and any diversions or disruptions expected.

### **3.12 Options**

- 3.12.1 Three funding options have been identified, namely:
- Do nothing – Without investment the journey times that occur will continue. Buses will suffer from delays and varying journeys and congestion will only increase;
  - Reduced investment – Provide a small amount of funding to tackle priority areas; and
  - Maximum investment – Provide funding to bring about all of the described improvements.
- 3.12.2 The 'Maximum Investment' option involves delivering the component schemes in the manner described in Section 2.4 of this report. It is designed to target the investment where it can generate the most benefit from the available capital funding package. Additionally, as the investment is targeted at the growth areas in the county and

SELEP region the delivery of the full committed investment will be crucial in delivering the growth targeted in these areas and mitigating the transport effects of the additional trip generation that growth will bring.

- 3.12.3 In the event of the “reduced investment” option being selected, this utility would be reduced by curtailing the multi-criteria analysis, postponing or shelving one or more “hotspot” schemes, or targeting the available investment on a more limited area. This runs the risk of failing to alleviate one or more of the issues described in Section 3.4 “Impact of Not Changing”.
- 3.12.4 This level of assessment of options is considered proportionate with the amount of funding being requested and in line with the detail of this Business Case. If no funding is received, it is unlikely that the schemes will go ahead.
- 3.12.5 The preferred option identified by KCC is the Maximum Investment option which will facilitate growth across the county and not just in limited areas. Investment will improve efficiency and reliability of journeys and influence modal choice, providing better alignment with the strategies and priorities at the national, regional and local level.



## **4 Economic Case**

### **4.1 General KCC Approach to Scheme Economic Case**

#### ***General Overview of Approach to Economic Case***

4.1.2 The economic case is one of five strands of evidence required to support the scheme transport business case. KCC's general approach to the economic case has been determined by the need for it to be proportionate to the scale, scope and cost of the proposed scheme and the preparation time available. This approach is fully consistent with Department for Transport advice to scheme promoters (KCC) and adjudicators (SELEP). This advice recurs in the following DfT guidelines:

- Transport Analysis Guidance (WebTAG) (The Proportionate Update Process January 2014);
- Value for Money advice note, December 2013 (Sections 1.4, 1.17, 5.3);
- The Transport Business Cases, January 2013 (Sections 1.4, 2.7, 6.2);
- LEP Assurance Framework, December 2014 (Sections 5.6, 5.7, Annex A); and
- HM Treasury The Green Book, July 2011 (Appraisal and Evaluation in Central Government).

4.1.3 However, none of the above guidance specifies the parameters of what constitutes a proportionate approach to appraisal. Therefore, KCC has applied best judgement to decide how much rigour there should be in the scheme economic case.

#### ***Qualitative Economic Appraisal***

4.1.4 In line with the proportionate approach, KCC has prepared qualitative evidence to support the scheme economic case. In regards to the C-ITS corridor, there are few examples of this kind of innovative implementation to benchmark against and so it would be difficult to place any quantified user benefits on the scheme. In addition to this, the difficulties in assessing the MOVA signal control means no quantified assessment has been undertaken for the Dartford Network Improvement scheme.

4.1.5 Generally, for a scheme with relatively large cost (>£5m), the economic appraisal has been substantiated with quantified outcomes. Conversely for schemes with relatively small cost (<£5m), mainly qualitative evidence has been assembled.

4.1.6 It has also not been appropriate to calculate monetised economic impacts for certain KCC schemes for which the LGF bid is not primarily aimed at achieving transport user

benefits. Here, the main scheme objective has been, for example, to enable a more prosperous economy and community by improving public realm, or to save unnecessary future expense by maintaining existing transport assets more effectively.

### ***Components of Economic Case***

4.1.7 The economic case has initially considered all aspects of scheme performance and likely impacts, in line with the TAG criteria outlined in the Appraisal Summary Table (AST), broadly:

- Economic prosperity and efficiency –
  - User travel costs, congestion, reliability, regeneration and wider economy;
- Environment –
  - Noise, air quality, greenhouse gases, landscape, townscape, heritage, biodiversity and water;
- Social well-being –
  - Accidents, physical activity, journey quality, value for non-users, affordable travel, security, access to opportunities/door-to-door options and severance;
- Public accounts –
  - Cost to transport budget, indirect tax receipts and value for money (VfM).

4.1.8 However, many of these aspects are insignificant, or not easily assessed, in the context of the KCC scheme in question. Therefore, the economic case has focussed on economic efficiency for transport users, decongestion, reliability, greenhouse gases (carbon), safety, capital cost and VfM as the core aspects for appraisal.

### ***Qualitative Evidence for Economic Case***

4.1.9 The economic outcomes from the scheme have been assessed by aligning with a qualitative scale. This appraisal method for the economic case has largely followed the steps outlined in the DfT 'Value for Money' approach. The qualitative method is considered to be appropriate for schemes of modest cost and scope, which do not merit an elaborate, quantified economic case.

4.1.10 Qualitative evidence used to support the economic case is based around applying an order of magnitude to a likely scheme outcome, rather than by calculating a precise, quantified, impact value.

## 4.2 Proportionality Assessment

4.2.1 HM Treasury’s Green Book states that all new proposals should be subject to comprehensive but proportionate assessment, wherever it is practicable, so as best to promote public interest.

4.2.2 Table 4-1 discusses TAG Appraisal Summary Table (AST) impacts and outlines the key proportionality assumptions made through the development of the KSCMP package of measures and the appraisal process. The assumption table provides supplementary and supporting information to the proportionality assessment.

Impact	A229 C-ITS Corridor	Hotspot Schemes
Economy: Business users and transport providers	This scheme is one of the first of its kind therefore, with nothing to quantify before this pilot goes ahead, a qualitative score has been applied using professional judgement.	Due to the difficulties of assessing proposed MOVA signal control at Dartford and the relatively low cost of the component schemes the journey time benefits have been assumed. A qualitative score has been applied using professional judgement.
Economy: Reliability impact on business users	It is difficult to assess the impact of this scheme due to its innovative nature. It is known that similar ITS schemes have improved journey time reliability. A qualitative score has been applied using professional judgement.	Due to the difficulties of assessing proposed MOVA signal control at Dartford and the relatively low cost of the component schemes the journey time benefits have been assumed. A qualitative score has been applied using professional judgement.
Economy: Regeneration	Positive regeneration impacts are anticipated across Kent; however, it is not judged appropriate to complete the assessment (TAG Unit A2.2 January 2014) for such a low cost scheme which is likely to have very diffused regeneration benefits. A qualitative score has been applied using professional judgement.	
Economy: Wider impacts	Positive wider impacts would be expected to accrue across Kent, but the impacts are expected to be dispersed rather than in measurable concentrations in a few locations. A qualitative score has been applied using professional judgement.	
Environmental: Noise	The proposed scheme is expected to result in minimal impact in terms of noise and vibration, therefore a quantitative assessment has not been carried out (TAG Unit A3 November 2014). A qualitative score has been applied using professional judgement.	
Environmental: Air quality and Greenhouse gases	There is considerable evidence from integrated ITS projects around the world that a benefit to local air quality is achieved. Levels of reduction of hydrocarbon, carbon monoxide and nitrous oxides of 3.5% to 5% at peak periods repeatedly arise as a by-product of integrated ITS. A qualitative score has been applied using professional judgement.	The proposed scheme would be expected to reduce congestion in urban areas resulting in fewer vehicles idling at congestion and pollution ‘hotspots’. However given the scope of the scheme it is inappropriate to perform detailed air quality testing (TAG Unit A3 November 2014). A qualitative score has been applied using professional judgement.

<b>Impact</b>	<b>A229 C-ITS Corridor</b>	<b>Hotspot Schemes</b>
Environmental: Landscape	Any change to landscape value is expected to be small and limited to the corridors and junctions covered in the scheme. A qualitative score has been applied using professional judgement.	
Environmental: Townscape	No change in townscape is expected as implementation is limited to the immediate M2-A2/A299 corridor only. A qualitative score has been applied using professional judgement.	Although the urban hotspot schemes are expected to result in townscape changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score has been applied using professional judgement.
Environmental: Historic environment	No change in historic environment is expected as implementation is limited to the immediate M2-A2/A229 corridor only. A qualitative score has been applied using professional judgement	Although the urban hotspot schemes are expected to result in environmental changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score has been applied using professional judgement.
Environmental: Biodiversity	Ecological impacts are unlikely with the introduction of any of the component parts of the programme. Works could potentially impact on protected species and habitats where vegetation clearance is required or where works are within or close to a sensitive site. A qualitative score has been applied using professional judgement.	
Environmental: Water environment	Proposed installation of C-ITS equipment at the roadside or hotspot mitigation schemes are unlikely to significantly affect the water environment. A qualitative score has been applied using professional judgement.	
Social: Commuting and other users	This scheme is one of the first of its kind therefore, with nothing to quantify before this pilot goes ahead, a qualitative score has been applied using professional judgement.	Due to the difficulties of assessing proposed MOVA signal control at Dartford and the relatively low cost of the component schemes the journey time benefits have been assumed. A qualitative score has been applied using professional judgement.
Social: Reliability impact on Commuting and Other users	Due to the difficulties of assessing the proposed schemes and the low costs of the component schemes, a qualitative score has been applied using professional judgement.	
Social: Physical activity	The proposed scheme is expected to result in minimal impact in terms of physical activity therefore a quantitative assessment (TAG Unit A4.1 November 2014) has not been carried out, particularly given the low cost of the scheme. A qualitative score has been applied using professional judgement.	
Social: Journey quality	C-ITS has the potential to reduce journey frustration as it can keep drivers informed and allow them to avoid queues. A qualitative score has been applied using professional judgement.	Due to the low cost of the scheme and the diffused locations of the improvements, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.

Impact	A229 C-ITS Corridor	Hotspot Schemes
Social: Accidents	C-ITS is expected to result in a reduction of accidents and increase road safety by warning users of hazards ahead, although given the low cost of the scheme it is not appropriate to undertake a full assessment (TAG Unit A4.1 November 2014). A qualitative score has been applied using professional judgement.	It is not anticipated that the hotspot schemes will have a discernible effect on accident rates. A qualitative score has been applied using professional judgement.
Social: Security	C-ITS is expected to result in an improvement in security as communication of locations and issues will be simplified. A qualitative score has been applied using professional judgement.	Due to the low cost of the scheme and the sparing distribution of impacts, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.
Social: Access to services	Minor improvements in access to a number of services are expected. The C-ITS corridor will slightly improve access to major ports, airports and facilities in Greater London and Dover. A qualitative score has been applied using professional judgement.	Minor improvements in access to a number of services are expected. The hotspot schemes will deliver more accessibility to retail, education and leisure. A qualitative score has been applied using professional judgement.
Social: Affordability	There is not expected to be any impact on personal affordability with the scheme. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). Instead, a qualitative score has been applied using professional judgement.	
Social: Severance	There is not expected to be any change in severance resulting from the scheme; pedestrian crossings and signal phases will remain in situ at all hotspot sites. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.	
Social: Option and non-use values	The scheme being appraised does not include any measures that will substantially change the availability of transport services within the study area. A qualitative score has been applied in line with TAG Unit A4.1 (November 2014).	

**Table 4-1: Proportionality Assumptions**

### 4.3 User Benefits

4.3.1 It is likely that the anticipated benefits from the schemes in this business case will be to commuters and those travelling in the peak periods of the day. As a result of the schemes, the greatest journey time saving is likely to be realised during the peak periods. Journey time savings are still likely outside of the peak periods, and will encompass more user groups, but to a lesser extent.

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#### **4.4 BCR**

4.4.1 Due to the identified difficulties in undertaking a quantified appraisal of the component schemes, no BCR has been calculated for the KSCMP scheme for this financial year.

#### **4.5 Qualitative Assessment**

4.5.1 The assessments of impacts made above have been input into the Appraisal Summary Table (AST) shown as Table 4-2 provided overleaf.

4.5.2 The qualitative assessment indicates that the proposed schemes making up the KSCMP programme for 2017/18 would have an overall beneficial impact. In particular the economic and social impacts of the scheme are where most benefits are considered to be gained by the proposed schemes.

Impacts		Summary of key impacts	Qualitative Assessment
Economy	Business users & transport providers	Journey time benefits are estimated to improve as a result of the schemes, however given the difficulty in being able to quantify the schemes and for such low cost schemes, the assessment (TAG Unit A1.3) has not been completed. A qualitative score has been applied using professional judgement.	Beneficial
	Reliability impact on Business users	Journey reliability is expected to increase as a result of the schemes, however given the difficulty in being able to quantify the schemes and for such low cost schemes, the assessment (TAG Unit A1.3) has not been completed. A qualitative score has been applied using professional judgement.	Beneficial
	Regeneration	Positive regeneration impacts are anticipated across Kent; however, it is not judged appropriate to complete the assessment (TAG Unit A2.2 January 2014) for such low cost schemes which is likely to have very diffused regeneration benefits. A qualitative score has been applied using professional judgement.	Neutral
Environmental	Noise	The proposed schemes are expected to result in minimal impact in terms of noise and vibration, therefore a quantitative assessment has not been carried out (TAG Unit A3 November 2014). A qualitative score has been applied using professional judgement.	Neutral
	Air Quality	There is considerable evidence from integrated ITS projects around the world that a benefit to local air quality is achieved. The proposed hotspot schemes would be expected to reduce congestion in urban areas resulting in fewer vehicles idling at congestion and pollution hotspots. However given the scope of the scheme it is inappropriate to perform detailed air quality testing (TAG Unit A3 November 2014). A qualitative score has been applied using professional judgement.	Slightly beneficial
	Greenhouse gases	Levels of reduction of hydrocarbon, carbon monoxide and nitrous oxides of 3.5% to 5% at peak periods repeatedly arise as a by-product of integrated ITS. A qualitative score has been applied using professional judgement.	Slightly beneficial
	Landscape	Any change to landscape value is expected to be small and limited to the corridors and junctions covered in the scheme. Such impacts are not, therefore, assessed in detail. A qualitative score has been applied using professional judgement.	Neutral
	Townscape	No change in townscape is expected as a result of the C-ITS scheme as implementation is limited to the immediate M2-A2/A229 corridor only. Although the urban hotspot schemes are expected to result in townscape changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score has been applied using professional judgement.	Neutral
	Historic Environment	No change in historic environment is expected as a result of the C-ITS scheme as implementation is limited to the immediate M2-A2/A229 corridor only. Although the urban hotspot schemes are expected to result in environmental changes, these are offset against the reduction of congestion in their immediate vicinities. A qualitative score has been applied using professional judgement.	Neutral
	Biodiversity	Ecological impacts are unlikely with the introduction of any of the component parts of the programme. Works could potentially impact on protected species and habitats where vegetation clearance is required or where works are within or close to a sensitive site. A qualitative score has been applied using professional judgement.	Neutral
	Water Environment	Proposed installation of C-ITS at the roadside or hotspot mitigation schemes are unlikely to significantly affect the water environment. A qualitative score has been applied using professional judgement.	Neutral
Social	Commuting and Other users	Journey time benefits are estimated to improve as a result of the schemes, however given the difficulty in being able to quantify the schemes and for such low cost schemes, the assessment (TAG Unit A1.3) has not been completed. A qualitative score has been applied using professional judgement.	Beneficial
	Reliability impact on Commuting and Other users	Journey reliability is expected to increase as a result of the schemes, however given the difficulty in being able to quantify the schemes and for such low cost schemes, the assessment (TAG Unit A1.3) has not been completed. A qualitative score has been applied using professional judgement.	Beneficial
	Physical activity	The proposed schemes are expected to result in minimal impact in terms of physical activity therefore a quantitative assessment (TAG Unit A4.1 November 2014) has not been carried out, particularly given the low cost of the scheme. A qualitative score has been applied using professional judgement.	Neutral
	Journey quality	C-ITS has the potential to reduce journey frustration as it can keep drivers informed and allow them to avoid queues. There are unlikely to be significant effects to pedestrian and cyclist journey quality. Due to the low cost of the scheme and the diffused locations of the improvements, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative	Slightly beneficial





Impacts		Summary of key impacts	Qualitative Assessment	
		score has been applied using professional judgement.		
	Accidents	C-ITS is expected to result in a reduction of accidents and increase road safety by warning users of hazards ahead, although given the low cost of the scheme it is not appropriate to undertake a full assessment (TAG Unit A4.1 November 2014). It is not anticipated that the hotspot schemes will have a discernible effect on accident rates. A qualitative impact score has been applied using professional judgement.	Largely beneficial	
	Security	C-ITS is expected to result in an improvement in security as communication of locations and issues will be simplified; the emergency services will have more ready access to this data as well. Due to the low cost of this and the hotspot schemes and the sparing distribution of impacts, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets).	Slightly beneficial	
	Access to services	Minor improvements in access to a number of services are expected; the hotspot schemes will deliver more accessibility to retail, education and leisure, whereas the C-ITS corridor will slightly improve access to major ports, airports and facilities in Greater London and Dover. Due to the low cost of the scheme and its dispersed impacts, it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative impact score has been applied using professional judgement.	Slightly beneficial	
	Affordability	There is not expected to be any impact on personal affordability with the scheme. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). A qualitative score has been applied using professional judgement.	Neutral	
	Severance	There is not expected to be any change in severance resulting from the scheme; pedestrian crossings and signal phases will remain in situ at all hotspot sites. Due to the low cost and small impact of the scheme it is not deemed appropriate to undertake a full assessment (i.e. completing TAG worksheets). Instead, a qualitative score has been applied using professional judgement.	Neutral	
	Option and non-use values	The scheme being appraised does not include any measures that will substantially change the availability of transport services within the study area. A qualitative score has been applied in line with TAG Unit A4.1 (November 2014).	Neutral	
Public Accounts	Cost to Broad Transport Budget	Capital costs have been assigned to each scheme within the project, and then adjusted for inflation (from 2010 prices) and for risk.	Scheme cost at 2010 prices	£1,110,156
	Indirect Tax Revenues	No indirect tax revenues are anticipated from this scheme.	N/A	

**Table 4-2: Appraisal Summary Table**

## **4.6 Benchmarking**

- 4.6.1 In order to provide an indication of the value for money of at least part of the KSCMP for 2017/18 it has been considered appropriate to benchmark the proposed improvements at the A225 Princes Road/Darenth Road junction in Dartford against a similar LGF scheme in Kent. The installation of MOVA signal control and puffin crossing facilities is similar to the scheme already delivered at the A26/Yew Tree Road/Speldhurst Road junction in Tunbridge Wells.
- 4.6.2 Although the A26/Yew Tree Rd scheme also included the implementation of staggered pedestrian crossings to improve the efficiency of the traffic signals, the estimated scheme cost was considerably higher than that estimated for the Dartford junction due to the reduced civils works. The A26/Yew Tree Road scheme had an estimated cost of £1.0m compared with an estimate cost of £0.27m for Dartford.
- 4.6.3 The approved business case for the A26/Yew Tree Rd scheme calculated a BCR of 7.3 representing high value for money (VfM). Although the Dartford scheme is not anticipated to derive the same level of benefit as the Tunbridge Wells scheme, the significantly smaller cost indicates that the proposals for this component of the KSCMP would also represent high value for money.

## **4.7 Value for Money Statement**

- 4.7.1 Due to the difficulties identified in undertaking a quantified appraisal of the proposed component schemes in the 2017/18 KSCMP, no BCR has been calculated.
- 4.7.2 A qualitative assessment of the schemes indicates that the proposals would have a beneficial impact, particularly in terms of economic and social impacts. In addition a benchmarking exercise of the proposed improvements at the A225 Princes Road/Darenth Road junction in Dartford indicates that this component would represent high value for money.
- 4.7.3 On the basis of the above and the relatively low cost of the scheme programme for 2017/18 it is considered that the combined proposals are likely to represent medium-high value for money.

## **5 Financial Case**

### **5.1 Introduction**

- 5.1.1 This chapter presents the Financial Case for the KSCMP scheme. It concentrates on the affordability of the proposal, its funding arrangements and technical accounting issues. The total outturn costs and expenditure profile are presented, along with an assessment of the impact of the proposed deal on the Department's budgets and accounts.
- 5.1.2 Capital costs have been calculated for the Do-Maximum funding option only, because there are not expected to be any alternative construction costs that would be incurred in the Do-Nothing and the Do-Maximum.
- 5.1.3 Only the costs which will be incurred subsequent to a successful funding bid have been considered. 'Sunk' costs, which represent expenditure incurred prior to funding approval and which cannot be retrieved, have not been included.

### **5.2 Capital Cost Components at 2016 Prices**

- 5.2.1 The capital required to fund the Programme is £4.8m for the period 2015 to 2021. With £0.863 spent in 2015/16 and an estimated £0.610m spent in 2016/17, giving a total spend of £1.473m for the first two financial years. The anticipated spend for 2017/18 will be £800,000. Table 5-1 shows the scheme capital costs as estimated in 2016 prices.

<b>Cost Category</b>		<b>£</b>
A229 CITS Scheme		300,000
Dartford Network Improvements		270,000
Barton Hill Drive		50,000
Forward Design:		
Wateringbury Crossroads	15,000	90,000
Tunbridge Wells link assessment	15,000	
Bluewater traffic management plan	7,500	
Dover network assessment to link with Highways England	22,500	
Traffic management of the Channel Port	7,500	
Punctuality improvement partnership data analysis	22,500	
<b>Total</b>		

**Table 5-1: Components of Investment Cost at 2016 Prices (2017/18)**

### 5.3 Inflation to 2017 Prices

5.3.1 Table 5-2 provides a base cost estimate of the investment which incorporates real cost increases. The average Consumer Price Index forecasts for 2017 is 2.4%<sup>2</sup>, while construction costs are forecast to increase by 4.0%<sup>3</sup> in the south east for the same period. Therefore the base investment costs, including real cost increases have been calculated as follows:

$$\text{cost} = \text{£}710,000 \times \frac{1.04}{1.024} = \text{£}721,094$$

<b>Cost Category</b>	<b>£</b>
A229 CITS Scheme	304,688
Dartford Network Improvements	274,219
Barton Hill Drive	50,781
Forward Scheme Identification for 2018/19	91,406
<b>Total</b>	<b>721,094</b>

**Table 5-2: Base Scheme Costs (2017 prices)**

<sup>2</sup> Forecasts for the UK economy: a comparison of independent forecasts; No. 354, October 2016.

<sup>3</sup> Sweett Tender price Update United Kingdom Q3 2016

## 5.4 Quantitative Risk Assessment

5.4.1 A 10% risk contingency has been applied in line with best practice for work of this nature.

## 5.5 Final Scheme Costs

5.5.1 Table 5-3 below shows the final scheme costs for the 2017/18 funding bid, including risk and inflation.

<b>Cost Type</b>	<b>Cost (£)</b>
Scheme Cost	710,000
Inflation	11,094
Risk Allowance	83,203
<b>Total</b>	<b>804,297</b>

**Table 5-3: Summary of Final Scheme Costs (2017 prices)**

## 5.6 Spend Profile

5.6.1 An estimated outturn spend profile for the KSCMP is shown in Table 5-4, split by financial year.

<b>Estimated Spend</b>	<b>Total</b>	<b>15/16</b>	<b>16/17</b>	<b>17/18</b>	<b>18/19</b>	<b>19/20</b>	<b>20/21</b>
Total Costs (£m)	4.800	0.863	0.610	0.805	0.922	0.800	0.800

**Table 5-4: Outturn Spend Profile**

## 5.7 Whole Life Costs

5.7.1 The spend profile for the whole life of the C-ITS scheme is such that KCC's costs will be covered in the 2017/18 and 2018/2019 financial years; the maintenance budget for the scheme will be covered by other stakeholders, primarily Highways England and DfT.

5.7.2 It is not anticipated that the hotspot schemes will generate any additional whole-life costs, they involve the modification of existing junctions that are presently in the highway maintenance cycle. Therefore, no additional whole-life costs should be ascribed.

## **5.8 Section 151 Officer Sign Off**

- 5.8.1 A signed letter by KCC's Section 151 officer providing appropriate assurances is contained in **Appendix A**.

## **5.9 Funding Assumptions**

- 5.9.1 The total remaining project cost is estimated at approx. £2.400 million which will be fully LEP funded which will be granted dependent on the business case.

## **6 Commercial Case**

### **6.1 Introduction**

6.1.1 The commercial case provides evidence on the commercial viability of the scheme and the procurement strategy that will be used. It sets out the financial implications of the proposed procurement strategy and presents evidence on risk allocation and transfer, contract timetables and implementation timescale as well as details of the capability and skills of the team delivering the project.

6.1.2 The outcomes which the procurement strategy must deliver are to:

- Achieve cost certainty, or certainty that the scheme can be delivered within the available funding constraints;
- Minimise further preparation costs with respect to scheme design by ensuring best value, and appropriate quality;
- Obtain contractor experience and input to the construction programme to ensure the implementation programme is robust and achievable; and
- Obtain contractor input to risk management and appraisals, including mitigation measures, to capitalise at an early stage on opportunities to reduce construction risk and improve out-turn certainty thereby reducing risks to a level that is As Low as Reasonably Practicable.

### **6.2 C-ITS Corridor Procurement**

6.2.1 The Department for Transport and Highways England will procure the feasibility studies and most of the infrastructure required to deliver the C-ITS corridor. Highways England has devised a procurement strategy setting out their approach to procurement of goods, services and construction expertise.

6.2.2 The strategy is structured around value for money, delivery and sustainability and sets out a prioritised plan of actions. The requirement for suppliers to demonstrate an ability to meet quality and Quality Management System (QMS) requirements will be required. Activities will be procured through the DfT's, partners and Highways England's existing framework contracts.

6.2.3 The C-ITS corridor is a pilot deployment and the study will determine the most appropriate technologies, which have been developed over many years, and the appropriate communications technologies and applications necessary to deliver a



number of applications from the launch of the project.

- 6.2.4 Most of the deployment activities planned to be carried out by partners during the C-ITS implementation will be procured and delivered following the studies needed to prepare project implementation (feasibility, evaluation, testing and validation). To secure the programme, and to deliver early confidence and outcomes, Highways England performed procurement for the first feasibility study between April and June 2015, to consider the infrastructure requirements for the roadside equipment and for the complementary in-vehicle systems. The corridor feasibility study (data models, services and in-vehicle technologies) was procured in July 2015.
- 6.2.5 The proposed C-ITS deployments will use mature and proven technologies that will deliver connectivity within a road corridor with heavy traffic flow and mixed speeds. The installation of the roadside infrastructure can be achieved with minimal intrusion to the highway and be deployed without the requirement for public consultation or local Orders.
- 6.2.6 As a result, and given the above, there is a mature market for the procurement and delivery of the C-ITS corridor, even if the development itself represents a technology pilot.

### **6.3 Hotspot Scheme Procurement**

- 6.3.1 KCC have identified two procurement options for the delivery of their LEP funded schemes. The alternative options are:

Full OJEU tender

- 6.3.2 This option is required for schemes with an estimated value of over £4,322,012.
- 6.3.3 KCC will then need to opt for an 'open' tender, where anyone may submit a tender, or a 'restricted' tender, where a Pre-Qualification is used to whittle down the open market to a pre-determined number of tenderers. This process takes approximately one month and the first part is a 47 day minimum period for KCC to publish a contract notice on the OJEU website.
- 6.3.4 The minimum tender period is 6 weeks but could be longer for larger schemes. Once the tenders are received they must be assessed and a preferred supplier identified. There is a mandatory 10 day 'standstill' period, during which unsuccessful tenderers may challenge the intention to award to the preferred contractor.

Delivery through existing Amey Highways Term Maintenance Contract (HTMC)

6.3.5 This option is strictly not procurement as the HTMC is an existing contract. The HTMC is based on a Schedule of Rates agreed at the inception of the contract. The price for each individual scheme is determined by identifying the quantities of each required item into a Bill of Quantities. Amey may price 'star' items if no rate already exists for the required item.

6.3.6 If the scope of a specific scheme is different from the item coverage within the HTMC contract a new rate can be negotiated. The HTMC contains an upper limit in terms of scheme value which is £100,000; however, this can potentially be increased with agreement from KCC procurement, or the works can be split up into smaller discreet packages with values less than £100,000.

## **6.4 Procurement Strategy**

6.4.1 The preferred procurement route for the KSCMP scheme is through its Amey HTMC.

6.4.2 This option has been selected as the value of the scheme is less than the OJEU scheme value threshold. The Amey HTMC has already delivered the hotspot schemes in the 2015/16 and 2016/17 financial years and provides similar interventions in the form of construction and maintenance on the Kent highways network. The fact that the contracts are already in place and a mature market for project delivery has already been explored/tendered will help to alleviate potential risks and dis-benefits which may otherwise occur from external (OJEU) procurement.

6.4.3 The European CITS scheme is a new and developing project, however, there is experience to be drawn on from France and The Netherlands as some of the system is already in place. KCC is supported by HE and DfT for the A2/M2 connected corridor.

## **6.5 Potential for Risk Transfer**

6.5.1 It is expected that many of the design risks will only be able to be resolved through rigorous design and review processes, once the design options are clear and the scope of land acquisition, planning requirements, environmental requirements and statutory services issues are fully identified, the primary risks will be related to construction. There is potential for transferring these risks through the construction procurement process. This will be explored further as the scheme progresses.

## **7 Management Case**

### **7.1 Introduction**

7.1.1 The management case assesses the deliverability of the project, testing project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance.

7.1.2 It sets out a plan to ensure that the benefits set out in the economic case are realised and includes measures to assess and evaluate this.

### **7.2 Evidence of Similar Projects**

7.2.1 It is anticipated that primarily, delivery of the C-ITS scheme will rest beyond KCC's sphere of influence, with the major project stakeholders being DfT and Highways England. KCC is committing to supporting the ITS group leading the project, participating in its Steering and Working Groups assisting with policy development and stakeholder engagement.

7.2.2 KCC has a long history of delivering and making use of Intelligent Transport Systems (ITS) to carry out its transport policy objectives. In particular, there are anticipated synergies between the HMC technology refresh and the C-ITS scheme, with data from each informing the other in turn. As the HMC technology refresh has been delivered, there is significant ITS expertise presently in house at KCC.

7.2.3 Furthermore, ITS has been previously utilised by KCC to realise the goals set in its Local Transport Plans for Kent, examples include:

- Extension of traffic control and monitoring tools (UTC, SCOOT, pedestrian and cycle crossings, variable message signs) to improve safety and reduce congestion in urban areas;
- Countywide rollout of the Kent Bus location and real time information system to improve journey times and reliability and promote the use of public transport;
- Monitoring and modelling the impacts of traffic management on air quality and assisting the DfT TRAMAQ research programme; and
- Managing traffic on the network by using variable message signs to inform drivers of car park space availability and general traffic congestion.

### **7.3 Project Dependencies**

7.3.1 The delivery of the C-ITS project is dependent on funding and support from Highways England and other stakeholders. This funding is presently assured and in place, with support from the European Union. There are no external dependencies associated with the hotspot schemes, with procurement contracts in place as described above in the Commercial Case.

### **7.4 Governance, Organisation Structure, Roles and Assurance – Hotspot Schemes**

7.4.1 KCC have set up a clear and robust structure to provide accountability and an effectual decision making process for the management of the LEP funded schemes. The KSCMP scheme has a designated Project Sponsor (Andrew Westwood) who is an appropriately trained and experienced member of KCC staff.

7.4.2 Figure 7-1 overleaf provides an outline of the overall governance structure implemented to manage the delivery of each scheme.

7.4.3 A detailed breakdown of the meetings (along with the attendees, scope and output of each) which make up the established governance proves is set out below.

#### ***Project Steering Group (PSG) Meetings***

7.4.4 PSG meetings are held fortnightly to discuss progress on the scheme and will be chaired by Andrew Westwood. Attendees include representatives from each stage of the LEP scheme (i.e. KCC bid team, KCC PMs, Amey design team and construction manager). Progress is discussed in technical detail raising any issues or concerns for all to action. A progress report, minutes of meeting and an update on programme dates are provided ahead of the Programme Board (PB) meeting for collation and production of the Highlight Report.

Bid	Design	Construction	High level Agenda	Frequency	Attendees	Format	Scope	Agenda Items	Key Deliverables/Feedback	Templates
Sponsoring Group			Bid Design Construction	Monthly - Can be called in emergency if required	<b>Chair: TR</b> BC/RW/MG Supported by IPM attendees as required	Face to face meeting, rotating venue	To discuss programme (i.e. high level progress/preview next steps and discuss and resolve issues.	LEP programme (high level) progress to date Programme Financial reporting Next steps Issues/Risk/Change Actions	Minutes of Meeting Action/Decision Log Output distributed to MG	<b>Agenda Minutes</b> <b>Decision list</b>
Sponsoring Group Progress Report			Decisions Needed	Monthly	MG/JW	Report	To record outstanding actions/issues that require a decision made by the board		Action list ready for the Steering Group	<b>Action List</b>
Programme Board Meeting			Bid Design Construction	Monthly	<b>Chair: MG</b> MG/KCC Promoters/KCC PMs/AQ or RC/SW/PC/JW	Face to face meeting, rotating venue	To discuss progress/preview next steps and discuss and resolve issues	LEP programme progress to date Project financial reporting Next steps Issues/Risk/Change Actions	Minutes of Meeting Action List Output distributed to all attendees	<b>Agenda Minutes</b>
Highlight Report			Identify key points for Programme Meeting	Monthly	JW/MG	Face to face meeting/report	JW to collate and streamline all reports highlighting areas of interest for the programme meeting. To be fed back to MG by report/meeting		Highlight report for MG to use for Programme Meeting. Highlight report shared with PR attendees.	<b>Highlight Report</b>
Steering Group Meeting			Progress Update	Monthly/Fortnightly as required	<b>Chair: KCC PMs</b> All input staff - KCC Bidding/KCC Promoters/KCC PMs/Amey Design/TMC/JW	Face to face meeting	Individual meetings per project (including each stage of the LEP process to discuss progress in detail).	LEP project progress to date/MS Programme Project financial reporting Issues/Risk/Change Actions	MS Programme Update Progress update in template for each project	<b>Progress Report</b>

**List of Initials:**

BC Barbara Cooper  
 RW Roger Wilkin  
 TR Tim Read  
 MG Mary Gillett  
 AQ Andrew Quilter  
 RC Richard Cowling  
 SW Steve Whittaker  
 PC Paul Couchman  
 JW Joanne Whittaker

**Figure 7-1: KCC Project Governance Structure**

### ***Highlight Report***

- 7.4.5 The Progress Reports sent by Andrew Westwood comprise of the following updates; general progress, project finances, issues, risks and governance meeting dates. The Highlight Report identifies any areas of concern or where decisions are required by the PB meeting or higher to the KCC LEP Programme Manager. An agreed version of the Highlight Report is issued to the PB meeting attendees during the meeting.

### ***Programme Board (PB) Meeting***

- 7.4.6 The PB meeting is held monthly and is chaired by the KCC LEP Programme Manager. Attendees include representatives from all three stages of the schemes (i.e. KCC LEP Management, KCC LEP Bidding, KCC Sponsors, KCC PMs, Amey Account Manager, Amey Technical Advisors, Amey Construction Representatives). This meeting discusses project progress to date, drilling into detail if there is an issue or action (as identified in the PSG meeting), financial progress, next steps and actions. Outputs of this meeting are the Highlight Report and the minutes of the meeting.

### ***Escalation Report***

- 7.4.7 A list of actions and decisions that the PB meeting was unable to resolve is prepared ready for the Sponsoring Group (SG) meeting to discuss and ultimately resolve.

### ***Sponsoring Group (SG) Meeting***

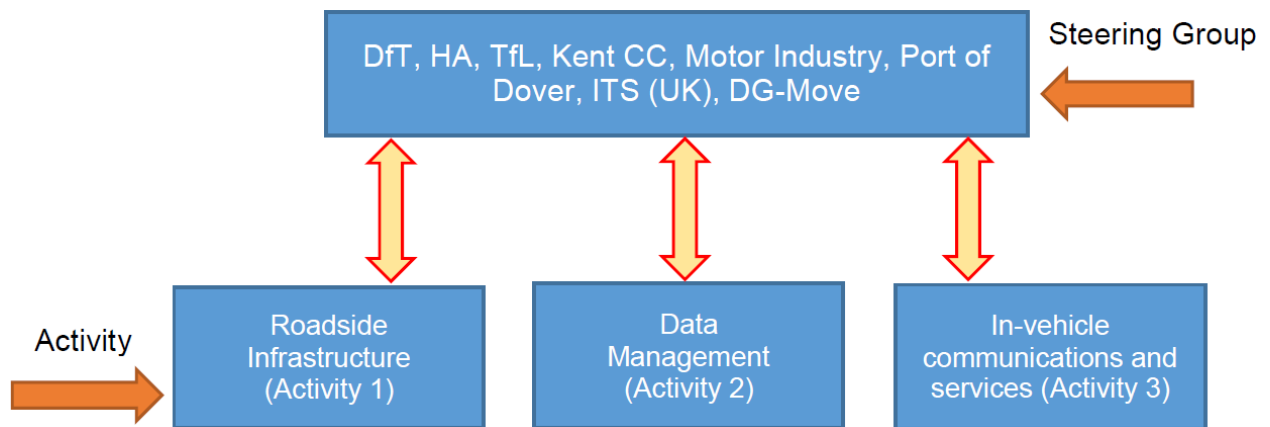
- 7.4.8 The SG meeting is held monthly and chaired by Tim Read (KCC Head of Transportation). Attendees are Barbara Cooper (Corporate Director), Roger Wilkin (Director of Highways, Transportation and Waste) and Mary Gillett (KCC Major Projects Planning Manager). This meeting discusses high-level programme progress to date, financial progress, next steps and closes out any actions from the escalation report. Output is sent to Mary Gillett for distribution. Technical advisors are invited if necessary to expand upon an issue. All actions from the start of this meeting cycle are to be closed out by the SG when they meet (i.e. no actions roll over to subsequent meetings).

***Project Roles and Responsibilities***

<b>Role</b>	<b>Name</b>
KCC SELEP Schemes Delivery Manager	Lee Burchill
Project Sponsor	Andy Westwood
KCC Project Manager	Chris Beck
Amey HTMC Contact	Martin Addison

**7.5 Governance, Organisation Structure, Roles and Assurance – C-ITS Corridor**

7.5.1 The organisational structure of the C-ITS scheme as a whole is such that the programme will be coordinated by DfT, who will deliver the Steering Group at the EU level. The partners and major sub-contractors involved in the corridor implementation are all experienced in using embedded Project Management, control and Governance processes, such as the PRINCE2 methodology, to run projects of this scale. The organisational structure of the scheme is shown below in Figure 7.2.



**Figure 7-2: C-ITS Scheme Organisational Structure**

7.5.2 DfT will also provide the Project Manager, who will be responsible for;

- Policy and project development, including project manager of feasibility study;
- Defining and managing the project related governance processes, procedures and templates;
- The interfaces between the partners and the overall quality of the programme;
- The project timelines and to ensure deliverables are prepared as originally agreed;
- The flow of information on the programme and secretariat for the Activity Groups;



- Chairing the project and programme reviews.

7.5.3 The Highways Agency will lead on matters relating to highway infrastructure. A dedicated Project Officer will be responsible for;

- Coordinating the role of the relevant highway authorities within the Study and Corridor delivery;
- Approving the works and programming delivery of roadside vehicle communication installations;
- Appointing a dedicated financial officer to manage the collection, checking and compilation of financial reports and other administrative information from all of the other parties.

#### ***Activity Leads***

7.5.4 There are three primary activities associated with the C-ITS scheme, namely Roadside Infrastructure, Data Management and In-vehicle Communications and Services. The work under each Activity is the responsibility of the respective Activity Leaders who will be responsible for the completion of high quality deliverables within their Activity according to the overall project timeline. Activity leaders will meet regularly with the coordinator to ensure communication between each package and resolve any issues between the packages. Their specific roles include:

- Compiling project status reports summarising the progress made by the Group;
- Ensuring that their deliverables are achieved on time, within budget and to a high quality;
- Levelling the risk issues and defining the appropriate mitigation;
- Notifying the coordinator of any potential problems within the Activity.

#### ***Steering Group***

7.5.5 The Steering Group will consist of the highway authorities engaged in the Corridor namely Highways England, Transport for London (also representing the London Borough of Greenwich and Bexley Council) and KCC; the motor vehicle industry (Visteon and the Automotive Association); the Port of Dover; ITS UK and a representative from DG-Move. Further consideration will be given to private sector service providers (Inrix, Trafficmaster and Tom Tom) who will also be invited to support the Action.

7.5.6 The Steering Group will be responsible for reviewing the coordinator's day-to-day decisions and will be tasked with resolving any disputes which may arise during the project. The Steering Group will also be responsible for reviewing the coordinator's day-to-day decisions and will be tasked with resolving any disputes which may arise during the project, as well as for providing a strategic guide to the programme over its life. It will be responsible for the management of knowledge, intellectual property and innovation-related activities. The six-monthly, annual and final reports will be validated by the Steering Group before being distributed by the project coordinator.

***Assurance***

7.5.7 In order to ensure timely delivery of programme deliverables, the programme coordinator will be responsible for managing the programme against a dynamic project plan, mainly documented in MS Project, Gantt chart format (or equivalent when it is necessary e.g. Excel file), which will be shared with the Steering Group on a regular basis as updates are made. Specific tasks here include:

- Continuous tracking of deliverables and milestone status: The status of the deliverables and milestones will be tracked by the project coordinator. Progress against agreed milestones will be charted against the programme and discussed at Activity leader meetings;
- Project reporting: The project status reports will provide a valuable reference for evaluating project progress;
- Project Milestones versus budget: The coordinator will control the budget making sure that the deliverables can be covered within the initial budget amount set for each activity. A good balance between the time and the quality criteria will have to be assessed by the coordinator to maintain the budget;
- Risk analysis: The coordinator will maintain and follow-up a 'risk log' in a programme collaborative workspace accessible by each member of the partnership. The coordinator and the Activity members will be asked to update the log as necessary. The risk log will enable the consortium to assess and to level the risks in order to anticipate and avoid any possible issues. If/when issues occur, an issue log including the change management log will be also carefully managed by the coordinator with regular communication with the Activity leaders (via review meetings) and the Steering Group;
- Monthly Activity leader meeting: This will allow the programme coordinator to identify whether technical and infrastructure targets are being met, including

those based on infrastructure and technology performance, vehicle on road availability performance, data quality and availability and safety incident reporting.

## **7.6 Suitability and Availability of Resources**

- 7.6.1 The hotspot schemes and the KCC element of the C-ITS corridor are intended to be delivered using a collaborative approach between KCC staff and their appointed support organisation Amey. KCC have identified appropriately trained and experienced staff that will be responsible for the delivery of the scheme. The identified staff fulfilling the Project Sponsor and Project Manager roles for the scheme has been ring-fenced to support the scheme throughout its duration and will have more junior staff available to support them.
- 7.6.2 Furthermore, the Project Sponsor and Project Manager will utilise appropriate staff from two existing contracts with Amey. Design and technical services support will be provided through the Technical and Environmental Services Contract (TESC) which is active until at least 2018. Amey have a dedicated multi-discipline team located in Maidstone to support the LGF funded schemes. KCC will also utilise dedicated Amey resource through the existing HTMC contract to undertake the construction of the scheme and also to provide early contractor involvement (ECI), where appropriate, to the design process to ensure best value.

## **7.7 Project Plan**

- 7.7.1 Key project milestones for 2017/18 from business case to completion are shown below in Figure 7-3.



**Figure 7-3: Project Plan**

NB. A2/M2 corridor implementation will continue into 2018/19.

## 7.8 Communications and Stakeholder Management

7.8.1 The communication and visibility plan for the C-ITS scheme will operate independently of KCC’s communications and engagement management and action plan.

7.8.2 KCC develop a communication plan specifically focussed on the individual components of the programme. The plan is likely to follow existing plans used for other schemes in Kent. Whilst not exhaustive, the following is an indication of what is likely to be included in the plan:

- Indicate suitable period of time for public consultation;
- Keep general public fully informed of progress during construction;
- Ensure that public and stakeholders are made aware as early as possible of any issues associated with scheme (time slips etc.);
- Engage with key stakeholders at regular pre-defined intervals; and
- Make stakeholders aware of benefits of scheme.

7.8.3 Details about the C-ITS scheme including key messages and scheme information will be delivered through industry and local interest open days, new traffic signs on the corridor, press releases issued by the Steering Group, other partners in EU Commission projects, and through electronic letterheads disseminated by contractors and partners.

7.8.4 The target audiences for the C-ITS scheme include scheme stakeholders, interested

parties at the EU level, as well as the general public and those affected by the scheme.

7.8.5 The hotspot schemes will mainly impact on the public when construction is involved.

There may be an impact on strategic partners when the scheme is close to the strategic network and it is likely that the communications may have to be in conjunction with Highways England. It is currently expected that the financial year 2017/18 hotspot schemes will only require limited resources from communications related to scheme start dates and awareness of the scheme and no specific consultation or design support.

7.8.6 The communication will be channelled according to the scope of the scheme. This will depend on each individual element and could utilise any of the below mediums.

- Local news media PR;
- National trade PR;
- Social media (e.g. LinkedIn, Twitter, Facebook, Yammer);
- Online presence;
- Presentations at other people's events; and
- Printed materials.

7.8.7 The C-ITS scheme has a committed programme of communication techniques and objectives:

- European policy dissemination and shared learning using existing European Commission structures including the C-ITS Platform, ITS Committee, and EIP projects and supervisory board, as well as other Europe-wide ITS platforms, including ERTICO;
- Engaging with stakeholders across the UK and Europe to help build understanding within the transport sector of the project through activities such as Stakeholder forums;
- A contact database for each of the organisations within the stakeholder target audiences segmented by level of interest and communications disseminated accordingly;
- A website and sub-site for both the public and stakeholders;
- An e-newsletter which will be a main tool to drive traffic towards the site and the learnings within it;
- A social media plan;
- A digital animation video;

- Publications to keep people up to date as the Action progresses, including a bi-annual newsletter for all stakeholders;
- Media liaison to ensure extensive media coverage of key milestones and raise awareness of the benefit of TEN-T Activities to the UK and Europe;
- Launch, industry partner, stakeholder and dissemination events;
- A strategy for one to one meetings with key influencers;
- A stakeholder Communications Plan detailing key messages and key milestones.

7.8.8 The budget for communication of the C-ITS corridor is costed within that project. No additional resources will be required from KCC for communications strategy.

7.8.9 The budget for communicating the hotspot schemes will be allocated according to the scheme being developed depending on its likely impact on the travelling public. This will be decided on a sub project basis and discussed with the communications team at the start of the financial year.

## **7.9 Contract Management**

7.9.1 The project will be managed by KCCs project manager (Andrew Westwood) with officers from their in house design team and contracts team delivering the works streams with support from the partnering Engineering Consultants (Amey) providing additional resources where required and specialist services that cannot be provided in house.

7.9.2 The senior user (Mary Gillett) on the Programme Board will also be a representative from the Council's Major Projects Planning team who are responsible for submitting the business case. This will ensure the project delivers the objectives identified within the original business case.

## **7.10 Risk Management**

7.10.1 Project risk is managed as an on-going process as part of the scheme governance structure, as set out in sections 7.4 and 7.5 of this report.

7.10.2 The KSCMP risk register is maintained and updated at each of the two-weekly Project Steering Group Meetings. Responsibility for the risk register being maintained is held by the KCC PM and is reported as part of the monthly Progress Reports. An example scheme risk register is shown in Figure 7-4 below.

RISK REGISTER															
Project Title: Example 1		High			Medium			Low			Total Risk Allowance				
Project Manager: Mr Smith		High			Medium			Low			Risk				
Date of Last Review: 24/02/2016		High			Medium			Low			Risk				
Risk Number	Risk Description	Date Logged	Residual Impact	Residual Probability	Residual Priority	Notes of Impact (Commercial/Programme/RIS)	Action to be taken (Mitigation)	By When	By Whom	Residual Impact	Residual Probability	Residual Priority	Progress	Residual Cost Allowance in Project Estimate	Risk needed this review?
01	Example: Plans to provide for some of the cost of the programme	01/01/16	L	L	L	Example: Delay to provide of end line of an contract	Example: Ensure that it is included in programme with relevant contract	By KCC		L	L	L			

Figure 7-4: Example Risk Register

- 7.10.3 Any high residual impact risks are then identified on the highlight report for discussion at the Programme Board (PB) meeting. Required mitigation measures are discussed and agreed at the PB meeting. Required mitigation measures are discussed at the PB meeting and actioned by the KCC PM as appropriate.
- 7.10.4 The risk management process for the C-ITS programme will be based on the PRINCE2 project management methodology to ensure that risks are identified, assessed in terms of their likely impact and probability, and can therefore be appropriately prioritised. In this way the risks with the greatest impact and the greatest probability of occurring can be addressed first, and risks with lower probability of occurrence and lower loss can be handled in descending order. Identifying ways of tackling these risks is an integral part of this process, which also considers the opportunity cost of the proposed mitigating actions, to ensure that the chosen action taken is both appropriate and cost effective.
- 7.10.5 This process follows widely recognized good principles for effective Risk Management, ensuring that risk will be an integral part of the organisational processes and part of the decision making process. It will explicitly address uncertainty and assumptions in a systematic and structured way based on the best available information at the time. It will be able to be tailored to suit the situation and need, be transparent, inclusive dynamic, iterative and responsive to change. The risk management strategy will be capable of continual improvement and enhancement, and can be continually or periodically re-assessed.
- 7.10.6 In line with these principles, initial risks were been identified during the inception and development stages of the programme as listed in Table 14. These risks will be continually reviewed and re-assessed going forward as part of the defined management processes for the programme. New risks will be raised and discussed as they are identified, assessed, tracked and acted upon as agreed by the programme coordinator and Steering Group as appropriate.



7.10.7 The C-ITS programme coordinator will maintain and follow-up a 'risk log' in a programme collaborative workspace accessible by each member of the partnership. The coordinator and C-ITS providers will be asked to update the log on as necessary. The risk log will enable the consortium to assess and to level the risks in order to anticipate and avoid any possible issues. If/when issues occur, an issue log including the change management log will be also carefully managed by the coordinator with regular communication with the Activity leaders (via review meetings) and the Steering Group.

**7.11 Scheme Risks**

As with any transport scheme there are a number of risks and issues that must be managed. Through the management arrangements established to progress the KSCMP scheme, there are risk management arrangements in place. For the purposes of this Business Case, the main risks associated with proposed investment to progress the KSCMP are summarised in <b>Barton Hill</b>				
Lack of local political support	1	3	3	Managed through stakeholder engagement and evidence from trial
Increased crash potential from drivers avoiding banned traffic movements	2	2	4	Careful detailed design to ensure compliance
Increased risk of congestion on surrounding network	3	2	6	Monitoring of the effects of the trial scheme to establish effect and potential of further works resulting from the scheme
Reputational risk if scheme has to be removed as it is temporary	3	3	9	Implement permanent scheme
<b>Dartford Network Improvements</b>				
Lack of local political support	1	3	3	Managed through stakeholder engagement
Scheme could reduce the reliability of the Fastrack bus service	2	2	4	Careful detailed design will include assurance that the bus service is not reduced
Difficult access the road network to carry out the works	1	1	2	Managed through stakeholder engagement and liaison with utilities.

7.11.1 Table 7-1 below under the headings of project delivery and project funding. Risks associated with the C-ITS corridor (as identified in the EU funding bid) have also been highlighted.

Risk description	Likelihood	Impact	Likelihood x Impact	Mitigation
<b>Project Delivery</b>				

<b>Concurrency with Multiple Suppliers:</b> dependencies and overlaps occur with the use of multiple suppliers and concurrent contracts.	3	3	9	Allow float in programme, consider coordination with main contractor.
<b>Integration:</b> Integration with existing systems and other new systems present teething problems, or compatibility issues.	1	3	3	Specify compliant systems and accurate specification of the Works Information.
<b>Competent Staff:</b> Shortage of skilled resources to operate / maintain the IT systems.	4	3	12	Allowance for training within the programme. Consider possible secondment of individuals into the HMC.
<b>Equipment Location:</b> Locations for equipment restricted by land ownership issues.	3	1	3	Ascertain land ownership issues at earliest opportunity.
<b>Unforeseen Statutory Services:</b> Availability or time taken to obtain information relating to locations of statutory undertakers apparatus	3	3	9	Early applications with Statutory Undertakers, contingency allocations.
<b>Unexpected Difficulties During Construction:</b> Archaeological finds, contractor performance, missed road bookings, equipment theft etc.	1	1	1	Desktop study. Quality Control process, method statements and site audits and supervision. Obtain internal agreement for flexibility of requirements. Site Management.
<b>Increased Environmental Requirements:</b> Environment Agency expresses concerns about proposals.	2	4	8	Early and ongoing consultation.
<b>Project Funding</b>				
<b>Changes / Uncertainty Over Funding Streams:</b> The funding for the KSCMP is not available.	1	5	5	Development of robust Business Case approved by the SELEP. Regular discussion of LGF with SELEP.
<b>Project Overspend:</b> Failure to deliver the scheme within available funding.	1	5	5	Careful project management.
<b>Political Changes of Direction:</b> Changes to Local Authority/SELEP Strategic Direction	2	5	10	On-going discussions with all organisations involved to ensure compatibility and consistency with Strategic Direction.
<b>A229 C-ITS Corridor</b>				
High staff turnover.	2	3	6	Resource to be regularly reviewed, as part of project and risk management.
The risk is that the infrastructure will not support the interventions.	2	1	2	Early engagement with NRTS providers and other local authority partners.

The risk is that the services may not be developed fully to deliver on Day one leading to delays in project delivery	3	3	9	Early engagement with service providers/ ensure brief is clear in feasibility study
The risk is that systems for roadside communications are not designed appropriately leading to inability to deliver services to users.	2	3	6	Ensure specification for development includes full testing requirements and commercial levers to encourage a successful outcome.
The risk is that the right resource will not be available to deliver suitable proposals.	2	2	4	Use the right procurement mechanisms and commercial levers to ensure the right resource produces the proposals.
The risk is that partners will not be available to determine the programme in the timescales required.	2	3	6	Ensure this activity is scheduled early on in the plan as part of the feasibility study/ begin early engagement with partners such as NRTS.
The risk is that an existing framework is not appropriate for costs and benefits	2	3	6	Engage early with colleagues involved in cost-benefit analysis to ensure what is delivered offers value for money.
The risk is that no technologies deliver value for money for in-vehicle systems	2	3	6	Engage early with in-vehicle systems industry to understand commercial models for services.
Monitoring of outcomes is difficult leading to lack of ability to demonstrate effectiveness of services	2	3	6	Early engagement and agreement by stakeholders of monitoring needs to ensure a successful evaluation –
Lack of good project management will lead to delays in installation of the communications services.	2	3	6	Ensure good specification for project management and project manager identified has appropriate qualifications and technical understanding, alongside good relationships in all areas
Lack of ability to get onto the network (due to other works) will lead to delays in programme.	3	3	9	Early engagement and liaison with partners in SE Region to ensure this work is programmed in early and alongside existing planned work.
Poor selection of day one services will lead to inability to deliver/delays to programme	2	2	4	Early engagement through steering group to ensure ambition is appropriate to deliver successful outcomes on Day One.
Risk is that the infrastructure does not achieve the outcomes desired leading to inability to deliver the services	2	2	4	Early definition of services required and granularity of data needed to deliver those services, alongside early engagement with suppliers (e.g. NRTS)

Risk is that travel and traffic information is not received seamlessly in vehicle leading to lack of delivery of outcomes	2	3	6	Initial testing using small sample of (Agency) vehicles to deliver initial results to determine full roll out of services on A2/M2.
Inability to integrate the communications systems will lead to lack of delivery of services in vehicles	3	3	9	Early engagement with vehicle systems manufacturers alongside roadside communications suppliers
Risk is that testing regime does not cover all the requirements to be tested leading to failure to deliver some of the services	3	2	6	Ensure robust testing regime is provided to test infrastructure delivery as well as in-vehicle service delivery. Early engagement with in-vehicle systems developers will be key.
Risk is that testing regime does not cover all the requirements to be tested leading to failure to deliver some of the services. C-ITS provision is not interoperable across the 3 4ways authorities leading to failure of some of the outcomes of the Action	3	2	6	Early engagement between authorities to ensure common services are agreed and steering group is used to ensure ambition delivers the right level of outcomes.
Information gained from the pilot is insufficient to inform the report leading to inability to develop the blue print for further deployment	3	2	6	Early engagement between authorities to ensure common services are agreed and steering group used to ensure ambition delivers the right level of outcomes.
Report conclusions do not match anticipated programme/outcomes leading to project delays/stop	2	3	6	Set realistic expectations for project at the start including timescales and outcomes.
Evaluation determines that the pilot has not delivered the anticipated outcomes or is unable to determine whether the project has delivered anything due to difficulty in data collection	2	3	6	Ensure performance measurements are appropriate to determine recommendations for further roll out of C-ITS infrastructure provision and services.
<b>Barton Hill</b>				
Lack of local political support	1	3	3	Managed through stakeholder engagement and evidence from trial
Increased crash potential from drivers avoiding banned traffic movements	2	2	4	Careful detailed design to ensure compliance
Increased risk of congestion on surrounding network	3	2	6	Monitoring of the effects of the trial scheme to establish effect and potential of further works resulting from the scheme
Reputational risk if scheme has to be removed as it is temporary	3	3	9	Implement permanent scheme
<b>Dartford Network Improvements</b>				

Lack of local political support	1	3	3	Managed through stakeholder engagement
Scheme could reduce the reliability of the Fastrack bus service	2	2	4	Careful detailed design will include assurance that the bus service is not reduced
Difficult access the road network to carry out the works	1	1	2	Managed through stakeholder engagement and liaison with utilities.

**Table 7-1: Scheme Risks**

	<b>Value</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Table Key	Likelihood	Very High	High	Significant	Low	Almost impossible
	Impact	Catastrophic	Critical	Major	Marginal	Negligible

7.11.2 In considering the need to manage the risks associated with this important scheme, there are considerable and possibly greater risks of not proceeding with the KSCMP. These risks have previously been outlined and are as follows:

- The constraints of the existing transport conditions will act as an inhibitor to growth with private sector investment attracted to other areas with better accessibility;
- The network will not be resilient enough to respond to disruption and resilience to incidents will continue to weaken without the scheme;
- The significant pockets of disadvantage of Kent will worsen;
- Kent’s reputation as the UK’s front door may be damaged without effective highway management; and
- The ongoing Air Quality issues in Kent will be exacerbated without the mitigation afforded by the scheme.

**7.12 Benefits Realisation and Monitoring**

7.12.1 Tracking of the scheme benefits will be a key element in understanding the success of a specific intervention. The realisation of benefits is intrinsically linked to the Monitoring and Evaluation plan.

7.12.2 The scheme objectives (as outlined in section 3.7) have been used to develop the desired outputs and outcomes for the scheme. The desired outputs are the actual benefits that are expected to be derived from the scheme and are directly linked to the original set of objectives. The definition of outputs and outcomes are:

- Outputs – tangible effects that are funded and produced directly as a result of

the scheme; and

- Outcomes – final impacts brought about by the scheme in the short and medium/long term.

7.12.3 To determine whether the scheme benefits are being realised, the outputs and outcomes have been converted into measurable indicators of scheme benefits; these are set out in Table 7-2.

<b>Objective</b>	<b>Indicator</b>
Alleviate congestion by allowing better flow of traffic	Car journey times
Supporting economic development in Kent	Travel time variability
To promote accessibility to jobs and services for all	Public transport modal split; Public transport passenger boardings; Public transport journey times
Provide a resilient network that is able to respond to disruption and incidents	Flow to capacity variation; vehicle journey time variation

**Table 7-2: Scheme Benefit Indicators**

7.12.4 Table 7-3 below provides a summary of the proposed measurement metrics and thresholds of acceptability that will be used to evaluate the benefits of the scheme.

<b>Monitoring Indicator</b>	<b>Measurement</b>	<b>Acceptable Threshold</b>
Vehicle journey times	Vehicle journey times (AM & PM peak hours)	% reduction from existing
Travel time variability	Mean journey time variation using GIS data (AM & PM peak hour)	Reduction from existing
Flow to capacity variation	Junction ratios of flow to capacity (AM & PM peak hours)	Reduction from existing

**Table 7-3: Outcome Measurement and Acceptability Thresholds**

7.12.5 KCC will conduct a full evaluation of the impact of the scheme in the period after it is completed. The Council will prepare evaluation reports one year and five years after scheme opening, using the information to be collected as set out above to gauge the impact of the scheme on the traffic network, and assess the success of the scheme in meeting the objectives of the KSCMP. Unexpected effects of the scheme will be reported upon and, where appropriate, remedial measures identified.



## **Appendix A S151 Officer Letter**