



*"The quality of a survey is best"* judged not by its size, scope, or prominence, but by how much attention is given to [preventing, measuring, and] dealing with the many important problems that can arise." (Ferber et al. 1980)

#### Innovation

Innovative Training of Technicians: Dedicating the time and resources to training vastly improves data quality and substantially reduces error.



Independent Training: Three self-training tasks—a store visit, a thorough review of the on-site protocols, and a mock site visit.

#### Store Visit Bulb Type Collection Form

Bulb Type	Identifying Features				
Incandescent	Clear or coated glass with a metal base; bulbs have an exposed filament that's heated to the point of glowing.				
CFL	Visible spirals; plastic cap near base of bulb; most common shape is twist/spiral, but also A-line and globe.				
Fluorescent	Bulbs are filled with mercury vapor that emits UV light when electricity is applied, then coating inside bulb turns UV rays into visible light; most common shapes are tube or circline.				
LED	Light emitting diode; common shapes are A-line and Spot/Reflector; typically more durable than other bulb types.				
Halogen	More efficient type of incandescent with a filament sealed into a small casing filled with a small amount of halogen gas, allowing the filament to be at a higher temperature.				
Other: Xenon	Usually pin based with an exposed filament; often found in under cabinet fixtures.				
Other: Metal Halide	Consist of a small fused quartz or ceramic arc tube which contains the gases and the arc, enclosed inside a larger glass bulb which has a coating to filter out the ultraviolet light produced. Looks similar to a halogen bulb.				
Base Type					
Medium Screw Base (Standard)	Light bulb screws in to socket; most common base type found on most bulb types except fluorescent.				



In-Person Training: Classroom and real-world training in which each technician leads a full on-site visit accompanied by a trainer.

# Secret Tips That Will Change **Everything You Think You Know About On-Sites**

### Standardization

Standardization and Simplification of Data Collection: Develop a series of standardized data collection tools and reference materials to guide technicians through their on-sites and minimize data collection errors.



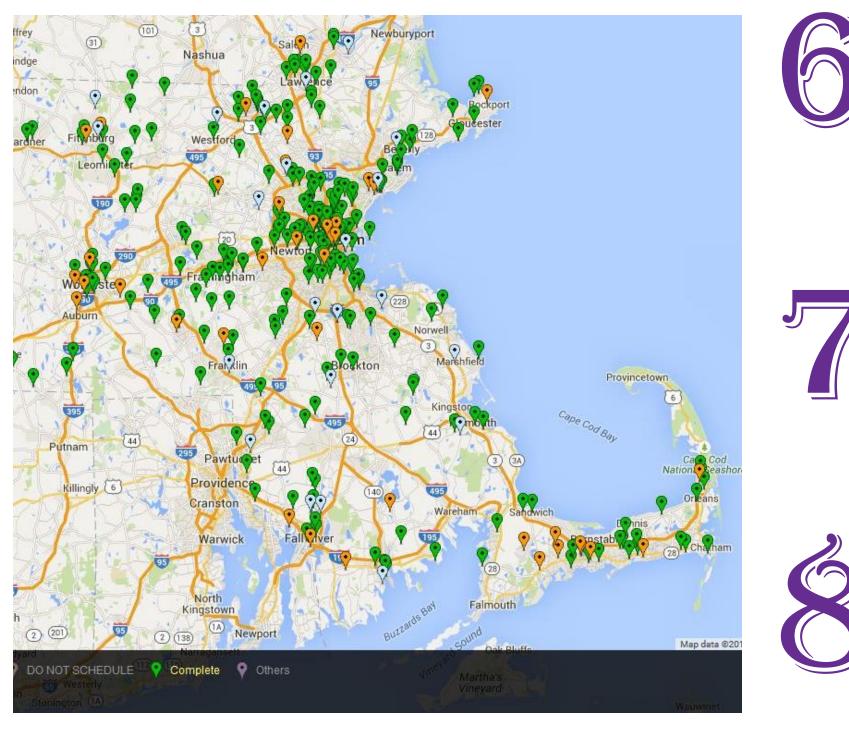
Electronic Data Capture Forms: Customized data collection software that enables the on-sites to be completed on a tablet computer.



Comprehensive Project-Specific Handbook: A singlesource reference guide for all protocols, definitions, and data collection instructions used for the on-site project.



Site Schematics: A sketch of the site helps technicians orient themselves, aids in QA/QC, and greatly enhances panel studies.



**Detailed On-site Protocols:** Designed to guide technicians through the on-site, starting as soon as they encounter the customer and directing them through the entire process of the on-site.

Careful and Systematic Scheduling: Using mapping software, scheduling on-sites that are geographically proximate in order to provide technicians with sufficient time to complete high-quality data collection.

For Panel Studies—Leave a Mark: Identifying a bulb, HVAC system, appliance, or household electronic device with a small mark or a sticker allows data to be compared over time.

## **Quality Control**

Real-Time Quality Control: Quality control measures allow for early identification of errors or inconsistencies and for any necessary adjustments to be made to the protocols or technician staffing.



**Daily Data Checks:** Techs sync data every night and every morning; NMR checks data promptly and follows up with clarification questions.



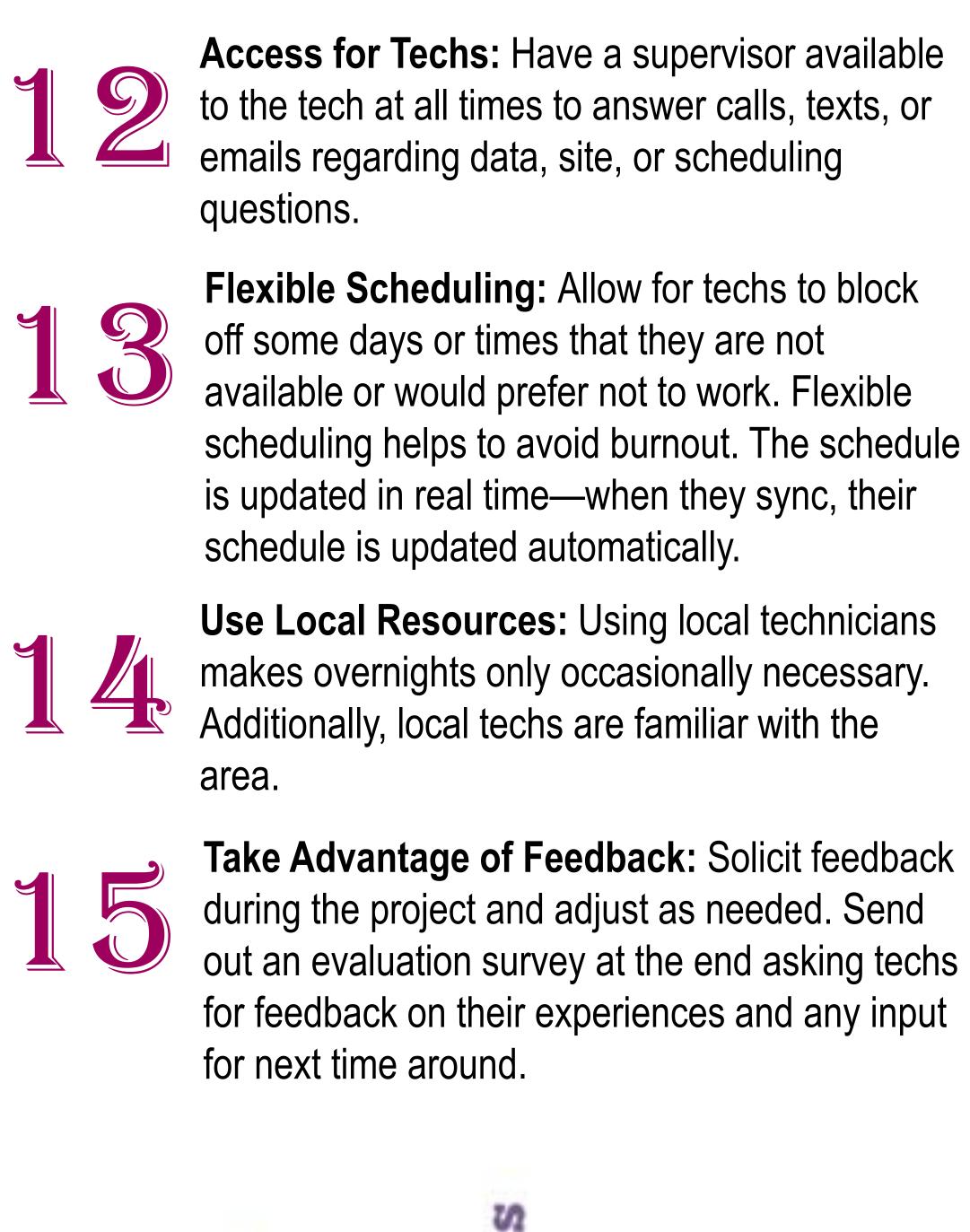
**Revisits:** Revisit sites from each tech in the first two weeks after training. This allows for immediate correction and retraining for anything that may not meet standards.



Quality Checks: Call 20% of homes to ensure that their experience was smooth and the tech was polite and professional.

	Rooms		Fixtures and Bulbs				
Select a Room to add fixtures:			Instructi	ons Fixtur Descripti		Bulb Descriptions	
Room	Closet Ro	om	Fixture Type		Fixtur ID	e # Sockets	
Bathroom 3	3 NA	<b>^</b>	Ceiling Fan	NA	072	1	
Bedroom 1	NA		Clip Light	NA	342	1	
Closet 1	Dining R	oom 1	Clip Light	NA	8CC	; 1	
Dining Roo	m 1 NA		Flush Mount	NA	44A	. 1	
Other 1	NA		Flush Mount	NA	8F6	1	
			Recessed	NA	875	2	
			Table Lamp	NA	2F6	1	
			Table Lamp	NA	231	1	
			Track	NA	64C	5	
		*					
	Add a fixture		Duplicate fixture	Duplicate fixture & bulbs	Edit fixture	Delete fixture	
Bulb Type		Bulb Sha	pe	Base Type	·	Bult Watta	
CFL	NA	A-line	NA	Medium Scre	W NA	15	
Fluorescen	t NA	Tube	NA	Pin Base	NA	40	

**Communication and Consideration with On-site Technicians:** Clear communication and flexibility with technicians, along with opportunities for feedback, create a work environment in which technicians can thrive and collect high-quality data; a happy technician leads to a better data set.







Kiersten von Trapp, Scott Walker, and David Barclay, NMR Group, Inc.; Matt Nelson, Eversource



#### Communication