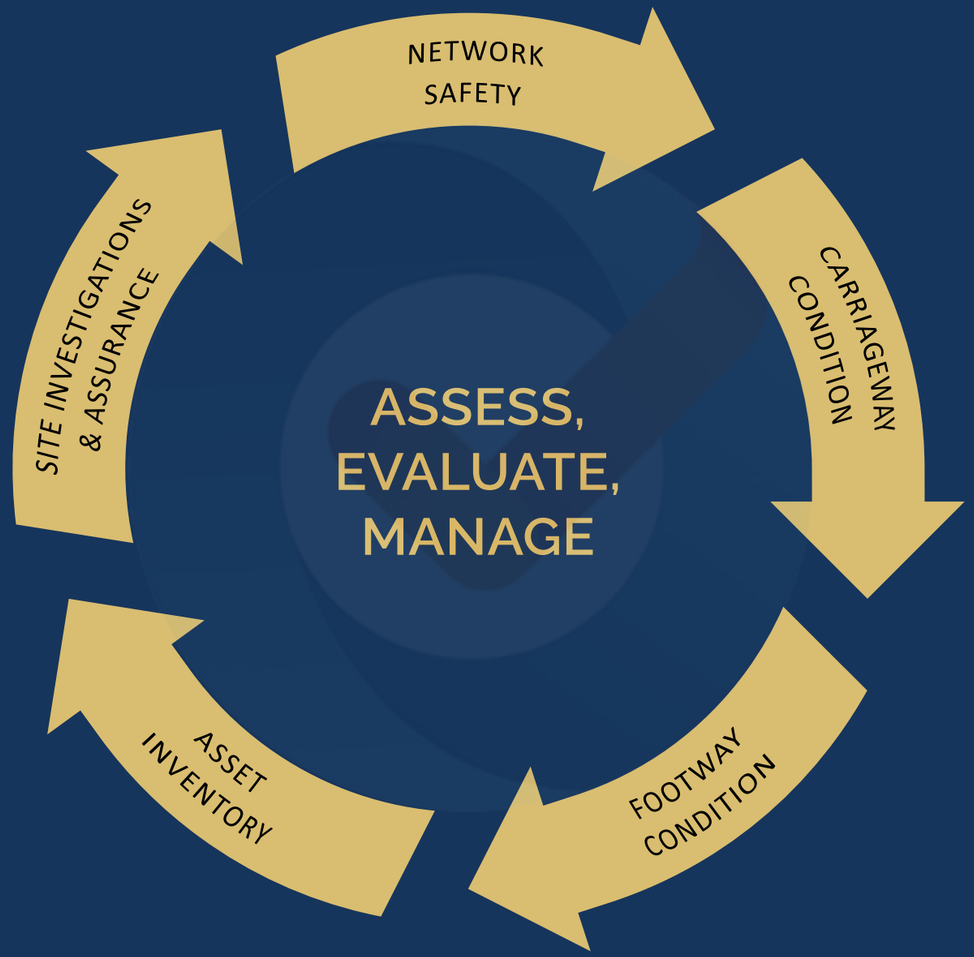
XAIS-PTS
INFRASTRUCTURE ASSET AND PAVEMENT SOLUTIONS
A PHENNA GROUP COMPANY

ASSET MANAGEMENT SURVEYS

Delivering industry-leading and innovative infrastructure surveys to support local authority asset management

www.xais-pts.co.uk



Contents:

XAIS-PTS provide comprehensive asset management survey services and our toolkit deploys a wide range of survey methodologies and technologies to provide the data you require to define, assess, understand, and manage all infrastructure assets.

Our network safety management team leverages a fleet of accredited vehicles, combined with expertise in the principles of skid resistance, an understanding of industry standards and compliance, and through a bespoke and client-focused approach to site investigations, to provide comprehensive services focused on network safety and risk management.

We deploy state-of-the-art traffic-speed survey technologies for the collection of carriageway condition data, delivering nationally-recognised surveys such as SCANNER+ and PAS 2161. Exceeding the requirements of national reporting, our enhanced survey services provide all condition data that is required to support local infrastructure asset management.

As pioneers of the Annual Engineering Inspection (AEI) and Footway Maintenance Survey (FMS), our team of in-house engineers and UKPMS specialists offer unparalleled capability in the delivery of visual condition surveys covering all industry-accredited UKPMS surveys. We also provide bespoke site investigatory and assurance services tailored to client needs.

Our experience has shown that successful data collection regimes must secure maximum value from the data collected, and we work collaboratively with our clients to establish data collection strategies that are tailored to the client's requirements.

NETWORK SAFETY

Delivering Network Safety as a Priority

Recent estimates suggest there are in excess of 40 million road users in the UK, with road network safety management absolutely crucial because it directly impacts the safety and well-being of road users, influences maintainence priorities, impacts traffic flow, delivers cost and environmental savings, and drives public confidence.

We support road safety management through the provision of network- and scheme-level safety assessments, including skid resistance surveys, which assess the frictional properties of the pavement surface to identify high-risk locations, and iRAP, which is an internationally-recognised methodology for evaluating road safety risks based on factors such as road design, traffic volumes, and environmental conditions.

Through effective network safety management and a skid based policy, our clients are able to deliver real-world reductions in the volume and severity of road traffic accidents, as well as bringing about improvements in road network connectivity and travel times.

With an ever greater focus being applied to the principal of resilient networks, which are made up of network routes that are considered essential for economic activity and for key services in the event of extreme weather events, major incidents and other disruption, effective network safety monitoring and management is becoming more and more important.

Our network safety surveys can be undertaken at a variety of scales:

- Network-wide, traffic speed surveys
- Strategic routes
- Resilient networks
- Accident hotspots
- Retextured sites (before and after testing)
- Incident response

Skid Resistance Surveys

According to the Design Manual for Roads & Bridges (DMRB CS 228), skid resistance refers to the frictional properties of the road surface in wet conditions. A lack of grip or a “slippery” road surface can cause road traffic accidents meaning effective monitoring of skid resistance is vital.

SCRIM® surveys measure the wet skidding resistance of a road using the sideway force principle. A freely rotating wheel, mounted in the nearside wheel track and angled at 20° to the vehicle's direction of travel, is applied to the road surface under a controlled vertical load and water flow. Sideways force coefficients are recorded and evaluated against pre-defined investigatory levels.

GripTester is a trailer based continuous measurement device. The GripTester determines the surface friction using a continuously reading braked wheel fixed slip device.

Both SCRIM® and GripTester surveys can be utilised to characterise the road surface and assess the need for maintenance.

Delivering Service Enhancements

We deliver bespoke and client focused services aligned with skid policy requirements and industry best practice guidance. Service enhancements include:

- National reporting
- Identification of areas of concern
- Data analysis & visualisation
- Detailed site investigations
- Collision reviews
- Investigatory level reviews
- LASR analysis & reporting
- Skid policy development & review
- RSTA / CPD training courses
- Bespoke training & consultancy

International Road Awareness Programme (iRAP)

iRAP is a system designed to evaluate and improve road infrastructure safety globally. The aim is to reduce road traffic fatalities and injuries by identifying and addressing high-risk areas, as well as improving road design and management. The iRAP safety assessment evaluates roads based on several factors including:

- **Road design and geometry -** Features such as curves, intersections, lane widths, and road surface conditions
- **Traffic volume and types -** Including vehicle types and pedestrian presence
- **Asset inventory -** Ensuring there are appropriate road signs, signals, protective barriers, line markings and more.
- **Road user behaviour -** Analyzing how the infrastructure interacts with traffic behaviours, like speeding or unsafe pedestrian crossings.

Holistic Road Safety Assessments

Our 360° visual inspections are the first part of a cost-effective and reliable solution for delivering iRAP accredited safety assessments.

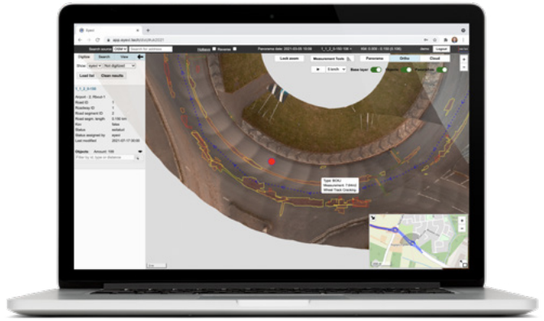
Our survey vehicles travel across your network using a highly accurate GNSS/INS system and panoramic cameras to continuously record high-definition imagery, orthophotos and GPS data – capturing infrastructure assets and condition data in unprecedented detail.

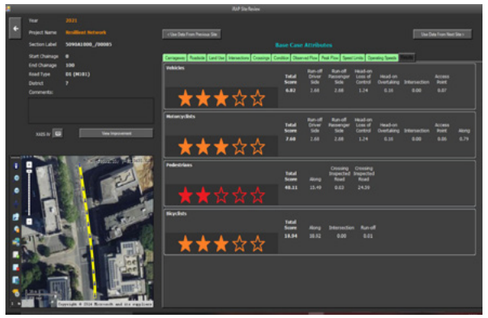
Post-survey data extraction and analysis is undertaken within our accredited XA© system, delivering the information you require for iRAP rating. Our accredited iRAP coders will work collaboratively with you to maximise the value of your assessment.

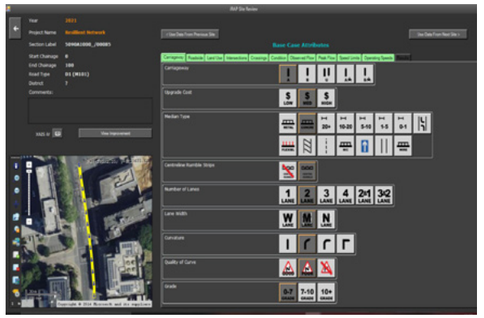
Taking a Risk-Based Approach to Network Safety Management

Through comprehensive image capture and a focus on all elements of road network safety, iRAP assessments deliver several key benefits:

- Inspect high-risk roads and develop iRAP Star Ratings and risk maps for motorists, motorcyclists, cyclists and pedestrians
- Track road safety performance and evaluate investment and maintenance decisions
- Integrate iRAP data with other established processes including SCRIM® / SKID analysis and LASR crash modelling, to deliver balanced network safety management outcomes
- Incorporate data within XA© Scheme Assembler to deliver safety focused maintenance. We utilise iRAP safety ratings in our scheme prioritisation as standard
- Minimise the need for engineer site visits.







CARRIAGEWAY CONDITION

Effective carriageway condition assessment is an essential part of long-term asset management planning, proactive carriageway maintenance, and the delivery of safer, more efficient road networks.

The recent introduction of PAS 2161:2024 presents a generational opportunity for developing industry practices further, and a key feature of PAS 2161 is its flexibility regarding the technologies used for data collection. This approach encourages innovation and enables the integration of new, cost-effective solutions as they become available.

At XAIS-PTS, we are seizing this opportunity by leading the way in carriageway assessment technology, providing a range of survey solutions designed to meet the specific needs of your network type, technological requirements, internal policies, and budget. Our surveys align fully with the new PAS, and can provide a range of additional data streams. We will work collaboratively with you to define the best survey solution.

Our carriageway assessment services include:

- SCANNER+
- Annual Engineers Inspections (AEI)
- Infrastructure Vision (iV) 360° Surveys
- Course & Detailed Visual Inspections

SCANNER+

We utilise state-of-the-art and UKPMS accredited SCANNER vehicles, which bring together the best in GPS, image-capture, AI analysis, and laser scanning technology to deliver detailed network-wide assessments of carriageway infrastructure.

- 3D data is exactly what we offer, we go beyond simple visual interpretation of the surface condition and utilise sensor technology to provide a 3-dimensional profile of the road surface
- We utilise advanced laser profilers delivering accurate ride quality, texture, rutting, and roughness measurements
- We apply Automatic Distress Detection (ADD) technology, which applies sophisticated and objective algorithms to the 3D data and image-based AI system, to deliver precise and repeatable distress measurements.

Our SCANNER+ services are designed to harness industry-developments with PAS 2161, providing Clients with the tools and freedom to drive local asset management practices. Our enhanced services deliver:

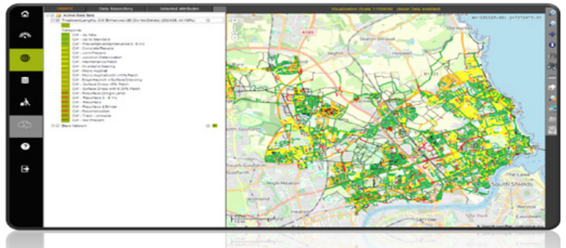
- UKPMS & PAS 2161 compliant national data reporting
- Maintenance scheme identification & prioritisation
- Condition projection modelling
- Data visualisation and embedded video
- Added-value datasets to support maintenance decisions including enhanced cracking, potholes, patching, edge defectiveness, ravelling, line markings and more.

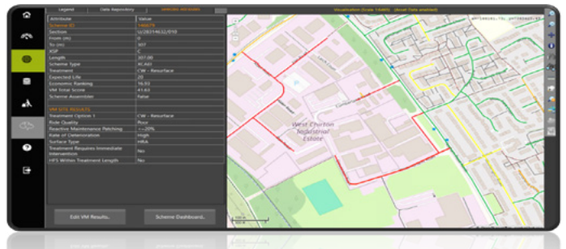
Annual Engineers Inspections (AEI)

The fundamental principle of the Annual Engineers Inspection (AEI) is that the survey is undertaken by a competent Highway Engineer experienced in treatments and materials. AEI, which is aligned with PAS 2161, covers a wide range of highway maintenance remedies including basic maintenance, preventative and preservative measures, and resurfacing or reconstruction works. Prior to delivering an AEI survey, our Engineers hold a client workshop to understand:

- What treatments are used within the authority?
- What maintenance interventions are used?
- What are the unit rates in delivering the treatments?
- What should be collected to inform a prioritisation process?

This client focused approach ensures maximum value can be derived from the survey and AEI delivers a better reflection of maintenance need than other defect based surveys.





Benefits of undertaking an AEI include:

- Network-level and highly efficient survey methodology
- Obtain PAS compliant condition categories to support national reporting
- Engineering-led multi-year costed works programmes can be delivered
- Projection modelling provides more accurate year-on-year comparisons of network condition
- Value management workshops tailor services to your asset management needs and corporate objectives
- AEI results integrate seemlessly with our XA© Scheme Assembler software module.

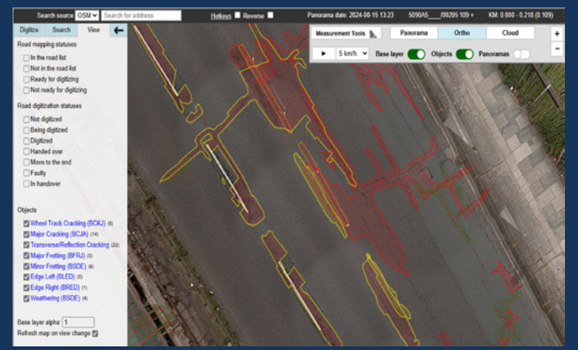
Infrastructure Vision (iV) 360° Surveys

XAIS-PTS Infrastructure Vision (iV) 360° surveys are transforming the way local authorities collect, store, and analyse the condition of carriageways. We combine high-definition photographic imagery, LiDAR, 3D mapping technology, and machine learning, to provide our clients with a comprehensive understanding of carriageway defectiveness.

Through industry-leading and accredited asset management software and our extensive engineering expertise, we make infrastructure monitoring, auditing, planning and maintenance more sustainable, cost-effective and safety focused.

Survey benefits include:

- Traffic-speed assessment designed to assess your full network heirarchy
- Access and interrogate detailed defect information alongside imagery through our web-viewer XA© Explorer
- Receive fully costed and prioritised works programmes
- Enhance carriageway condition assessments through embedding iRAP safety assessments, which are obtained using the same iV 360° technology - iRAP supports a more holistic view of highway maintenance by accounting for more than carriageway condition alone.



UKPMS Coarse & Detailed Visual Inspections

Course Visual Inspections (CVI) are driven surveys that collect information on the condition of your carriageways. Standard defects assessed include wearing course and surface deterioration, cracking, rutting, edge deterioration, and more. The survey was developed by asset management experts to be a highly efficient and cost-effective network level assessment.

Detailed Visual Inspections (DVI) are undertaken on foot by a UKPMS accredited inspector using a hand-held data collection device and calibrated measurement wheel. Inspectors assess condition using an extensive defect catalogue referenced by surface material type including fretting, cracking, chip loss, cracked and depressed flags, and joint defectiveness to name a few examples.

We are the UKs leading provider of UKPMS surveys and our highly-experienced accredited inspectors utilise the latest hand-hald data capture devices alongside our UKPMS accredited XA© Inspector software.

Asset Management Support Services

We are also an industry-leader in UKPMS and asset management solutions, and our experienced consultancy team will work with you to provide an end-to-end service. We deliver a variety of industry-standard and bespoke reports including but not limited to:

- Automatic Pass
- BVPI 224b & BVPI 187 reporting
- PAS 2161 reporting
- Maintenance scheme recommendation
- Value management workshops to support scheme prioritisation
- GIS condition mapping and analysis

FOOTWAY CONDITION

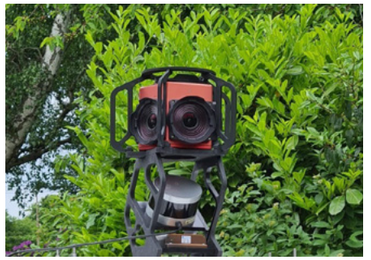
The Well Maintained Highway Infrastructure: A Code of Practice (UKRLG) guidance document advocates the adoption of a risk- and evidence-based approach to all aspects of highway asset management.

Traditionally, carriageway network management has been prioritised due to the greater dangers associated with carriageway use and the greater level of condition data available. In recent years however, there has been a greater focus assigned to the management of non-carriageway assets, driven largely by "Active Travel" considerations and wider sustainability initiatives.

Record amounts are now being invested in active travel to help deliver a healthier, safer and more carbon neutral transport system – with a focus on raising the standard of cycling and walking infrastructure.

At XAIS-PTS, our services are designed to support the management of non-carriageway assets and we offer the most comprehensive range of survey solutions in the UK, aimed at delivering valuable asset management insights. Our off-carriageway surveys include:

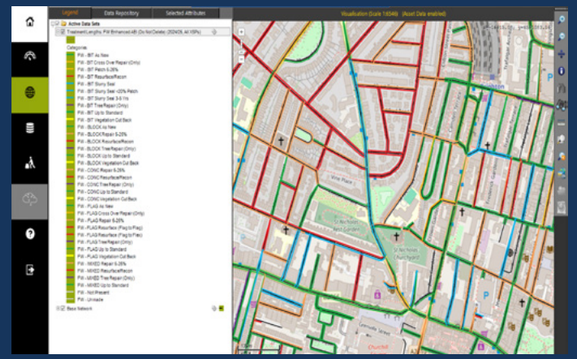
- Annual Engineers Inspections (AEI)
- Infrastructure Vision (iV) 360° Surveys - MAVIS
- Footway Network Surveys (FNS), Footway Maintenance Surveys (FMS) & Detailed Visual Inspections (DVI)

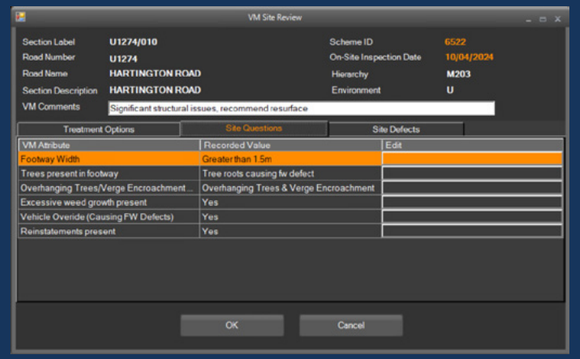


Annual Engineers Inspections (AEI)

This engineer-led inspection is not only confined to carriageway assessments, we are also able to deliver detailed inspections on off-cariageway assets including footways, cycleways, and paved verges.

AEI is undertaken by an experienced highways engineer, and the survey focuses on practical footway treatment options such as resurfacing, reconstruction, slurry seal, and patching.





Benefits of undertaking an AEI on your footways and cycleways include:

- Works programme development supports real-world scheme identification and prioritisation
- Multiple defect types accompany the treatment lengths and allow the treatments to be prioritised based upon percentage defectiveness
- Projection modelling provides more accurate year-on-year comparisons of network condition
- Value management workshops tailor services to your footway and cycleway maintenance needs, considering wider factors such as active travel
- AEI results integrate seemlessly with our XA© Scheme Assembler software module.

Infrastructure Vision (iV) 360° Surveys - MAVIS

Our Mapping & Visual Imaging Scooter, affectionately known as MAVIS, is transforming the way clients collect, store and analyse the condition of footways. Much like our carriageway inspections, we travel across your network using a highly accurate GNSS/INS system and panoramic cameras to continuously record high-definition imagery, orthophotos and GPS data.

Critically, this image collection is completed from the footway or cycleway itself, overcoming the limitations of other carriageway-based systems. By surveying from the footways, we maximise visibility of defects and deliver detailed condition assessments.

Local Authorities across the UK are turning to our robust, reliable and innovative mobile solution which incorporates several key features:

- Innovative use of our iV 360˚ system, operated through our battery-powered mobility scooter, delivers greater survey efficiency than traditional walked assessments
- Supports dedicated footway surveys whilst using objective machine learning technology
- Data accuracy and image quality enables faster workflows and reduces carbon footprints
- Improved decision making with respect to active travel, covering key areas such as accessibility, Healthy Streets and cycle infrastructure
- System supports treatment and maintenance scheme identification and prioritisation.

Footway Network Surveys (FNS) & Footway Maintenance Surveys (FMS)

Footway Network Surveys and Footway Maintenance Surveys have been developed as network level tools to enable rapid assessment and comparison of footway condition to be undertaken. Standard FNS utilises four condition levels (as new, aesthetically impaired, functionally impaired, structurally unsound) to assess footway condition for asset management purposes, and the collated data can also assist in identifying sites for further investigation by DVI or site visits by highway engineers.

Defect cause information, surface inventory type, footway inventory measurements, and lateral extent of defects can also be recorded in enhanced surveys such as FMS to further the value of assessments undertaken, and to support forward works programming and maintenance decisions.

Walked inspections such as DVI, FNS and FMS can overcome the limitations of making off-carriageway condition assessments using vehicle- and video-based technology, where visibility can be impacted by image quality issues, and physical obstructions such as parked cars and pedestrians.

Detailed Visual Inspections (DVI)

DVI is undertaken on foot by a UKPMS accredited inspector using a hand-held data collection device and calibrated measurement wheel. XAIS-PTS have a dedicated team of UKPMS accredited inspectors that can deliver detailed inspections across off-carriageway paved infrastructure assets such as footways and cycleways.

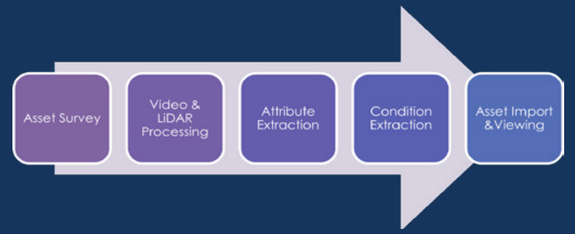
Asset management support services also include:

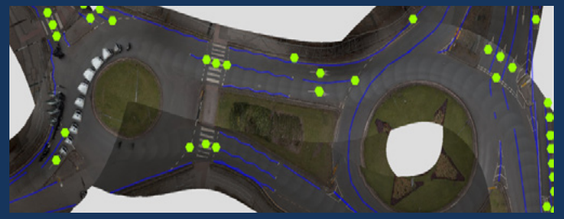
- BVPI 187 reporting & FNS Headline Indicator
- Maintenance scheme recommendation
- Value management workshops to support scheme prioritisation
- GIS condition mapping and analysis

ASSET INVENTORY

The CIPFA Code of Practice and Highways Infrastructure Asset Management Guidance both highlight a need for condition data to be available across all infrastructure assets including carriageways, footways, and other assets such as street lighting, structures, and road markings. A complete asset register is a fundamental part of being able to produce Gross Replacement Costs (GRC), Depreciated Replacement Costs (DRC), and life cycle plans.

Through our iV 360˚ video surveys, we collate detailed asset inventory data, which can supplement our comprehensive carriageway and footway condition assessments.



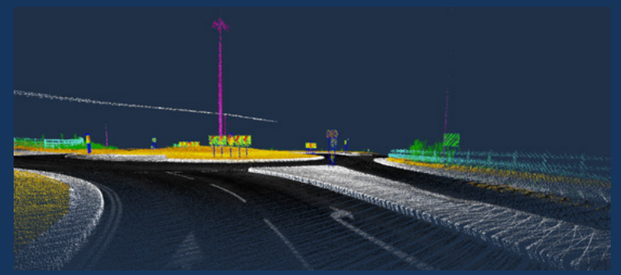


LiDAR Point Cloud Applications

Our 360˚ vehicles are also fitted with advanced LiDAR scanners, which automatically record and collect detailed point cloud data. This technology can produce a highly accurate 3D point cloud representation of the entire infrastructure network covering all visible assets.

Detailed data on road geometry can be delivered as part of scheme level surveys or major highway improvements, with data supporting design initiatives.

We also deliver precise measurements for bridge heights, clearance profiles, as well as the geometry of road signs, safety barriers (VRS), embankments, drainage, road markings and more.



SITE INVESTIGATIONS & ASSURANCE

In addition to our comprehensive range of asset management surveys, we also complete detailed site investigations in relation to structures and network safety management.

Structures Asset Management

Highway structures provide key links for communities to emergency services, health care, education, shops and jobs. Any unplanned or emergency works, closures or restrictions to highway structures cause large-scale disruption to traffic and public transport networks, having a significant impact on local and regional economies and access to services.

In addition to the significant impacts on local and regional economies and access to services, the cost of urgent repairs can rapidly escalate – burdening local authorities with the need to find significant funds at a time when budgets are increasingly constrained.

To support asset managers, we offer a structures management package built around 4 key areas:

- Structures review
- Data collection
- Works programming & scheme management
- Data analysis & improvement planning

Through this comprehensive works package, and use of our accredited XA© system, we can incorporate all assets managed by your structures team, which traditionally includes bridges, retaining walls, culverts, masts, tunnels and subways, but can also include flood assets such as chambers, manholes, walls, embankments or various street furniture items.

Structures Review

The first part of any improvement plan is an honest assessment of the current position. A Structures review will focus on understanding existing processes and available information to give a clear picture of where to focus initial efforts.

We deliver:

- Structures review workshops
- Data technician support
- Structures GAP analysis reporting
- Structures asset management / data management
- Policy / strategy review.

Works Programming & Scheme Management

Having the most effective systems, strategy, and data now means that putting prioritised programmes of work together becomes much simpler and accurate against budgets.

All programme and scheme development are overseen by a qualified chartered structural engineer. Services include:

- Short term planning in the form of prioritised inspection led works programmes
- XA© Scheme Assembler module
- Asset valuation.

Data Collection

We can facilitate both the management and undertaking of bridge inspections to assist in structures management. Our service includes on-site inspections, inventory collection, and engineering support. Our end-to-end survey solutions incorporate:

- Data technician support
- Bridge inspections (General / Principal)
- Chartered engineer oversight
- Bridge inspection competency training
- XA© asset management & XA© mobile software support
- Innovative 360˚ video & LiDAR collection methods.

Data Analysis & Improvement Planning

By using structures deterioration modelling – developed by the University of Nottingham and XAIS-PTS – we can help you use inspection data to underpin effective life cycle planning, with an indication given of future works requirements and costs. Our service enhancements include:

- XA© life cycle planning
- Bridge deterioration modelling
- Condition & budget projections resulting in 120 year assessments
- Asset management strategy workshops
- Performance management workshops.

Skid Assessment Lengths (SALs)

Network safety management is not only dependent on dedicated surveys such as SCRIM® and GripTester, which assess surface skid resistance properties, but also on completing contextual analysis of the data.

A Skid Assessment Length (SAL) forms the basis of more detailed network safety investigations, which can be undertaken in accordance with CS 229 and the LASR approach depending on your local requirements.

SALs give consideration to road surface material and condition, road users and layout, site gradient and curvature, drainage characteristics, signage and line markings, historic maintenance and STATS information.

SITE INVESTIGATION

1 General	
Is the site affected by trees/ vegetation?	No
Is there evidence of crash damage or heavy braking (ie Skid marks)?	No
Is there evidence of past patching repairs/ pothole fillings?	Yes
Majority Suface Type	HRA

2 Site Details	
Are Road Markings ie stop lines, clearly visible? (due to wear not leaves, etc)	No
Are Road Signs clear, visible and easily understood?	Yes
Is >50% of the Centre Line Longitudinal Road Markings clearly visible? (Due to wear not leaves, etc)	Yes
Is there poor advance visibility? (Cannot see event from 100m in either direction/ Complicated Turning/ Sudden stopping)	No

3 Condition Details	
Does the site exhibit >15% loss of HFS within the wheel paths/braking zone?	No
Does the site exhibit Fatting/Polishing/Minor Fretting within the wheel paths/ braking zone?	Yes (15-75%)
Does the site exhibit MAJOR Fretting within the Surface Course?	No
Is there Deformation/Pushing of Material?	No

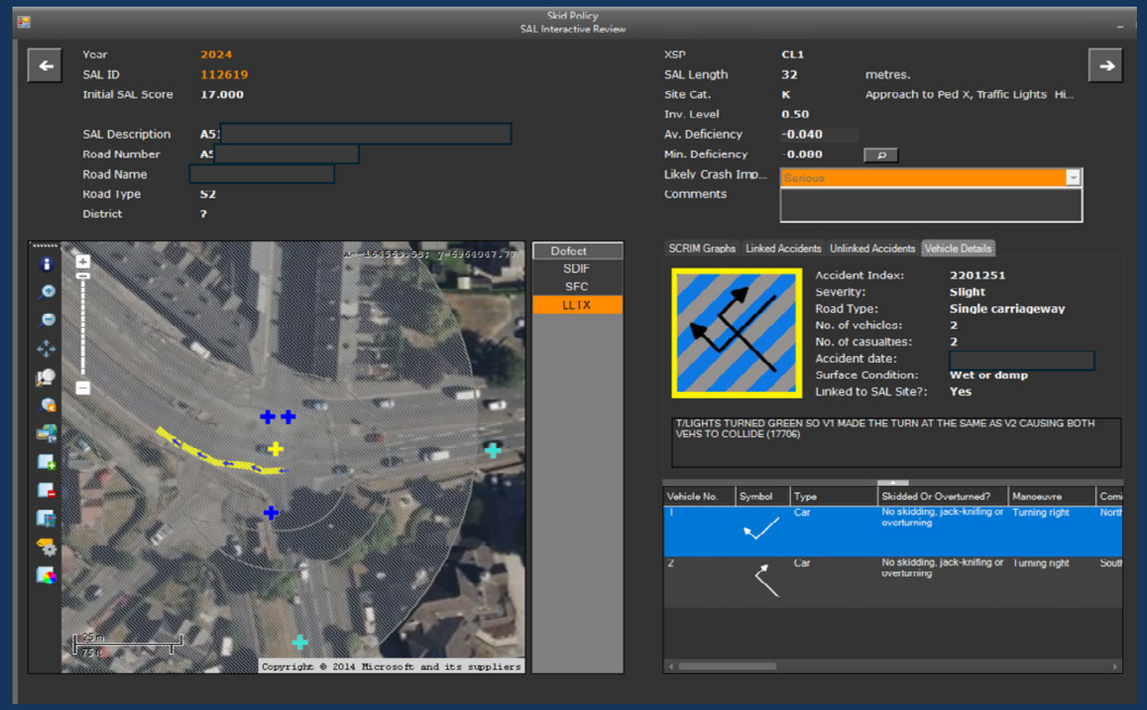
4 Visual Assessment	
Is there Contamination (eg Detritus) on the road surface?	No
Is there evidence of standing water NOT drainage related? (ie Rutting/Settlement)	No
Is there evidence of the drainage system not working? (ie Blocked drains)	No

5 Road Users and Layout	
Does the site have shared use? (ie Bus or cycle lane)	No
Is Queuing/ Standing traffic likely at any time? (including Peak hours)	Yes
Is there sufficient space? (ie lane width >2.7m /Damaged Kerbs present)	Yes

6 Additional Information	
Is there presence of existing slippery road signs?	No
Is there presence of Lay-bys or other access (ie property/field access)?	Yes
Is there presence of Traffic Signal Induction Loops?	No

Our comprehensive detailed investigations deliver the following:

- Collision reviews - we undertake detailed collision reviews to understand the route cause of recorded accidents, which in turn feed into maintenance prioritisation
- Processing of detailed investigations (SALs) to produce prioritised treatments / actions in line with client skid policies and procedures
- Access to XA© software and results through a cloud application
- Final client handover session / basic training in XA© and interpreting the results.



"We deliver industry-leading infrastructure surveys using a wide variety of innovative and industry compliant technologies, and it is our goal to lead in the future development of asset management survey technology. Through complementary asset management software and support services, we also deliver bespoke survey solutions, which maximises value for our clients."

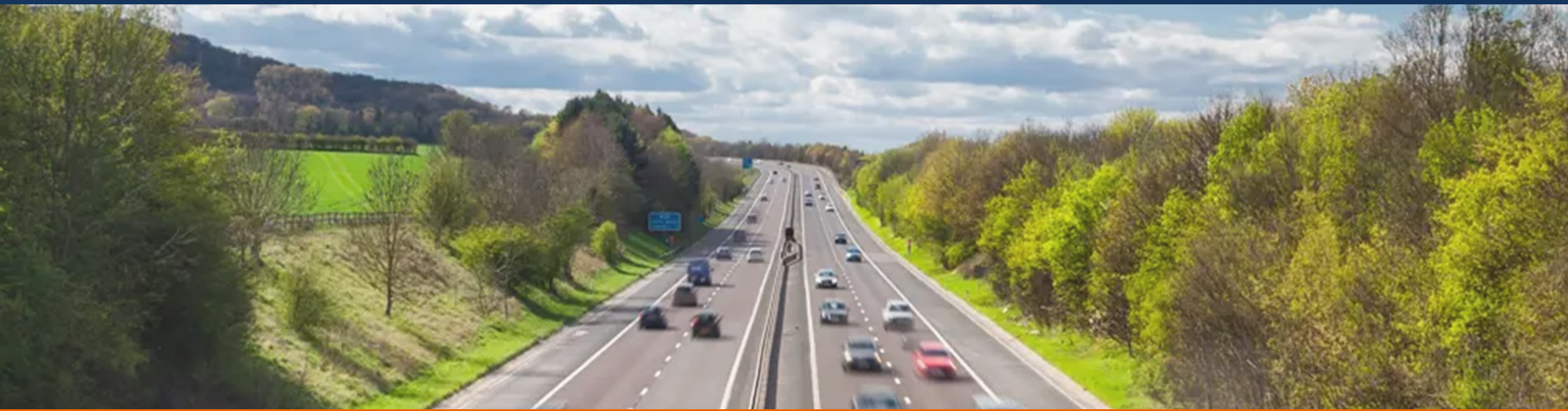
ROBERT FOX BSC MSC
XAIS-PTS COMMERCIAL DIRECTOR

GET HELP FROM THE EXPERTS

Our asset management survey services are built on more than 150 years of senior asset management experience underpinned by experts in survey technology, UKPMS, and pavement engineering.

We offer asset infrastructure surveying solutions to meet your needs and budgets, and we will work collaboratively with you to identify the optimum solution.

So, if you need help with assessing and managing your infrastructure assets, contact our team today on **01772 792899** or send an email to: **sales@xais-pts.co.uk**



To learn more about our wider services, scan the QR codes below to see the following brochures:

MATERIALS TESTING & CERTIFICATION

ASSET MANAGEMENT SOFTWARE

ASSET MANAGEMENT SERVICES

PROGRAMME DEVELOPMENT, FEASIBILITY & ASSURANCE, DESIGN & DELIVERY

XAIS-PTS
INFRASTRUCTURE ASSET AND PAVEMENT SOLUTIONS
A PHENNA GROUP COMPANY

info@xais-pts.co.uk | www.xais-pts.co.uk