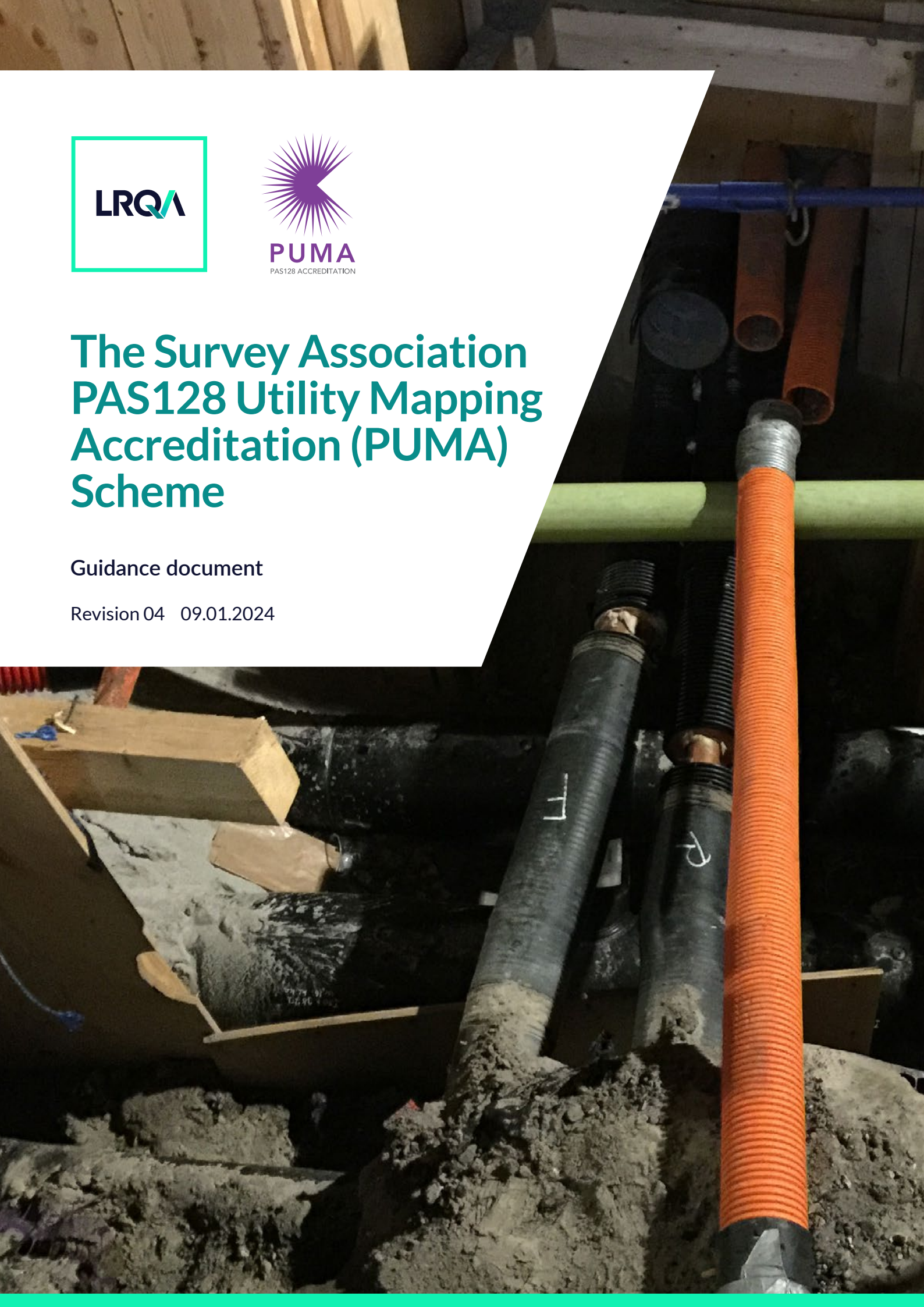

The Survey Association PAS128 Utility Mapping Accreditation (PUMA) Scheme

Guidance document

Revision 04 09.01.2024

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PUMA
PAS128 ACCREDITATION

1. Introduction and Purpose

The purpose of this document is to provide details of the requirements to be satisfied to achieve accreditation under The Survey Association's PAS128 Utility Mapping Accreditation Scheme.

The Scheme has been jointly developed by The Survey Association (TSA) and LRQA in consultation with the Survey companies that participated in the pilot process.

Accreditation under the Scheme demonstrates compliance with PAS 128:2022 and the implementation of good practice in terms of risk management, competency management, transparency of process and organisational efficiency in the delivery of the specific scope for which accreditation was awarded.

This document sets out the requirements a TSA Member must meet to be deemed as conforming and achieve accreditation status under the Scheme. It also details the route to achieving accreditation status from application through the audit stages and the post award surveillance programme.

The purpose of the Scheme is to differentiate between accredited TSA members and other competitor companies and to highlight to the client organisations that accreditation under the scheme provides assurance of consistent standards of service and product accuracy.

1.1 Definitions – Explanation of terminology

Term	Explanation
Accreditation	Accreditation is the external recognition of adherence to a set of standards to perform an activity, which in the context of the TSA scheme is scopes A, B, C and D
Accreditation Body	The organisation that accredits TSA Members under the TSA Accreditation Scheme based upon the assessment reports produced by the independent Accreditation Body
Accreditation Certificate	A certificate awarded to the assessed TSA Member by the Accreditation Body following verification of conformity to PAS 128:2022 and Scheme Requirements
Accreditation Validity	Accreditation is valid for a term of three years
Accredited TSA Member	Any TSA Member that has been assessed in accordance with the Scheme as conforming and has been issued with a valid and current Accreditation Certificate
Assessment	Objective and detailed evaluation of a TSA Member to determine their conformity with the scheme criteria
Key Performance Indicators	Set of quantifiable measurements used to gauge scheme performance
Milestones	Schedules agreed for the closure of gaps identified during an assessment or the achievement of targets agreed at the audit stage to demonstrate continuous improvement throughout the approval validity period
Deficiencies	The identified absence of, or a failure to implement or maintain, one or more of the minimum criteria against which approval may be granted. The deficiency will be classified as either a major or minor deficiency as defined in 1.3
Scheme	The general requirements of the Scheme as defined in this document

1.2 Abbreviations

TSA	The Survey Association
PUMA Scheme	PAS128 Utility Mapping Accreditation Scheme
BSI	British Standards Institute
PAS128	Publicly Available Specification 128
KPIs	Key Performance Indicators

1.3 Mandatory/ Non-mandatory terms

In this document the following terms have the stated meanings.

Shall: Indicates a mandatory requirement

Should: Indicates a strong preference and is used to denote best practice or where a new requirement is being introduced

May: Indicates an option which is not mandatory

1.4 Definitions of major and minor deficiencies

Major deficiencies occur where there is:

- Objective evidence that demonstrates that an element from the Scheme requirements has not been documented, implemented, or maintained
- Repetitive failures (product quality or systems) or multiple minor deficiencies in a single category
- Significant numbers of minor deficiencies
- Action not taken to close previously identified minor deficiencies within agreed timescales or to meet the milestone goals set at the time of approval
- Use of unsafe working practices
- Performing work that is outside the registered scope(s).

Minor deficiencies occur where there is:

- Objective evidence that there is a weak element within the management system, procedure or control for the effective implementation and maintenance of the Scheme requirements
- Isolated cases of deficiencies to procedures

1.5 Additional findings classifications

Observation – this is a finding that is outside the scope of PAS 128:2022 but falls short of 'good practice.'

1.6 Scheme Description

The Scheme comprises:

- An office systems audit (stage 1)
- A site implementation audit (stage 2)
- Post approved status surveillance programme

Accreditation under TSA PUMA Scheme provides an assurance of the:

- Execution of a methodology that supports the efficient production of an accurate fully compliant deliverable, which meets clients' expectations
- Implementation of a comprehensive risk management process
- Competence of the participating specialists involved in the risk management process
- Robustness of the systems to identify and mitigate hazards ensuring the safety of operational personnel and the public is protected
- Consistent standards that are achieved and maintained across all participating TSA Members throughout the accreditation validity
- Interaction with the client throughout the project/contract stages and the ongoing dissemination of reliable and accurate information
- Benchmarking of standards, which promotes and raises the professional reputation of participating TSA Members and their staff

The Scheme is operated by LRQA acting as the independent accreditation body. However, the scheme, associated guidance and defined audit process is owned by TSA who also serve as Scheme Governance. The relationship between the parties is defined in the Memorandum of Understanding which can be accessed **here**.

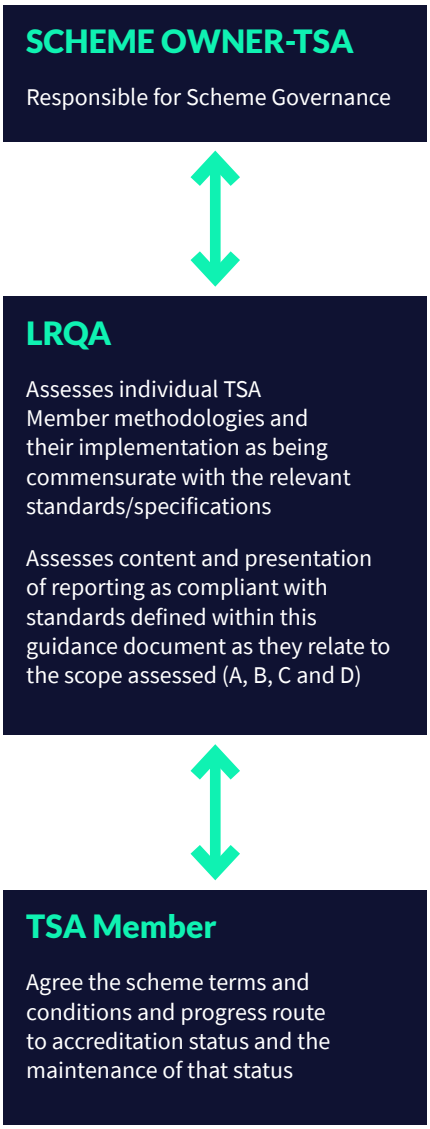


Figure 1 Defines the relationship between the Scheme stakeholders

1.7 Responsibilities

Accreditation under the scheme is a demonstration that a TSA Member has established the systems, procedures and competencies needed for the consistent delivery of services that fully meet client expectations.

An essential feature of the accreditation process is the assurance that procedures and practices, against which accreditation has been awarded, are consistently applied and maintained by the TSA Member. This is ensured throughout the approval period by the implementation of a surveillance visit programme.

To support and maintain the approval process, TSA Members and LRQA are required to work in the ways outlined below.

LRQA as the Accreditation Body:

In operating the scheme, LRQA shall:

- Conduct evaluations against the scheme requirements in a technically competent and objective manner
- In conjunction with TSA, arrange training for assessors involved in the TSA scheme on survey processes
- Adopt a pragmatic but consistent approach to the evaluation of scheme standards as defined by PAS 128:2022 and this document to validate the TSA member methodology
- Establish conformity to scheme requirements through evidence-based evaluation comprising procedural review, assessment of project data and deliverables, and effective implementation of PAS128 methodologies, determined through observation and demonstration as applicable
- Measure scheme performance against defined KPIs and report regularly to TSA Governance Committee
- Endeavour to respect TSA Member business constraints
- Ensure any information determined in respect of TSA Members' commercial business interests is treated in confidence and not passed to any third party with the exception of the scheme owner
- Maintain a publicly available register of PUMA Accredited TSA Members

TSA Member:

Develop and maintain processes, competency and working practices that are compliant with the following:

- The requirements of PAS 128:2022
- An organogram with defined roles and responsibilities of all key operational staff and management
- A competency assessment process supporting a competency matrix, which is aligned to job descriptions
- An integrated risk management process incorporating a generic risk register, contract/project specific risk register and site-specific risk register reviewed and updated daily
- Processes that provide for consistent quality, performance monitoring and opportunities for improvement. These shall incorporate HSE and technical audit and measurement of service quality; the establishment of a link between audit checks and identified risks and the identification and implementation of opportunities for improvement

1.8 Scheme Process

TSA members wishing to apply for PUMA Scheme Accreditation are required to apply to LRQA, the Accreditation Body through the application form on the Scheme page on the LRQA website. A commercial contract will be established between the applicant and LRQA.

Once the contract between the applicant and LRQA has been established, the applicant will be contacted by the LRQA-appointed assessor to arrange a date for the office system audit, which represents the first stage of the PUMA scheme.

Office System Audit

The office system audit represents an audit of the applicant's management systems for compliance with PAS 128:2022 deliverables (site data, reports, drawings etc.) and this document. The office system audit agenda will be issued to the applicant a minimum of 14 working days prior to the due date.

The applicant shall provide a list of at least ten PAS128 compliant projects to LRQA a minimum of seven working days prior to the site audit due date. A sample of these projects will be used to check evidence for compliance with the requirements of PAS128 and all data associated with these projects must be available for review by the LRQA assessor on the day(s) of the audit.

The applicant should prepare the information indicated on the office systems audit checklist in advance of the system audit so that it can be easily referenced by the assessor on the day of the audit. Failure to do this may result in additional time being required and additional audit fees.

The audit is usually limited to one day and feedback is provided both verbally, at the close-out meeting, and by way of a report which details the findings log and categorises the findings in terms of major deficiencies, minor deficiencies etc. as defined in section 1.3. Evidence will be required during this stage of the audit through the provision of current and archived project files to demonstrate appropriate implementation of the documented systems presented.

If major deficiencies have been identified, then the applicant will be required to confirm their closure prior to arrangements being made for the site audit. If no significant deficiencies are identified, then arrangements for the site audit may be agreed with the assessor at the office system close-out meeting.

Site Audit

Upon receiving confirmation of the closure of major deficiencies identified during the office system audit from the TSA member under assessment, the LRQA assessor will agree a date for the commencement of the site audit to ensure comprehensive implementation of the processes, systems and competencies presented during the office systems audit.

An outline of the agenda for the site visit will be confirmed at the conclusion of stage 1 and will define specific areas to be covered as well as potential sites to be visited. It will be issued to the TSA Member under assessment a minimum of seven working days before the agreed commencement date.

The audit will be evidence-based and will verify that the TSA Member under assessment has established the appropriate interfaces with the client and has fully implemented all processes etc, as described during the office system audit, and is in full conformity with this document.

The close-out of the site audit will follow a similar format to the office system audit with verbal feedback as to findings, followed by a report with an update of the findings log produced following stage 1 and a recommendation as to conformity and potential accreditation.

The report will be issued within twenty working days of the completion of the audit. If the review of the audit report by the review panel supports the recommendation for accreditation an accreditation certificate will be issued by LRQA and the PUMA Scheme page on the LRQA website will be updated to reflect the new-found status of the TSA Member.

Surveillance Programme

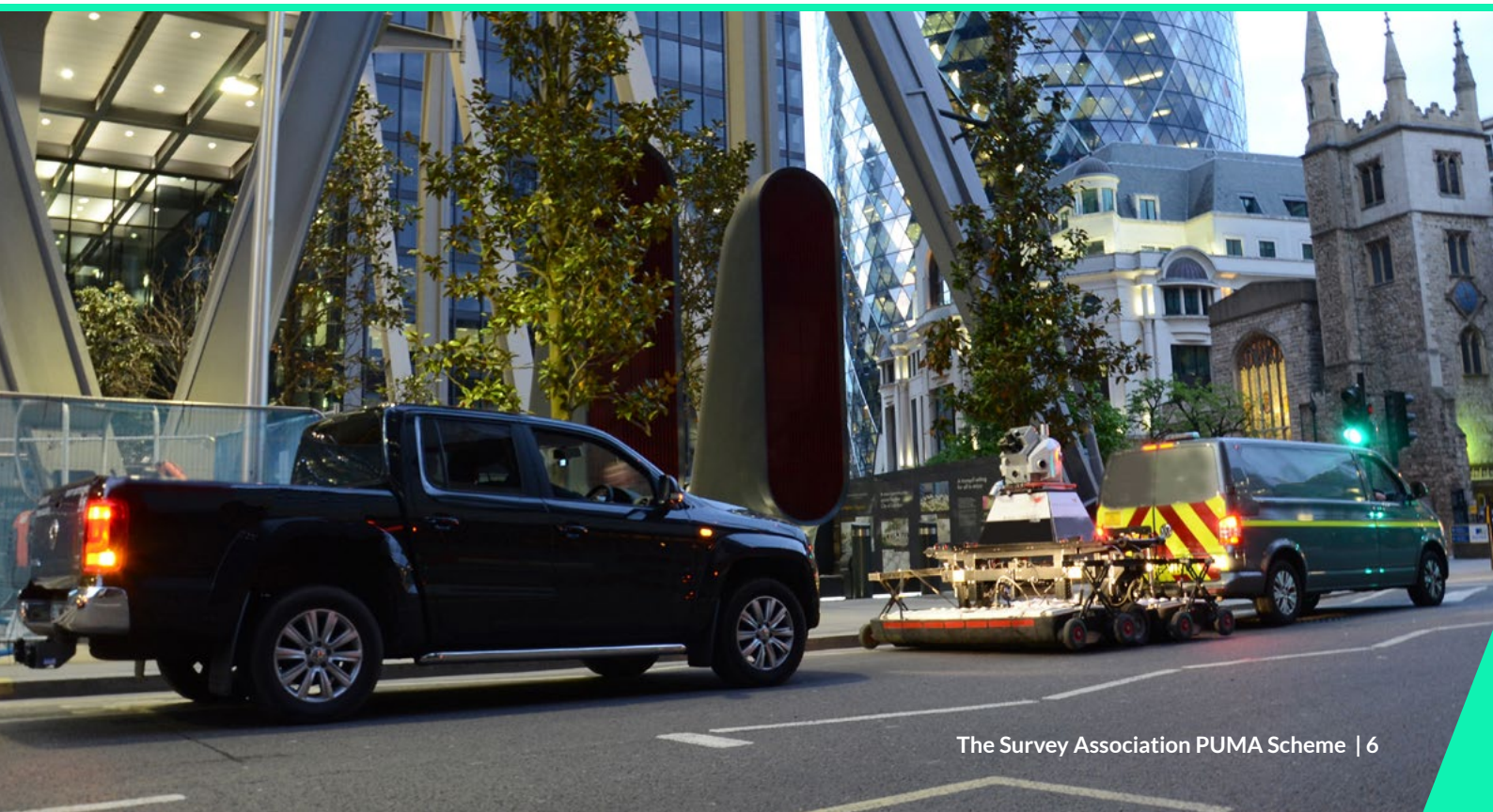
Following accreditation, LRQA will institute a surveillance programme to ensure that the standards, processes, and systems against which accreditation was granted are maintained through the 3-year validity of accreditation.

The frequency of visits under the surveillance programme will depend upon a number of variables and will be agreed with the accredited TSA member but will typically represent one per year, however if major deficiencies are identified during a surveillance visit then a follow-up visit may be required to close out the findings and a more frequent surveillance programme may be justified.

The commercial contract with LRQA established at the application stage will incorporate the surveillance programme. Surveillance visit reporting will comprise the updating of the findings log developed during the stage 1 and 2 of the initial assessment and will provide an ongoing audit trail of the Accredited TSA Member's performance.

An agenda will be issued by LRQA to the Accredited TSA member a minimum of seven working days prior to the surveillance visit due date.

The Accredited TSA Member must provide a list of a minimum of five PAS128 compliant projects, which should be available for the auditor to examine as required on the day of the surveillance visit. An inability to provide sufficient example projects will be classed as a major deficiency and may result in the suspension of the accreditation in the absence of any acceptable explanatory factors.



2. Suspension and Re-approval

Accreditation shall be subject to cancellation or amendment by LRQA if the Accredited TSA Member:

- Is found to have made false claims within the application for approval, which are considered to impact on the integrity of the company's operations
- Does not implement within 28 days remedial actions needed to rectify a major or series of minor deficiencies to the satisfaction of LRQA
- Implements corrective action that is subsequently found to have been inadequate to prevent a reoccurrence (at any location) of recently identified major deficiencies
- Is found to continually fail to maintain safe systems of working and has working practices that result in their workforce or others being exposed to danger or serious risk of injury through faulty workmanship, working practices, faulty materials or materials not conforming to recognised standards
- Undertakes work below the standard required and demonstrates a lack of commitment to achieve the required standard or is unable to continue to comply with the criteria set out in the scheme requirements
- Notifies TSA that they no longer wish to maintain their membership

LRQA shall notify the TSA member and TSA in writing of the intention to cancel approval, fully detailing the reasons for such action. Normally, unless the nature of the deficiency merits immediate action or is a reoccurrence of a recently closed deficiency, the process will comprise two stages:

- Stage 1: The accredited TSA member will be notified that their accreditation is being suspended and given a limited time to address the deficiencies giving rise to the suspension.
- Stage 2: If the deficiencies are not satisfactorily addressed during the allotted time and steps are not taken to prevent a reoccurrence to the satisfaction of LRQA, then TSA will be notified of the circumstances and the intent to withdraw accreditation. If TSA concur, then accreditation will be cancelled.
- Once accreditation has been cancelled re-establishing accreditation will be subject to a full re-assessment of the TSA Member.

2.1 Appeals, Complaints and Disputes concerning Approval

If the accredited TSA Member wishes to object to action taken, including withdrawal of accreditation, they shall, within twenty-one days of the issue of the notification to them, give notice in writing to LRQA and TSA of their objections setting out clearly the grounds for an appeal.

Any such appeal will be assessed by a panel within LRQA, independent of the assessors associated with the original withdrawal action.

The results of the review will be communicated to TSA for review prior to communicating with the TSA member. If the TSA review does not support the LRQA panel's finding, then a consensus view and outcome will be established prior to communicating the outcome to the TSA Member.

If the appeals process finds the approval withdrawal to be the correct course of action, then re-instatement of the TSA Member would entail a full re-assessment.

2.2 Scheme Management review

LRQA and TSA will hold a meeting or teleconference at six-monthly intervals following the scheme launch to discuss issues arising and lessons learned from the initial scheme assessments with a view to provide continuous improvement of the process and coordination of scheme delivery.

The first 360-degree feedback session incorporating all accredited TSA Members involved in the scheme to date, will be held within the first year following scheme launch. The purpose of which, will be to refine the guidance document and associated assessment process as may be necessary.

2.3 Scheme KPIs

- A scheme proposal shall be issued within 5 working days of receipt of an expression of interest/request for a quote which includes sufficient information to enable proposal development.
- The assignment of a scheme assessor shall take place within 5 working days of receipt of a signed proposal and PO number.
- The assigned scheme assessor shall contact the TSA Member to arrange the stage 1 assessment within 5 working days of receipt of the assignment.
- The date of the stage 1 assessment shall depend upon mutual availability but should typically take place within one month from the assessor initial contact with the TSA Member.
- The report of the stage 1 assessment shall be issued to the TSA Member within 10 working days of the assessment date.
- Arrangements for the stage 2 assessment will be dependent upon the extent and nature of the findings from stage 1 but as a minimum will require confirmation of all reported major deficiencies and most minor deficiencies to have been addressed, prior to a date being finalised.
- The stage 2 assessment report shall be issued to the TSA Member within 10 working days of a successful assessment.
- All stage 2 reports shall be issued to TSA for review by the Scheme Governance Committee as required.

Appendix:
PUMA Scheme Checklist

	LRQA, UK Industry Utilities Group Publicly Available Specification 128: 2022	
	Initial Office Evaluation of:	
	Provider Reference No:	
	Date:	Report Nº

Company Name:	
Contact Name:	
Telephone Numbers:	
Email Address	
Evaluation Date/s:	
Assessors	

SESSION 1 – Opening Meeting

			YES	NO
1.1	Confirm Assessment Agenda and establish understanding of and purpose of the pilot assessment.			
1.1.1	Confirm range of survey activities being performed			
1.1.2	Who is providing input to assessment?			
	Name	Title		
Comments				

SECTION 1: SUMMARY FINDINGS			
This summarises the number of deficiencies identified within each section of the report:			
Section Ref		*Major Deficiencies*	*Minor Deficiencies*
1	Opening Meeting		
2	Organisation Structure	0	0
3	Role Competency Requirements	0	0
4	Risk Identification, Assessment and Control	0	0
5	Quality, Performance Monitoring and Improvement.	0	0
6	Review against PAS 128 checklist		
	4.1 – Documentation	0	0
	4.2 – Utility Records	0	0
	4.3 - Base mapping	0	0
	4.4 - Other buried features and obstructions	0	0
	4.5 - Geology of the site	0	0

	4.6 - Meetings and site visits	0	0
	5 - Quality level	0	0
	6 - Desktop utility records search (survey type D)	0	0
	7 - Site reconnaissance (Survey type C)	0	0
	8 - Detection (survey type B)	0	0
	9 - Verification (survey type A)	0	0
	10 - Location	0	0
	11 - Deliverables	0	0
Conclusions and Recommendations			

SESSION 2 – Organisation Structure

		YES	NO
2.1	Is the survey contractor a member of a recognised institution or trade association such as, RICS, ICES, TSA or the European GPR Association		
2.1.1	Does the contractor have accreditation from an organisation such as		
	• The Contractors Health and Safety Assessment Scheme (CHAS),		
	• Construction Line –		
	• Achilles, -		
	• Safe Contractor and Builders Profile.		
	• SMAS		
2.1.2	Insurance Details • Public Liability • Employer Liability • Professional Indemnity Etc		
2.2	Organisation		
2.2.1	Organisational structure		
2.2.2	Key Responsibilities for service delivery		
2.2.3	Business model re full time staff vs subcontractors		
2.2.4	Is a formal quality management system in place (ISO 9001:2015)?		
Comments			

A	**Major Deficiencies Identified: None**
B	**Minor Deficiencies Identified: None**

	LRQA, UK Industry Utilities Group Publicly Available Specification 128: 2022	
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SESSION 3 – Training Qualifications and Competency

		YES	NO
3.1	Role Definitions		
3.1.1	Review and demonstration of existing competency assessment and training process/requirements.		
	• New Roads and Street Works Act 1991 (NRSWA) qualification for working in highways. (minimum one supervisor to hold NRSWA card)		
	• Construction Skills Certificate Scheme (CSCS) qualification for working on construction sites		
	• Equipment and Plant training ProQual trained on individual		
	• First Aid.		
3.1.2	If lifting covers and working in and around open manholes the following hazards will apply:		
	• Confined Space		
	• Gas Detection – as part of the confined space training		
	• Manual Handling		
	• Working at Height.		
3.1.3	Survey Processing, Radar Data Interpretation and Computer-Aided Draughting		
	• In-house training		
	• External courses through approved training provider		
	• Training workshops / residentials		
	• Academic qualifications		
3.1.4	Construction Skills Certification Scheme (CSCS) at the following levels:		
	• Level 2 Diploma –		
	• Level 3 Certificate		
	• Level 4 Diploma		
	• Level 5 Diploma		
	• Level 6 Diploma		
3.1.5	Disclosure Scotland and Disclosure and Barring Service (DBS) / Security Cleared staff		
3.1.6	Induction and training processes		
3.1.7	Discussion with Trainee Surveyor and Senior Surveyor		
Comments			

A	**Major Deficiencies Identified: None**
B	**Minor Deficiencies Identified: None**

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SESSION 4 – Risk Identification, Assessment and Control

		YES	NO
4.1	Approach to risk identification and assessment.		
4.2	Use of Risk Register		
4.3	Risk Reporting Arrangements		
4.4	Project Specific Risks		
4.4.2	Do procedures require that a site-specific risk assessment and safety plan or safe system of works shall be compiled?		
4.4.3	How does your approach recognise the risk and outcomes of non-detection within the context of each individual survey?		
	How do you manage the risk of following a completely different utility than that targeted?		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

SESSION 5 – Quality, Performance Monitoring and Improvement.

		YES	NO
5.1	Performance standards and improvement strategy.		
5.2	Auditing arrangements (incl. those relating to health, safety and environment).		
5.3	Measurement and reporting of service quality.		
5.4	Link between audit checks and risk identification.		
5.5	Identification and implementation of improvement opportunities.		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

	LRQA, UK Industry Utilities Group Publicly Available Specification 128: 2022	
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SESSION 6 – Review against PAS 128 Requirements.

5.1 – General			
PAS Section		YES	NO
5	Do procedures require that Surveys shall be designed, and deliverables signed off, by a senior experienced and competent person who takes responsibility for the standard of practice and accuracy of deliverables on behalf of their organization.		
5.1.1	Do procedures require that a method statement, programme of works, risk assessment and safety plan for the survey shall be submitted to the client before commencing work on-site.		
5.1.2	Does the method statement include as a minimum?		
	• the survey type(s) to be deployed as specified in Table 1, including the estimated survey extent for each survey type.		
	• for survey type B, detection methods to be deployed as specified in Table 2, including the estimated survey extent for each method.		
	• comment on these survey type(s) and, for survey type B, detection methods, with regard to satisfying the client's requirements.		
	• comment on the expected achievable quality level.		
	• qualifications, experience and competencies of the project team including the named individual responsible for signing off the survey design and results		
	• how traffic, pedestrians, parked vehicles, bus stops, skips, animals and other surface obstructions are to be managed to maximize the area available for survey and to ensure the safe execution of the works.		
	• health, safety and security requirements and costs		
5.1.3	Do procedures require that a programme of works shall be drawn up detailing the time allowed for the fieldwork, initial reporting, client consultation, any agreed further fieldwork and submission of the deliverables.		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

5.2 – Utility Records			
		YES	NO
5.2.1	Do procedures require that for a survey type C, B or A, utility records shall be obtained through a desktop utility records search in accordance with Clause 6.		
5.2.2	Is there a time limit specified after which the desktop utility records search deliverable shall require to be considered out-of-date and new records obtained? Is **"recent"** defined?		
Comments			

	LRQA, UK Industry Utilities Group Publicly Available Specification 128: 2022	
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A	**Major Deficiencies Identified: None**
B	**Minor Deficiencies Identified: None**

5.3 – Base Mapping			
		YES	NO
5.3.1	Where existing base mapping has been obtained (in any format, e.g. drawing, electronic such as 3D-CAD/GIS/BIM models), its accuracy, currency and scale shall be assessed for its intended purpose.		
5.3.2	*If there are any obvious omissions, inaccuracies about any inherited data or doubts, or if any data are considered unsuitable, the practitioner should inform the client that a new topographic survey will need to be undertaken.*		
5.3.3	*Where Ordnance Survey data is being used, the practitioner should obtain details of an Ordnance Survey licence from the client to include on drawings.*		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

5.4 – Other Buried Features and obstruction			
		YES	NO
5.4.1	If buried feature or obstructions are discovered whilst undertaking the works, they shall be reported in accordance with [12.5.]		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

5.5 – Geology of the site			
		YES	NO
5.5.1	Any detection or verification methodologies to be used should consider the geological bedrock, natural and artificial superficial deposits and geological structures beneath the site when known.		
5.5.2	When selecting the geophysical technique, the resolution as well as depth of penetration expected in the prevailing geological bedrock should be considered along with the variability within the geological subsurface which might exert a strong influence.		
5.5.3	When selecting the method of verification, the composition, and physical properties of the subsurface shall be considered.		

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Comments	
A	**Major Deficiencies Identified: None**
B	**Minor Deficiencies Identified: None**

5.6 – Meetings and Site Visits			
		YES	NO
5.6.1	A post-fieldwork meeting shall be held to review the results in terms of the information delivered and any remaining areas of uncertainty, and to discuss whether additional fieldwork is required. The outcomes of this meeting shall be recorded. If a client declines a post-fieldwork meeting, this shall be recorded.		
5.6.2	In addition to the post-fieldwork meeting, other meetings, site visits, client visits and progress reports might be required to inform the client on progress and resolve problems as they arise		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

6 – Quality Level			
		YES	NO
6.1	The survey type(s) shall be selected from the following: a) Survey type D - desktop utility records search. b) Survey type C - site reconnaissance. c) Survey type B – detection. d) Survey type A – verification.		
6.2	The quality level achieved shall be applied to each segment of utility surveyed in accordance with Table 1. *Survey type D can only be classified as QL-Din the deliverables. Survey type C can have utility segments that are classified as QL-C or QL-D in the deliverables. Survey type B can have utility segments that are classified as QL-B1, QL-B1P, QL-B2, QL-B2P, QL-B3, QL-B3P or QL-B4 in the deliverables. Survey type A can have utility segments that are classified as QL-A in the deliverables if utility(ies) are exposed/inspected and measured.*		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

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7 - Desktop utility records search (survey type D)			
		YES	NO
7.1	**General**		
7.1.1	Survey type D shall use desktop search techniques to identify existing utility data within the survey area.		
7.1.2	The quality level achieved shall be documented as QL-D in accordance with Table 1.		
7.2	**Methodology**		
7.2.1	A desktop utility records search shall be produced by the following process: a) identify known utility owners within the specified survey area. b) request asset information from identified utility owners. c) collate all data on utility owners and their assets. *The practitioner should allow adequate time within their schedule of work to receive the responses from utility owners. A 20-day period is recommended.*		
7.2.2	The information gathered shall include as a minimum: a) company details of the practitioner carrying out survey type D. b) client details. c) a plan showing the boundary for the requested survey area. d) a list of utility owners to whom a request was sent. e) a list showing utility owner responses and actions taken to obtain response from non-responders. f) any information received from the utility owner by way of plans, maps, diagrams, or text and covering letter along with any asset guidance notes. g) the date of issue of any maps supplied by the utility owners. h) an advisory/cautionary note in BOLD explaining how this information was constructed, its limitations regarding accuracy and that no on-site survey/geophysical detecting techniques have been used.		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

8- Site reconnaissance (Survey type C)			
		YES	NO
8.1	**General**		
8.1.1	Survey type C shall comprise a site reconnaissance to identify physical features that support the existence of utilities within the survey area.		
8.1.2	Where the utility records can be matched to surface features, the quality level achieved shall be documented as QL-C in accordance with Table 1. *Where only one surface feature is identified relating to a specific utility, then the QL-C given for that segment will comprise a point on the utility. Where two or more surface features reference a specific utility, then the QL-C given for that segment will comprise a length on the utility.*		

8.1.3	Where the utility records cannot be matched to surface features, the quality level achieved shall be documented as QL-D in accordance with Table 1.		
8.2	**Methodology**		
8.2.1	Site reconnaissance shall comprise on-site visual inspection to validate the utility records and to assess if there are any conflicts that need to be resolved.		
8.2.2	On-site checks shall document: a) the presence, type, and markings of utility-related surface features (see 8.2.3). b) measurements between known surface features on the ground compared with those depicted on the plan. c) differences between the map/drawing or digital features supplied and those extant on the ground. *Documentation of on-site checks may include, but are not limited to, the mark-up and annotation of existing plans, the inclusion of supporting photographic evidence and/or a written report.*		
8.2.3	Surface features to be included in the on-site checks shall include as a minimum: a) manhole and inspection chamber covers. b) valve covers. c) utility markers. d) control and distribution pillars and columns, LV power, street lighting, traffic lights. e) historic excavation scar lines.		
8.2.4	The following shall be recorded as a minimum as evidence of work carried out, and provided in report format (see 12.1): a) site name and location. b) time and date of the site visit(s). c) weather conditions. d) the names, qualifications and experience of the survey practitioner(s). e) type of measurement methods used on site, including the model, serial number and calibration information where appropriate (e.g. total station, mobile mapping tools). f) photographs of the site and features present (e.g. trench scars, meter boxes, utility cabinets). g) a plan showing the position of photograph locations and the direction of shot. h) notes on site limitations or inaccessible areas (e.g. overgrown, immovable obstructions cars parked). i) a register of all utility records available for consultation at the time of the survey. j) a polygon representing the extents of the areas inspected. k) a digital drawing showing the statutory record information repositioned according to the site features observed during the survey. l) additional information that might be collected where required for surveys such as decommissioning surveys, etc.:		
8.2.5	Any linear feature indicative of an underground utility identified whilst on site (e.g. trench scar) shall be either followed to a node where the identity of the utility can be established or, where this is not practicable, labelled as “unknown utility” in accordance with 12.4 and presented on the digital drawing (for more information, see PAS 256).		

8.2.6	Other features that appear utility related but that cannot be identified shall be photographed and presented in the report.		
Comments			

9 - Detection (survey type B)			
		YES	NO
9.1	**General**		
9.1.1	Survey type B shall use geophysical techniques to detect and identify utilities within the survey area.		
9.1.2	The quality level achieved shall be documented as QL-B1, QL-B2, QL-B3 or QL-B4 in accordance with Table 1.		
9.1.3	If post-processing has been used to improve the confidence of the data, then each quality level shall be suffixed with the letter "P", i.e. QL-B1P, QL-B2P and QL-B3P.		
9.1.4	Where post-processing is selected as part of the detection methodology, all data which can be post-processed, shall be post-processed.		
9.2	**Methodology**		
9.2.1.1	Detection Techniques General		
9.2.1.1.19	The detection techniques shall be deployed in accordance with Table 2.		
9.2.1.1.20	A minimum of GPR and EML techniques shall be used in detecting utilities.		
9.2.1.2	**Electromagnetic locator (EML)**		
	EML shall be deployed in accordance with Table 2. and the following requirements. a) A signal generator shall be used to attempt to apply a signal onto buried services from the surface or directly where accessible, e.g. via an inspection cover or hatch using clamps/clips b) Each duct/cable in a bank of ducts shall be individually traced using appropriate survey technique to ensure they don't diverge from each other. c) Where a duct/cable or pipe (including drains/sewers) cannot be traced using other active EML methods and a line threader or sonde can be used, it shall be used. d) Passive EML shall then be deployed across the whole site to look for additional utilities once all other EML techniques have been completed		
9.2.1.3	**Ground penetrating radar (GPR)**		
9.2.1.3.1	GPR shall be deployed in accordance with Table 2.		
9.2.1.3.2	For a multiple antenna array, the following requirements shall be met. a) The collection regime for any and all array use shall be maintained throughout the survey area ensuring that any gap between swaths is no larger than the transect spacing specified in Table 2, including any gaps caused by access around kerbs, pavements, street furniture etc. [see d)].		

	b) Survey speed shall be selected such that it allows sufficient density of recorded data in the direction of travel to confidently resolve reflections from the buried utilities that the survey is designed to detect. c) Positioning of the array shall be recorded using either GNSS or total station so that the survey transect can be georeferenced at an absolute accuracy of ≤100 mm. d) Where a large (typically vehicle-towed) multiple antenna array cannot achieve full coverage over the whole survey area due to limited access, an alternative GPR system shall be used to infill where possible. All infill areas covered by alternative GPR means and those that could not be covered at all shall be clearly marked on the deliverable drawing.		
9.2.1.4	**Other technologies**		
9.2.1.4.1	Where any of the geophysical detection technologies given in Table 3 are proposed for use in place of GPR or EML these shall be clearly justified in the method statement with reference to the objectives of the survey, the relative benefits of the proposed technology at the specific site and the environmental and ground conditions understood or expected to be present.		
9.2.1.4.2	The GPR, EML and any other geophysical equipment shall be operated in accordance with the manufacturer's instruction procedures, calibration and any equipment process or limitations.		
9.2.1.4.3	The following shall be recorded as a minimum as evidence of work carried out a) site name and location; b) time and date of the site interpretation; c) detection techniques used, including the model and serial number of equipment; d) weather conditions; e) the names, qualification and experience of the operator(s); f) calibration method and calibration data obtained; g) modes of detection for each geophysical survey instrument used; h) photographs of the site (e.g. of on-site mark out, obstructions); i) notes on site limitations (e.g. overgrown); j) utility records available at time of the survey; k) a polygon representing where any search sweep has been undertaken; l) all geophysical data (including all GPR data whether post-processed or not) together with the accurate georeferenced location of data (lines or grids as appropriate to the survey design); m) where data analysis (post-processing) is not employed, the coordinate at any point where a utility has been detected and marked on the ground; and n) EML data and locations where the instrumentation used has this capability.		
9.2.1.4.4	Any linear feature identified in the data whilst on site shall be either followed to a node where the identity of the feature can be established or, where this is not practicable, labelled as "unknown utility" or "unknown GPR linear" in accordance with 12.4 (for more information see PAS 256).		

9.2.1.4.5	Where post-processing has been employed, the results of the data interpretation shall be presented on drawings with a “P” after the QL-B1, QL-B2 or QL-B3, e.g. QL-B1P		
9.2.1.4.6	Where post-processing has not been employed, the data shall be marked out on site in accordance with 9.2.2. Where no post-processing has been carried out, a “P” shall not be used on the segment of utility assigned a QL-B code.		
9.2.2	Marking out detected utilities and survey grids whilst on-site		
9.2.2.1	Where wooden pegs are used, they shall be offset and placed to one side of the horizontal position of the utility. This offset shall be made clear by annotating the peg		
9.2.2.2	The type of the utility shall be marked using an agreed letter code and/or colour		
9.2.2.3	Depth estimations shall be marked on the ground in metres followed by "d" to indicate depth (e.g. 0.95d - this indicates that the utility has an estimated depth of 0.95 m).		
9.2.2.4	Where paint is used, it shall be temporary and water-soluble, unless the client instructs otherwise in writing		
9.2.2.5	Steel pins, spikes or long pegs shall not be used to mark out detected utilities.		
9.2.2.6	The marks representing the detection of the utility shall: a) depict the alignment of the utility at the scale of capture. b) include a mark at each change in direction, each junction and each point of termination. Parallel utilities shall be marked up with their paint lines adjacent wherever possible		
9.2.2.7	The time between marking out and the recording of its location shall not exceed 48 hours.		
9.2.2.8	High pressure pipelines shall be marked up in accordance with the utility owner/operator's instructions.		
9.2.3	Where the survey detects anomalies other than those caused by utilities, these shall be recorded as specified in 11.5. *The use of geophysics might detect anomalies, often referred to as radar anomalies, that are the result of buried features other than utilities. This is particularly true of GPR.* *The types of features that may be detected include but are not limited to:* • *voids.* • *foundations.* • *thrust blocks.* • *tanks.* • *chambers.* • *basement extents.* • *ducts (not linked to any street furniture).* • *reinforced concrete.* *Evidence: Survey drawings detailing GPR features, survey reports discussing results.*		

Comments	
A	**Major Deficiencies Identified: None**
B	**Minor Deficiencies Identified: None**

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10 - Verification (survey type A)			
Verification is the process of exposing a utility and subsequently measuring and recording its accurate location as well as other relevant attributes.		YES	NO
10.1	**General**		
10.1.1	Survey type A shall comprise exposing the target utility(ies) within the survey area to confirm and record the location and other attribute data.		
10.1.2	The quality level achieved shall be documented as QL-A in accordance with Table 1.		
10.2	**Methodology**		
10.2.1	For survey type A, the data shall be obtained through visual inspection of the utility: a) at access points such as in a manhole or inspection chamber. and/or b) by its excavation and exposure. *Exposing the utility could be by any number of standard of care techniques including:* *a) vacuum excavation with pressurized air and/or water to expose the utility.* *b) hand digging techniques to expose the utility.* *c) other conventional mechanical excavation technologies used in conjunction with a) and or b).* *Exact intervals of non-destructive verifications are project dependent and should be specified by the client.*		
10.2.2	Data gathered from visual inspection at access points shall include as a minimum: a) for foul, surface and combined water drainage systems access points (manholes and inspection chambers): a. pipe positions and orientation at 'ground surface. b. visible pipe diameters. c. material type. d. pipe depths (invert levels related to a common datum). e. directions of flow. f. manhole/inspection chamber size. g. manhole/inspection chamber soffit depth and depth to base. h. connectivity diagram. i. manhole/inspection chamber layout and/or photographs. b) for telecoms/electrical utility manholes and inspection chambers: a. ducts position and orientation at ground surface. b. number and size of ducts on each face. c. material type. d. depth to top of ducts. e. manhole/inspection chamber size. f. depth to base. g. manhole/inspection chamber layout and/or photographs. c) for gas/water utility manholes and inspection chambers: a. depths and diameter of the utility, when visible in manhole/inspection chamber. b. valve connectivity. c. material type. d. manhole/inspection chamber layout and/or photographs.		

10.2.3	Excavations shall be: *a)* a single spot excavation (commonly known as an inspection pit, test hole or pothole) for the verification of an individual utility. *(and/or)* b) a trench excavation for the verification of multiple utilities.		
10.2.4	The location of the utility to be excavated shall be determined by: *a)* utility detection. *(and/or)* *b)* on-site utility features obtained through site reconnaissance. *(and/or)* c) utility records. *Excavation verification work should be undertaken using utility detection data (9.2.4 a) undertaken in accordance with this PAS. However, it can be undertaken using data from site reconnaissance (9.2.4 b) or a desktop utility records search (9.2.4 c).*		
10.2.5	The information gathered once the utility has been exposed shall include as a minimum, depth from top of utility to a reference point installed on the surface level. *Where safe working practices allow, the information gathered should also include:* *a) nature of utility (i.e. pipe, cable or other).* *b) configuration of multiple utility layout.* *c) diameter of utility (external diameter only).* *d) material type.* *e) backfill materials used.* *f) observation of the condition of utility.* *g) prevailing ground conditions.* *h) appropriate imagery to be captured of the exposed asset and environment - in line with the requirements of the client.*		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

11 - Location			
		YES	NO
11.1	**General**		
11.1.1	A location survey shall comprise a topographic survey to: *a)* locate topographic features to provide new mapping and/or to validate the utility data obtained through the survey type D or C. *(and/or)* *b)* locate the utility data obtained through a survey type B. *(and/or)* *c)* locate the utility data obtained through a survey type A. *(and/or)* d) locate GPR and EML transects *(and/or)* e) locate with gyro mapping *Location points identified through detection or verification should be given absolute coordinates based on a national grid and datum (e.g. OSGB36 or Irish Grid)*		

11.1.2	All topographic detail and utility location points identified via detection or verification shall be located by geospatial surveying techniques to an accuracy of ±50 mm horizontally and ±50 mm vertically, using a total station and/or real-time kinematic (RTK)global navigation satellite system (GNSS) equipment. • *The horizontal and vertical accuracies specified are equivalent to survey detail accuracy band F (or 1:200 legacy output scale) as defined in RICS specification and guidance note: Measured Surveys of Land, Buildings and Utilities [3rd Edition, 2014]* • *Examples of topographic detail that might be needed to be located include buildings, kerbs, vegetation, walls, manhole covers, inspection covers, valve covers, cabinets and traffic signals. For further guidance see RICS specification and guidance note: Measured Surveys of Land, Buildings and Utilities [3rd Edition, 2014]*		
11.1.3	All survey points located shall be referenced to a framework of survey control. The survey control shall be established using GNSS and/or via a total station traverse between survey control points.		
11.1.4	Where the framework of survey control uses a local site grid, the local site grid shall be referenced to a national grid and datum (e.g. OSGB36 or Irish Grid) which shall be recorded in the project's survey control report.		
11.1.5	Where the use of geospatial surveying instruments is restricted due to insufficient satellite signals or obstruction to line of sight, measuring tapes or electronic distance measuring tools shall be used for infill surveys.		
11.1.6	Three-dimensional coordinates shall be recorded for all identified utility location points. Where no depth or an uncertain depth reading is obtained, a null level shall be recorded.		
11.2	**Total station and global navigation satellite systems (GNSS)**		
11.2.1	The total station or GNSS system shall be used in accordance with the manufacturers' instructions, procedures, calibration and any instrument or process limitations.		
11.2.2	All survey points shall be either: *a)* stored digitally within the total station or GNSS system as coded detail points for post-processing. *(or)* b) plotted directly onto digital drawings on-site using a precision mobile system for data collection.		
11.2.3	The survey detail pole shall be held vertically above the point being surveyed by reference to a plate bubble attached to the pole.		
11.2.4	The GNSS system shall be configured to work with either available GNSS correction services or a base and rover system with a post-processed base position.		
11.2.5	When using GNSS as a data collection method, this shall be used in accordance with *Replace with: RICS Guidance Note: Guidelines for the use of GNSS in Surveying and Mapping (2nd Edition, 2010)*		
11.3	**Measuring tapes and electronic distance measuring tools** *The use of measuring tapes and electronic distance measuring tools to accurately depict positions of utilities is not recommended and should only be used for infill areas (see 10.1.5).*		

11.3.1	Measuring tapes and electronic distance measuring tools shall not be used to position a utility for distances ≥30m on ground sloping at a gradient of ≥ 10%. Where using such equipment, minimal gradient measurements or slope measurements shall be adjusted to the horizontal.		
11.3.2	Where offset measurements are used, the offset distance shall not exceed 10m or 1/3 of the length of the baseline whichever is the least.		
11.3.3	For utility location points that are >10 m from the baseline, trilateration shall be from three hard points of detail identified on the topographic base map.		
11.3.4	Measurements shall be taken to two decimal places of a metre. Baselines shall be checked and scaled for relative length between two known hard points of detail shown on the topographic base map.		
11.4	**Gyroscopic mapping**		
11.4.1	The measurement of the access points is critical to the accurate calculation of the sensor's position, and shall be precisely surveyed in accordance with a type A survey.		
11.4.2	A number of repeat measurements shall made by feeding the gyroscopic sensor between two access points multiple times in each direction. From the data acquired a statistical estimate of accuracy shall be determined from the repeatability of the measurements achieved. This repeatability shall be clearly reported in the survey deliverables.		
11.5	**Survey/mapping accuracies**		
11.5.1	Where existing base mapping data are used, checks shall be undertaken on-site to demonstrate the location accuracy of the base mapping provided. These checks shall include as a minimum: a) visual checks that features on-site are represented on the drawings provided (known as currency). b) dimensional checks of site features against those shown at scale on the drawings provided to ensure the correct scale is used when plotting points. c) instrumental checks to demonstrate the accuracy of the survey control.		
11.5.2	Use of supplied base plan survey data shall be reflected in the title block of the deliverable.		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

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12 - Deliverables			
		YES	NO
12.1	A report shall be produced and, as a minimum, contain the following: a) a description of the survey project requirements and defined survey area. b) a list of the detection methodologies used during the survey. c) survey outcomes including: a. planimetric information (see 12.2). b. metadata (see 12.3). c. a description of how successful each detection methodology proved to be and a plan showing any areas where these detection methodologies were not successful. d. a list of any utilities that would have been expected to be present that were not detectable using these detection methodologies. e. a list of buried features and obstructions other than utilities detected during the execution of the survey (see 11.5). f. plans showing all areas of conflict between record information, site information and detected utilities. g. photographs as specified or where taken to support understanding; recommendations for any further survey work provided during the execution of the works. h. for a verification survey, the verification deliverable (see 12.6). i. recommendations for any further survey work provided during the execution of the works. j. information on how GPR was calibrated and how many calibrations have been conducted around the site. k. what post-processing software has been used to post-process the GPR results; l. the variations in depth of GPR penetration achieved around the site, to define the limitations of this detection method; and m. the conditions on site at the time of the survey and any issues that might generically affect the survey outputs, e.g. rain.		
12.2	**Planimetric information**		
12.2.1	The planimetric information shall be in the form of one or a combination of CAD drawing, GIS or BIM model as agreed with the client.		
12.2.2	Metadata and any attribute data obtained shall be associated with their related CAD/GIS/BIM objects.		
12.2.3	BIM deliverable shall be in accordance with the EIR and the BEP as specified in BS EN ISO 19650-1:2018, 3.3.6, and BS EN ISO 19650-2:2018, 3.1.3.1, respectively.		
12.2.4	Information on sensitive assets shall not be published on any public platform.		
12.3	**Metadata and attribute data**		
12.3.1	Metadata shall be provided as part of the deliverables with the following recorded as a minimum: a) the date the information was obtained or where information was taken from records, the date shown on the record drawing;		

	b) utility type; c) quality level of the utility segment in accordance with Table 1 (QL-A, QL-B1, QL-B1P, QL-B2, QL-B2P, QL-B3, QL-B3P, QL-B4, QL-C or QL-D); and d) detection method in accordance with Table 2 (M1, M1P, M2, M2P, M3P or M4P).		
12.4	Unknown utilities Any utility discovered that is unidentified during the execution of any of the survey types shall be marked as "unknown utility" in the deliverables.		
12.5	Buried features and obstructions other than utilities. Where buried features and obstructions other than utilities are detected during the execution of any of the survey types, these shall be noted and reported in the deliverables.		
12.6	**Verification deliverable**		
12.6.1	Visible information shall be obtained and recorded from physical sighting of the exposed utility.		
12.6.2	The measurement results obtained from exposing the utility shall be recorded on a trial pit/slit trench data sheet. This shall include as a minimum: a) utility type. b) utility depth (top of utility). c) relative measurements to local detail for the location of the excavation. d) geospatial location of the utility. e) digital photographs taken of the location, open excavation and utility(s) as exposed. f) a description and location plan of the excavation. *NOTE The following measurement results should also be obtained, where accessible:* *a) utility diameter (external).* *b) utility material.* *c) note of adjacent utility markers, warning tapes and protection tiles or shields.* *d) any accompanying utility apparatus such as pilot cables next to HV cabling.*		
12.7	Retention of survey data/records All recorded and processed data, site notes, metadata, and intermediate stage processing files shall be retained for a minimum of five years and shall be made available to the client on request. *A longer retention period may be required in the client's specification.*		
Comments			
A	**Major Deficiencies Identified: None**		
B	**Minor Deficiencies Identified: None**		

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About LRQA

By bringing together unrivalled expertise in inspection, certification, brand assurance, cybersecurity and training, we've become a leading global assurance provider.

We're proud of our heritage, but it's who we are today that really matters, because that's what shapes how we partner with our clients tomorrow. By combining strong values, decades of experience in risk management and mitigation and a keen focus on the future, we're here to support our clients as they build safer, more secure, more sustainable businesses.

From independent inspection, certification and auditing; to training and technical advisory services; to real-time assurance technology; to data-driven supply chain transformation, our innovative end-to-end solutions help our clients negotiate a rapidly changing risk landscape – making sure they're shaping their own future, rather than letting it shape them.

About TSA

The Survey Association, known generally as TSA, is the trade body for commercial land survey companies in the UK. The association was formed in 1979 to give a focus for private sector businesses in land and hydrographic survey. It is important to realise, however, that it is not a regulatory body. The role of TSA is to promote best practice amongst its members, provide a forum for members for discussion, debate and continuing professional development and, to the wider audience such as engineers and architects, provide guidance on new methods and techniques and a list of suitably qualified and experienced companies.

Today, the association has over 200 companies in membership as full, associate, supplier, affiliate or academic members directly involved in the geospatial profession.

Get in touch

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