



# ADEPT LIVELABS

## ADEPT SMART PLACES LIVE LABS PROGRAMME

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# Central Bedfordshire

Project Lead: Paul Mason

Comms Lead: Jack Bowers



Central  
Bedfordshire

A green circular logo containing the text 'Central Bedfordshire' in white, bold, sans-serif font. The logo is positioned in the lower center of the slide.

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## Project update:

- The Pavegen installation has been completed and is the first of its kind at a train station in Europe.
- The two walkways at Leighton Buzzard Station can harvest energy and data from people's footsteps. This can be used for several different applications.
- In this case we are using the energy to power a smart bench and the data will be displayed on a nearby digital screen.
- The Pavegen walkway can power an LED-lit smart bench as well as contributing renewable energy to phone charging stations.



Project update :

- Our Power Road Thermal Trial is the first of its kind in the UK and the installation was completed in April 2021.
- We have completed drilling the five geothermal probes at our Thorn Turn Depot which extend 150m deep into the ground.
- These probes will take energy from underground where the temperature is warmer and store them in a tank which can then be used for energy,
- We will be using this renewable energy source to de-ice the depot car park and heat the depot building during the winter.





- Our WattWay solar energy trial installation will begin at the end of Summer 2021
- No need for reconstruction which will make the process quicker!
- The trial will be installed at our Thorn Turn Highways Depot



# Smarter Suffolk

Project Director: Richard Webster  
Project Manager: Brigitte Sodano-Carter



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# A Smarter Suffolk

<b>Pitch</b>	Suffolk County Council has an excellent record of introducing award winning innovation to the highways sector including transformative pioneering adaptive street lighting technology. Early adoption of large scale, remotely managed node technology has yielded highly effective, energy efficient light distribution. The Live Labs project provides an outstanding opportunity to install sensors, at scale, to revolutionise the way highways services are delivered and to improve the lives of Suffolk's residents.
<b>Location</b>	Covering urban, rural and coastal locations to enable the learning to be shared and replicated nationwide
<b>Highlights</b>	<ul style="list-style-type: none"><li>• Sensors measuring road surface temperature, air quality, gully fill levels</li><li>• Assisting vulnerable adults through sensing changes in behaviour</li><li>• Business cases generated for each sensor type used</li><li>• Evaluation of renewable energy to power street lighting and provide wi-fi hotspots</li><li>• Adaptive lighting through radars and cameras</li><li>• Trial of multiple street lighting central management systems</li></ul>
<b>Key Partners</b>	University of Suffolk, BT, BSI, Proving Services and Future Highways Research Group, Institute of Lighting Professionals, Highway Electrical Association
<b>Funding</b>	£4.41M
<b>Innovation</b>	<ul style="list-style-type: none"><li>• Upscaling adaptive lighting</li><li>• Utilisation of countywide communications networks (Radio UNB, LoRa WAN etc.)</li><li>• Integrated approach to network assets and vulnerable citizens, across many directorates in the council</li><li>• Innovation portfolio builder for all councils nationwide to identify assets that can be utilised for smart places</li></ul>



# 13 Different Sensor Types



Data being used to adapt lighting levels



Gully sensor locations mapped and now installed



AQ monitors installed / data being received and analysed



Renewables (wind/solar) installed urban area with rural location to follow



Different types of RST sensors installed and sending data



Anemometers installed to analyse alongside AQ



UoS and BSi drafting documents regarding Suffolk's sensors.  
Hackathon arranged for October '21



4 street lighting central management systems installed



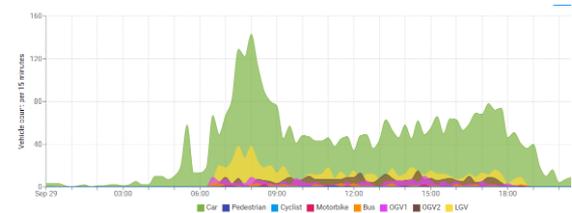
Bespoke dashboard now displaying data from various different sensors



Multiple cameras installed and classifying/counting vehicles



Multiple gateways and data hubs installed to facilitate comms networks



## Research reports

Road Surface Temperature sensors  
Gully Sensors  
Air Quality Sensors



## Data collection

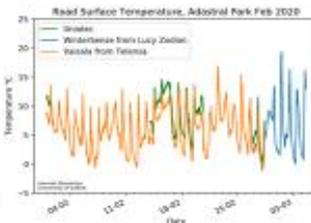
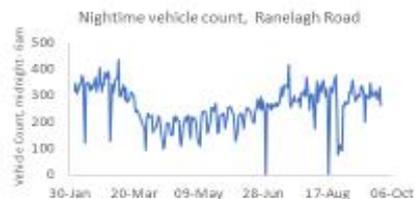
Liaison with suppliers  
Millions of data points accumulated  
Range of formats and sources

## County deployment plans

Liaison with domain specialists  
Identify and understand needs  
Support location planning

## Data into service delivery

Ongoing discussions around:  
Winter Service delivery  
Gully cleansing activity  
Air Quality monitoring



ADEPT

**LIVELABS**

Transforming Local Places



# Cumbria County Council

Project Lead: Matt Waning  
Comms Lead: Kate Stark



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# The Project – What is it?

- Investigate the suitability and sustainability of using waste plastic as additive in highways construction looking both environmentally and economically.
- The concept behind the Live Lab is very simple. Some bitumen is removed from the asphalt that is used to lay roads and replaced with an additive made from end of life plastic that cannot be recycled and would otherwise have ended up in landfill or been incinerated.
- Cumbria has been the most focused on enabling the circular economy. With partners including MacRebur, it is taking a material at the very end of its life and giving it new purpose.



Cumbria are working with MacRebur as one of our project Partners – but what do they do?



MacRebur® have found an innovative way of using waste plastics to give a cost effective, enhanced asphalt solution that can help to:

- Reduce carbon emissions
- Reduce fossil fuel usage
- Recycle waste plastics using a circular economy
- Meet environmental targets.
- Improve the life cycle of the road network



# Context – What is it?

100% waste plastic

- Industrial and domestic sources
- Otherwise destined for landfill

Selected, processed and blended

Pellets, flakes or shreddings

Three finished products

- MR 6. Stiff and hard, but not crack susceptible
- MR 8. Economic extension with minor enhancement
- MR 10. Stiff and flexible, but not rut susceptible



## PROGRAM OUTLINE

The project will investigate the sustainability and suitability of developing a surfacing operation that utilizes waste plastic as an additive in bituminous asphalt to provide a stronger, longer lasting and more resilient road network whilst conveying a local waste for local roads ethos. The project will look to determine what the financial and environmental benefits are for adopting 'plastic roads' as a standard design principle when considering waste disposal and the improved lifecycle of the highways network.

## EXPECTED OUTCOME

The project will review existing information, continue surfacing trials including looking at construction design changes and investigate the business case of a local authority circular economy of waste to road surfacing.

**We want local roads, made with local waste.**





# Staffordshire County Council

Project Lead: Louise Clayton  
Comms Lead: Tom Hobbins



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## Lead Authority Partners

Staffordshire CC Amey, the Connected Places Catapult and Keele University

Title Smart Infrastructure & Mobility Urban Laboratory and Test Environment (SIMULATE)

Pitch The ADEPT Live Labs SIMULATE (Smart Infrastructure & Mobility Urban Laboratory and Test Environment) programme is a new kind of infrastructure model designed to accelerate innovative solutions in Air Quality and Intelligent Mobility across Staffordshire. The model aims to develop a network of interconnected Mobility Hubs and Transport Nodes providing multi-modal, sustainable and demand responsive transport solutions.

The programme aims to provide the environment and framework for game-changing SMEs with new solutions to trial and incubate their concepts, with the ultimate aim of them being adopted into the local and strategic road network. 11 SMEs were chosen to enter the incubator programme and receive funding to trial their innovative air quality and mobility solutions in Staffordshire.

Innovative SMEs trial solutions to challenges set out in the SIMULATE programme, with each representing a core delivery element of the Mobility Hub network, centred around tackling sustainable transport problems within a rural county. Pop-up electric vehicle chargers, green walls and electric scooters are among the systems to be tested as part of the project exploring how the transport hub of the future could look and function.

Location Staffordshire County, the test beds are split between different urban and rural areas for across four different sensorised Air Quality Management areas

Funding £3.95m (Shared with Kent County Council)

- Innovation
- Real world test beds integrating clean air tech and future transport
  - Academic/student engagement
  - Technical support for new and innovate ideas from leading SMEs
  - Scaling successful innovation
  - Development of a new collaborative innovation methodology

# SIMULATE is an end-to-end Future Mobility and Cleantech living laboratory



£3m+ funded

13+ innovations

3 funding sources

4 core delivery partners



**Vision Definition**  
Sept '19 – Oct '19



**Challenge Creation**  
Dec '19 – Jan '20



**Challenge Sharing**  
Feb '20 – Apr '20



**Partner Selection**  
May '20



**Incubation**  
Jun '20 – Dec'20

**Live Trialling**  
Aug '20 – Aug '21

*“A network of interconnected Mobility Hubs and Transport Nodes providing multi-modal, sustainable and demand-responsive transport solutions that can adapt to the varied topography and population density within Staffordshire”.*



**Three Air Quality Management Areas (AQMAs)**

+

**Four Mobility Challenges designed around delivery of the Hub ecosystem:**

1. Micro-Mobility
2. Demand responsive
3. Point-to-point
4. Behaviour change and integration

**100+** SMEs attend launch of Challenge documents in London

SIMULATE website goes live – **£100k** per SME available

Expansive partner network drives high volume of traffic



**132** applications make SIMULATE the most subscribed mobility incubator in the UK

Three-stage selection process culminates with Dragon's Den to select final 10 from shortlist of 25

Successful SMEs receive a bespoke programme of incubation delivered by Amey, the Connected Places Catapult and Keele University, lasting 6 months

SMEs in the programme build towards live trialling

Successful SMEs invited to partnership discussion



# SIMULATE Trials and Workstreams

Project	SME	Owner	Start Date	End Date	Status	Notes
AQMA sensorisation	Envirowatch/Airlabs	Jake Harrison	15/06/20	15/09/21		Deployment and monitoring
Mobility Hub feasibility study phase 2	Amey Intelligent Mobility	Jake Harrison	27/07/20	15/01/21		Initiated w/c 20 <sup>th</sup> Jul
Demand responsive transport simulations	Liftango	Jake Harrison	15/09/20	05/05/21		Deployment and monitoring
Pop-up electric chargers and e-car-share hub	Urban Electric/MEV	Jake Harrison	21/04/20	01/09/21		Scoping and planning
Micro e-mobility 1	Zwings	Jake Harrison	14/09	14/09/21		Deployment and monitoring
Micro e-mobility 2	Ginger	Jake Harrison	14/09	14/09/21		Deployment and monitoring
Green-wall installation	Biotechure	Jake Harrison	01/03	01/09/21		Scoping and planning
IoT moss wall air cleansing and carbon basin	FortyTwo	Jake Harrison	01/03	01/09/21		Scoping and planning
Pollution monitoring and forecasting	Now Wireless	Jake Harrison	10/12/20	01/09/21		Scoping and planning
Fibre optic ITS management	Fotech	Jake Harrison	15/01/21	15/06/21		Deployment and monitoring
Mobility hub feasibility study phase 1	Amey Intelligent Mobility	Jake Harrison	01/10/19	15/02/20		<b>Complete</b>

Total secured in programme    £1.975m



# Highlights

**130+** Applications from SMEs

**11** SMEs brought into the programme for incubation and trialling

**3** Air Quality Management Areas (AQMAs) sensorised.

**2** Green walls

**2** Micromobility operators – over 200 scooters and bikes

**6** Demand Responsive Transport simulations

**1** Electric car share service

**2** Feasibility studies

**3** Further bids into Innovate UK to build on SIMULATE

**1** Radical and approach to revolutionise the mobility ecosystem

## Development of a new approach to innovation procurement

### Traditional Approach

To date procurement of new technology involves specifying requirements and inviting the market to respond against measurable outputs. This traditional approach can stifle innovation. The fragmented nature of the industry is also seen to inhibit innovation in the sector as well as the input of partner across the sector regarding technical solutions. By inviting the market to respond against measurable outputs leaves little room for true innovation.

### Making our approach work

In order to shift to an outcomes-based approach and create an environment that allows innovation to thrive, the SIMULATE programme had to work collaboratively to set a simple vision for what those outcomes would need to achieve, being mindful not to submit a prescriptive method to achieve this. The programme focuses on two key areas that have real problems: mobility and air quality. To set about and identify the challenges that are faced by local authorities across the UK, we had to lend our focus to those specific areas that require rapid change in order to be considered successful.



# Innovation is structured around the delivery of a future place ecosystem



**Live-Lab Management** Amey manage programme with Connected Places Catapult delivering a bespoke accelerator with support from Keele University approach to assessing the location, size and constitution of Mobility hubs within Staffordshire



**Moss-wall Carbon Sink** Developing the UK's first IoT Connected Moss 'carbonsink' to clean the air and store as much carbon as 40k trees, developed alongside FortyTwo and Oxfordshire County Council

**Mobility Hub strategy and feasibility** Multi-phase approach to assessing the location, size and constitution of Mobility hubs across rural counties

**Pop-up Electric Charging Hubs**  
UK first trial of new 'pop-up' charging units alongside partners Urban Electric



**Electric Car Share** UK first trial of ground-breaking new mini electric vehicles; the 'BeeAnywhere' developed by UK based auto manufacturer MEV

**Pollution monitoring across 4 locations including 3 AQMAs** air quality monitoring test-beds to test the efficacy of the solutions deployed in SIMULATE alongside EarthSense and Now Wireless



**Fibre optic traffic management** working alongside Fotech to use fibre optic cabling to monitor traffic flow for intelligent traffic signal management deployment of



**Demand Responsive Transport** 6 simulations across the county will feed into a DRT roll out in Staffordshire

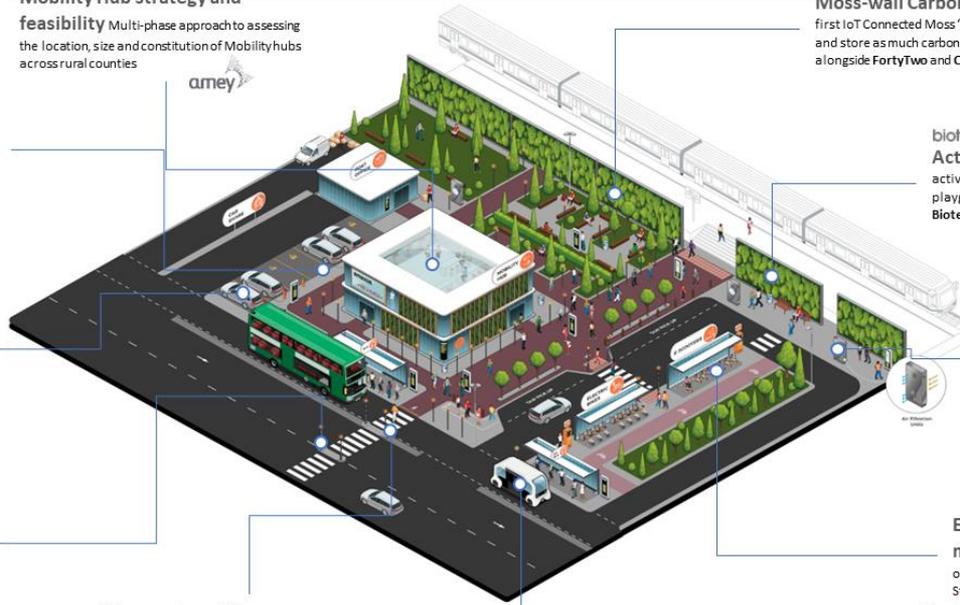


**Active Greenwall** Developing the UK's first active airflow Greenwall to protect school playgrounds from high pollution areas alongside Biotecture

**Deploying water-based air filtration technology** working with ISCLEANAIR on the only filterless air purification technology on the market



**E-Scooter deployment and monitoring** two e-scooter providers deploying over 200 scooters across rural and urban settings in Staffordshire with ZWINGS and GINGER





# Buckinghamshire Council

Project Lead: David Aimson  
Comms Lead: Luciano Lopes



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# SMART materials



## Modular Composite Columns & 3D Printing

Design and create 170 modular composite light columns.

Adorned with 3D printed materials using new techniques.

Creation of heritage-style sensor housing.



# SMART

# communication



## MESH Network – Gully Sensors, CMS & Adult Social Care

Gully sensors and predictive flood management software.

2400 Sensors building a MESH network with the capability of measuring air/ground, traffic type/count, Bluetooth sniffer, air pollution and more.

CMS system that can control the above and give us greater management of our network.

Home sensors, smart wearable and a complementary application allow us to compliment existing care packages using the MESH network.



# SMART energy



## Energy Generation and Storage

Solar & wind energy generation.

Kinetic energy recovery system that uses traffic to generate renewable energy from movement on the network.



# SMART

## mobility



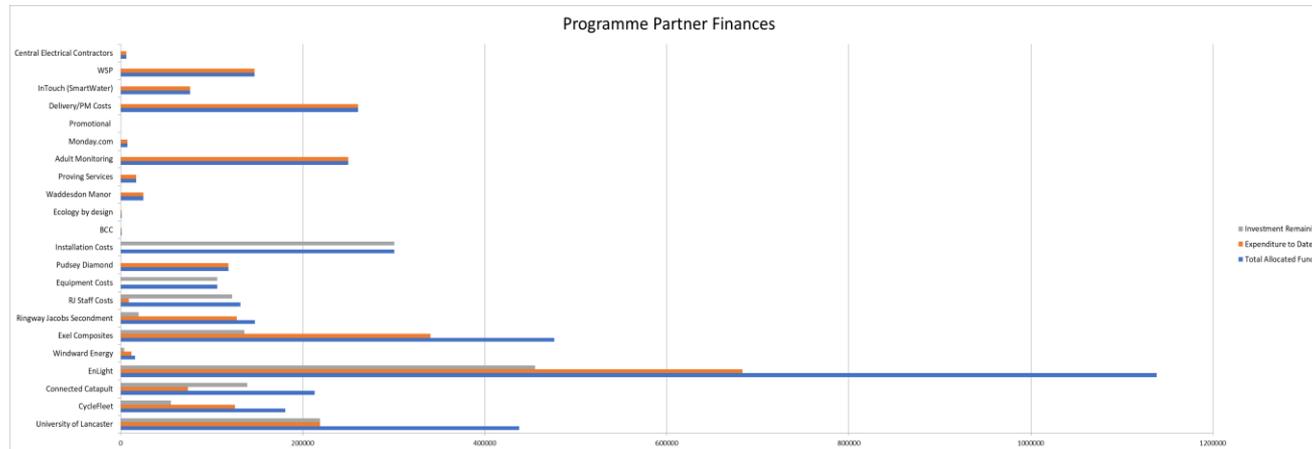
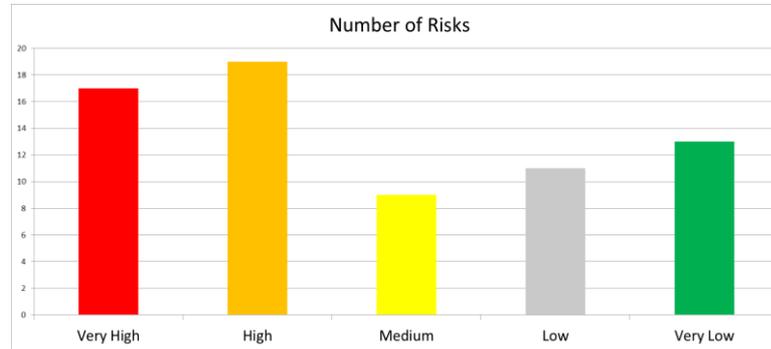
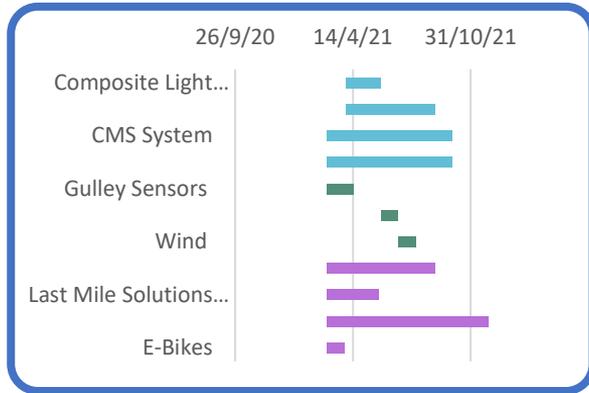
### E-Bikes & Feasibility Study

Last Mile desk study to look at how suburban authorities should tackle new technologies. This will include a road map on recommendations for transport authorities.

Docked e-bikes being installed to service transport to and from one of Buckinghamshire's premier tourist attractions.



# Buckinghamshire Dashboards





# Thames Valley (Reading)

Project Lead: Simon Beasley  
Comms Lead: Rob McDonald



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# Reading



Lead Authority	Partners
Reading	Reading BC, Siemens, University of Reading, O2/Telefonica/Wayra, Stantec, Smarter Grid Solutions, Wokingham BC, Bracknell Forest Council, Slough BC, Royal Borough of Windsor and Maidenhead, Thames Valley Berkshire LEP, Shoothill
Title	Thames Valley Berkshire Live Lab
Pitch	Berkshire local authorities plan to build over 500 new homes per year over the next decade. Critical infrastructure is already under stress. Deploying connected vehicles and communications infrastructure enables optimisation of traffic flow tackling congestion, air quality and road surface problems, allowing growth in population and employment. Combining location information with smart energy monitoring will improve the resilience of the local energy grid. The sustainability of the approach will be tested with a novel, replicable commercial model that will create a shared revenue opportunity for local government.
Location	Thames Valley Berkshire Local Enterprise Partnership Area
Highlights	<ul style="list-style-type: none"><li>• Utilise existing infra. An smart coms tech. and data from Intelligent Mobility partners</li><li>• Existing sources of data from traffic signal detectors and Bluetooth journey time units will be fused with mobility data from O2 and traffic signal data</li><li>• The live data will be fused with the current transport network data to derive a multi-modal view of real time movement across the Thames Valley</li><li>• The real time and historical data will inform transport, environment and planning projects throughout Thames Valley</li></ul>
Funding	£4.75m
Innovation	<ul style="list-style-type: none"><li>• Integrated approach to large-scale data management to inform networks</li><li>• Wide area coverage and application</li><li>• Open approach to data sharing</li></ul>

# A Collaborative Project

## Pot Holes

Specialist **O2** sub-contractor **GDC** is using cameras attached to Bin Lorries to identify pot holes and provide predictions of future degradation or road surface (trial camera installed)

**O2** motion data (based on mobile phone positions)  
Traffic flow data from **Siemens** traffic control systems – to seek to improve accuracy of predictions

## Traffic Congestion

**Siemens** is developing its Roadcast product to improve predictions of traffic, incidents and congestion on the network. **Shoothill** is opening up Transport Data across the 6 authorities

**Siemens** are trialling improving Roadcast - integrating: **O2** motion data (average speed / flow)  
Journey time information from Thames Valley Police ANPR

## Air Quality

**Siemens** have deployed 30 EarthSense air quality sensors and are trialling low cost particulate sensors for a range of trials across three authorities

**Siemens** integrating sensors into their traffic control system. **O2** integrating Siemens / EarthSense into insights platform Dashboard for local Authorities. **UoR** and **Stantec** advising and evaluating benefits

## Energy

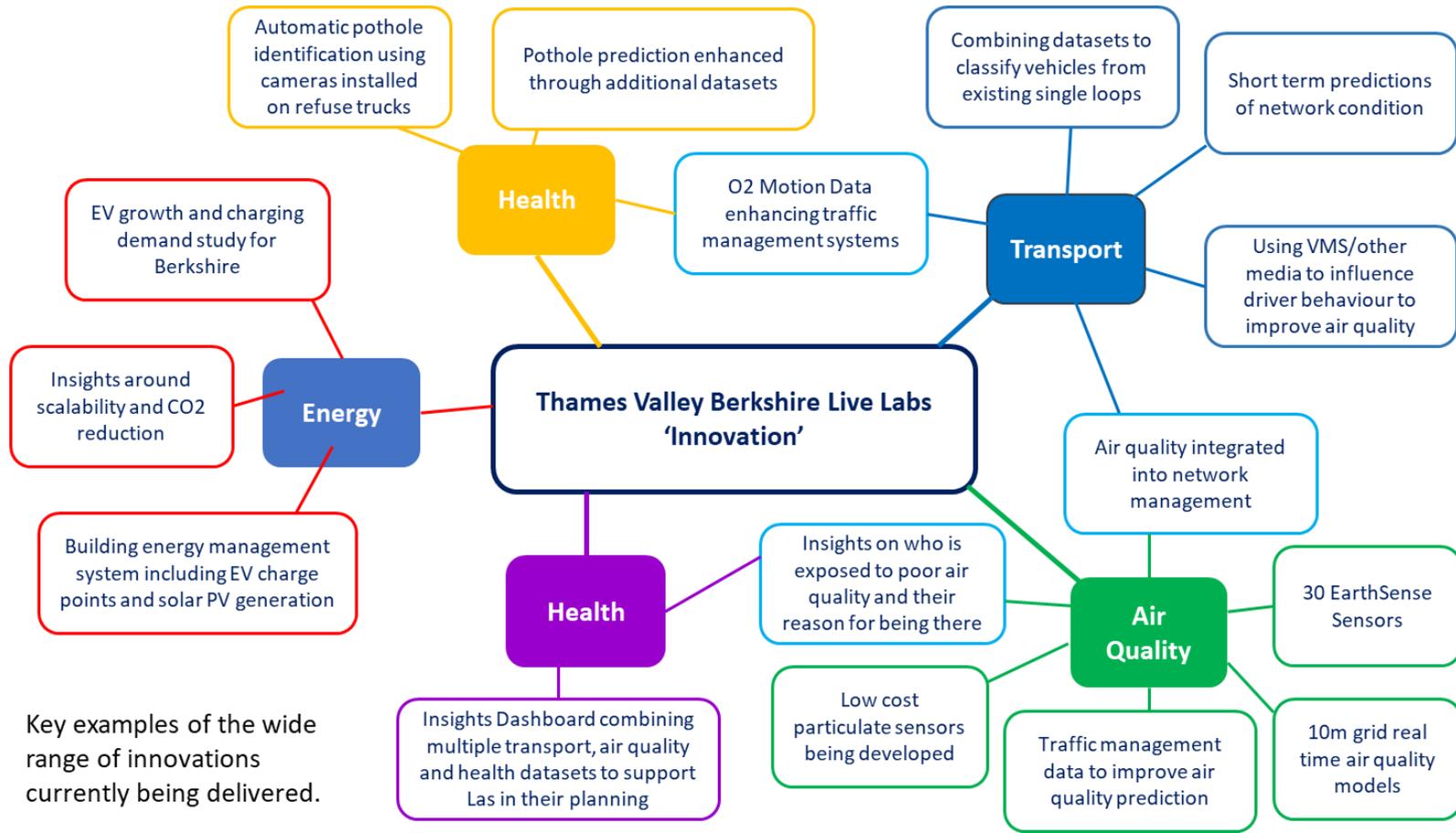
**Smarter Grid Solutions** have installed their energy management systems at two sites in Reading and are rolling out to others.

**University of Reading** are working with SGS to evaluate benefits and investigate scalability. **O2** are undertaking a Berkshire wide EV future demand study. **Stantec** are working with SGS to support project messaging and delivery

## Health

**O2** are bringing together all the transport insights together with health metrics to create a dashboard for Local Authorities to support the development of transport policies that benefit health

**Siemens** air quality data and traffic data  
Road quality data from GDC  
**Local Authority Health Leads** - Key health metrics identified by LA staff



Key examples of the wide range of innovations currently being delivered.

# Thames Valley Berkshire Live Labs

## 'Reaching the LA Officers and Public'

We want people to have information in a way that means something to them and encourages them to make decisions to reduce the impact of poor air quality on themselves and for others.

### LA Officers

- ✓ Air quality and exposure dashboard
- ✓ Road surface quality and pot hole prediction dashboard
- ✓ Public health and transport dashboard
- ✓ Energy management dashboard
- ✓ Enhanced traffic management system - prediction and control

### Public

- ✓ Transport, air quality and health behavioural change app. Able to make better transport choices
- ✓ More efficient council services – demonstration of the potential for improved transport systems, lower cost and lower carbon
- ✓ Better managed highways for all modes



# Transport for West Midlands

Project Lead: Deborah Fox  
Comms Lead: Kevin Thompson



Transport for  
**West Midlands**

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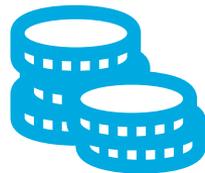


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# Network Resilience Live Lab Dashboard/Overview

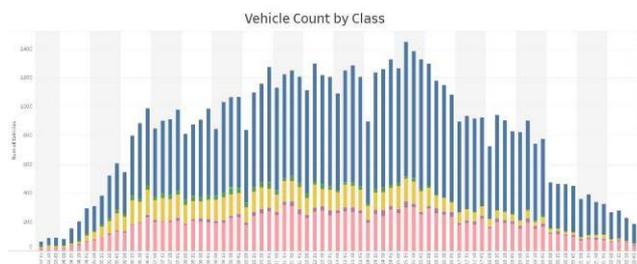
Combining data analytics from multiple sources, including a camera-based monitoring system, and deeper understanding of customers who use the road network.



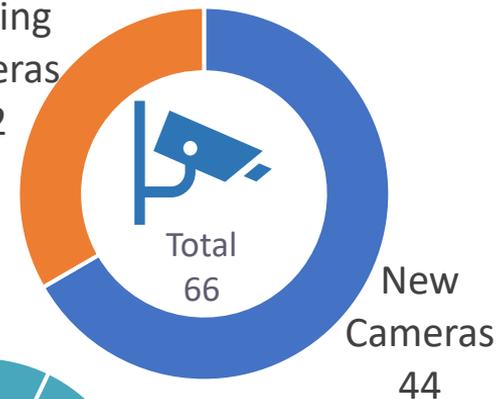
## £2.65M Project



## 2 Million Records Daily



Existing  
Cameras  
22

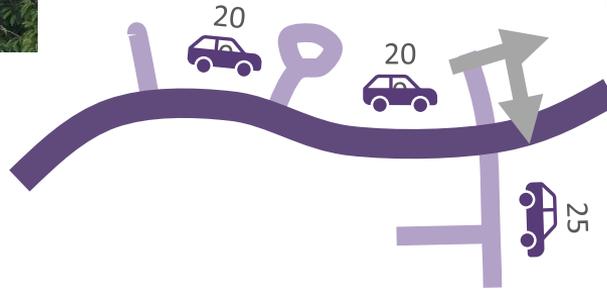
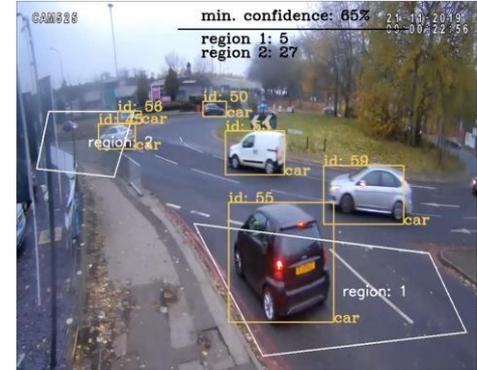


14 Personas - 8 Segments



# West Midlands Police & Camera Analytics

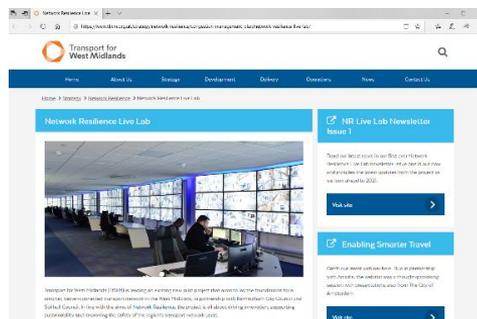
TfWM  
West Midlands  
Police  
Memorandum  
of  
Understanding



# Traveller Persona & Live Lab Knowledge - sharing and Communications



650+ professionals informed about the ADEPT SMART Places Live Labs programme through knowledge-sharing sessions, and 7 collaborative meetings held with other Live Labs

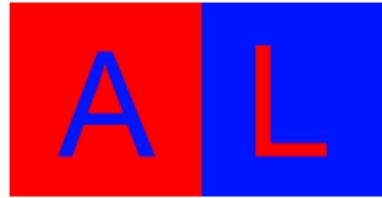


Network Resilience Live Lab bi-monthly newsletter  
Issue 1 – February 2021

# Network Resilience Live Lab Partners



**BIRMINGHAM CITY**  
University



T R I N I T Y  
M Q U E E N



**WARWICK**  
THE UNIVERSITY OF WARWICK





# Kent County Council

Project Director: Carol Valentine  
Comms Lead : Katherine Porter



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## Key headlines

17 initiatives	11 active suppliers	£2.5m total programme (including £1.975m ADEPT)	£500k in pipeline
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- Public, parish stakeholder engagement underway for digital customer service transformation
- HADMS operational platform undergoing business integration, enabling managers to make better, more informed decisions about service approach
- Network risk data-science model in development to drive risk-based service transformation
- New bid submitted to Kent Lane Rental Fund around outcome-based service delivery approach to be developed on HADMS
- The Vivacity project has grown from 10 cameras in the initial project scope to over 47 cameras now, through continual renewed demand from new KCC sponsors
- Smart drainage has come to the end of its phase 1 trials and recommendations for continuing investigation have been provided to KCC, a full project completion report is now available
- The Route Reports trial is well into phase 2 of its Live trial and early data collection showing a good level of defect collection and pavement condition prediction
- Post live-lab innovation catalyst model design finalised with delivery approach in discussion between Kent and partners





## Highways Assets Data Management System (HADMS)

	Initiative	Summary	Status
<b>Performance and compliance</b>			
	Work order process, KPI performance	Performance analytics around work orders, analysis of delivery process, automated KPI reporting	Final development
	People productivity	Productivity and compliance toolsets for stewards and gangs	Mid-development
	Winter maintenance	Fully integrated client/supplier gritting performance and compliance dashboarding	Final development
	Enquiries and customer response	Trending of incoming enquiry load across county alongside response performance	Mid development
	Value for money	Metrics determining VfM within the operational business	Scoping
<b>Integrated planning and strategy tools</b>			
	Trees and vegetation planning	Integrating all tree and vegetation data from canopy coverage, inspections, enquiries, works orders, assets etc. into singular visualisation and planning tooling.	Mid development
	Strategic/reactive planning	Cross planning toolset between strategic and reactive delivery elements e.g. strategic programme, RSI, work-orders, enquiries etc.	Final development
	Safety scheme planning	Integrated planning toolset for assessing network factors pertaining to safety interventions	Final development
<b>Modelling and data-science</b>			
	Network risk	Using data-science to model network crash risk and integrating pro-active safety driven service design	Mid development
	Risk-based trees/vegetation management	Modelling risk around tree and vegetation assets to drive risk-based service design	Initial development
	Customer outcomes	Calculating customer outcome impacts for tactical workstack e.g. risk, journey time and assessing service design opportunity around these priorities	Initial development
	Smart Winter	Predictive data-science model of grit risk across Kent alongside domain-based forecasting	Complete

