Method	Measured Properties	Study Objectives	Lateral Scale (feet)	Depth (feet)	Resolution (feet)	Geology/lithology	Large area needed	Acoustic/ Vibration Interference	Cultural Interference (metalic objects, power lines, utilities, pipes, fences, rebar, etc.)	Electromagnetic Interference (power lines, vehicles, atmospheric storms)	Limitations	Other supporting geophysical tools	Self Perform or Contractor
	Objectives					Considerations							
ERT	Electrical potential from applied current	Fracture zones, voids/solution features, lithology, buried debris, monitoring applied amendments, landfill leachate, saltwater intrusion, LNAPL	10 to 300	1 to 300	3 to 30	Low resistivity (high conductivity) soils	X		X			MASW, GPR	contractor due to high equipment costs
GPR	Amplitude and arrival time of reflected EM wave	Water table, lithology, buried debris, subsurface utilities, UST, voids, top of bedrock, unexploded ordinance (UXO), LNAPL	10 to 3,000	1 to 150	1 to 30	Dry, sandy soils provide best conditions for performance; high clay content greatly reduces penetration depth			X		Site access contstraints, interferences at ground surface, relatively flat terrain reduces topographic correction uncertainty, shallow water table reduces resolution and penetration depth	Magnetometer ERT	contractor due to high equipment costs
Seismic Reflection	Amplitude and arrival time of reflected acoustic waves	Top of bedrock, geologic contacts, faults, fractures, lithology, water table	1 to 3,000	1 to 1500	1 to 30	Saturated, fine-grained soils	X	X			Source to geophone distance 1-2X target depth	Seismic refraction ?	rental equipment available for self-performing with qualified personnel
Seismic Refraction	Amplitude and arrival time of refracted acoustic waves	Top of bedrock, geologic contacts, faults, fractures, lithology, water table, soil and rock properties	1 to 3,000	1 to 1500	1 to 30	will not detect thin layers	X	X			source to geophone distance 3-5X target depth	Seismic reflection?	rental equipment available for self-performing with qualified personnel
Frequency Domain Electromagnetics	Electrical conductivity of the subsurface using the magnitude and phase of the secondary field resulting from induced EM current	Mapping of contaminant plumes, hydrogeologic mapping, locating and mapping buried wastes, metal drums and tanks, and metal utilities	Unlimited (lateral extent is limited by battery life, or site features (such as trees, buildings, etc.))	1 to 200	Measurement Resolution +/- 0.1% of full scale	Low resistivity (high conductivity) soils	X		X	X		TDEM?	rental equipment available for self-performing with qualified personnel

Method	Measured Properties	Study Objectives	Lateral Scale (feet)	Depth (feet)	Resolution (feet)	Geology/lithology	Large area needed	Acoustic/ Vibration Interference	Cultural Interference (metalic objects, power lines, utilities, pipes, fences, rebar, etc.)	Electromagnetic Interference (power lines, vehicles, atmospheric storms)	Limitations	Other supporting geophysical tools	Self Perform or Contractor
Time Domain Electromagnetics	Electrical resistivity of subsurface by inducing pulsed currents with a transmitter loop	Primarily used for soundings to determine depth and thickness of geologic and hydrologic layers and for detection and mapping of inorganic plumes, seepage from brine pits, and salt-water intrusion	1 to 3,000	20 to 3,000	N/A	Low resistivity (high conductivity) soils	X			X	Areas of measurable resistivity contrast between subsurface layers	FDEM?	rental equipment available for self-performing with qualified personnel
MASW	Amplitude and arrival time of surface waves	Top of bedrock, karst features, soil layers, lithology, soil and rock properties (variation in soil or rock strength), rippability of material	10 to 300	0.1 to 120	0.1 to 20	Unconsolidated materials provide best performance. Will not detect deep thin layers and deep interfaces, will not work well with varaible lithologic interfaces and soil or rock properties					Shallow penetration depth, Relatively flat terrain	ERT Seismic Refraction GPR	rental equipment available for self-performing with qualified personnel
sources:													
Lee Slater - Envirowiki													
ASTM D6429-99 (reapproved 2006)													