

# PAS128 Customer Survey Specification Discussion Document



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## Survey Type v. Quality

Survey Type	Relative Accuracy / Relative Costs	Quality Level	Post-Processing	Location Accuracy		Supporting Data	
				Horiz <sup>1</sup>	Vert <sup>2</sup>		
<b>Type D</b>	Desktop Utility Record Search	<b>Lowest Accuracy / Lowest Cost</b>	QL-D		Undefined	Undefined	
<b>Type C</b>	Site Reconnaissance	<b>Medium Low Accuracy / Medium Low Cost</b>	QL-C		Undefined	Undefined	A part of utility located by visual ref to street furniture, topo feature or trench scar
<b>Type B</b>	Detection with EML & GPR Equipment <sup>3</sup>	<b>Medium High Accuracy / Medium High Cost</b>	QL-B4	No	Undefined	Undefined	A utility segment which is suspected to exist but has not been detected and is therefore shown as an assumed route
			QL-B3	No	±500mm	Undefined (No reliable depth measurement possible)	Horizontal location only of the utility detected by one of the geophysical techniques used
			QL-B3P	Yes			
			QL-B2	No	±250mm or ±40% of detected depth whichever is greater	±40% of detected depth whichever is greater	Horizontal and vertical location of the utility detected by one of the geophysical techniques used <sup>4</sup>
			QL-B2P	Yes			
			QL-B1	No	±150mm or ±15% of detected depth whichever is greater	±15% of detected depth	Horizontal and vertical location of the utility detected by multiple <sup>5</sup> geophysical techniques used
			QL-B1P	Yes			
<b>Type A</b>	Verification using Intrusive Inspection	<b>Highest Accuracy / Highest Cost</b>	QL-A		±50mm	±25mm	Horizontal and vertical location of the top and/ or bottom of the utility. Additional attribution is recorded as specified in 9.2.5

Greater Relative Accuracy Means Higher Cost of Survey

## Methods Used to Achieve Quality for Type B Surveys

Method <sup>3</sup>	Survey Grid / Search Resolution <sup>6</sup>				Quality Levels Achievable	Typical Application
	EML <sup>7</sup>	GPR		Other Techniques <sup>8</sup>		
		General	Post-Processed			
M1	Orthogonal search transect at ≤10m intervals & when following utility trace, at ≤5m intervals	Use as applicable	No	≤5m survey grid	B1, B2, B3, B4	Where density of services is typical of undeveloped area
M1P			Yes			
M2	Orthogonal search transect at ≤5m intervals & when following utility trace, at ≤2m intervals	Either: a) ≤2m orthogonal; or b) High density array <sup>9</sup>	No	≤2m survey grid	B1, B2, B3, B4	Where density of services is typical of suburban area or where utilities cross boundary of a survey area
M2P			Yes			
M3	Orthogonal search transect at ≤2m intervals & when following utility trace, at ≤1m intervals	Either: a) ≤1m orthogonal; or b) High density array <sup>9</sup>	No	≤1m survey grid	B1, B2, B3, B4	Where density of services is typical of busy urban area or for clearance surveys prior to borehole / drilling / fencing / tree planting
M3P			Yes			
M4	Orthogonal search transect at ≤2m intervals & when following utility trace at ≤0.5m intervals	Either: a) ≤0.5m orthogonal; or b) High density array <sup>9</sup>	No	≤0.5m survey grid	B1, B2, B3, B4	Where density of services is typical of congested city area
M4P			Yes			

**NOTE:** In general the effort increases from M1 to M4 plus the addition of post-processing. For areas with a greater density of utilities or considered high risk by the client, a detection method that has a higher level of effort should be selected.

## Survey Use

<b>Potential Uses for PAS128 Data:</b>
Initial feasibility survey. Space planning, initial site layout proposals
Project agreed in principle, designs worked up for planning application
Full site design, probably post planning. Essential before ground is broken.
High risk areas. Design close to identified service.

<sup>1</sup> Measured to centreline of utility

<sup>2</sup> Measured to top of utility

<sup>3</sup> For Type B, it is a requirement that a min of GPR & EML are used

<sup>4</sup> Depth readings using EML equipment are not normally sufficient to achieve a QL-B2 or higher

<sup>5</sup> Some utilities can only be detected by a single detection techniques, therefore, these cannot be classified as a QL-B1

<sup>6</sup> The tolerance for orthogonal transect centres and survey grids shall be ±0.1m

<sup>7</sup> It is a requirement that passive (preferably active) EML is deployed over the whole survey area

<sup>8</sup> The transect centre depends on technique used

<sup>9</sup> A high density array comprises 100mm or closer antenna separation