Survey Logistics

The general procedure followed by Archaeo-Physics to perform most surveys is to divide the survey area into a series of square or rectangular survey "grids." Each grid is surveyed by taking readings at regular intervals along regularly spaced transects. Ropes marked at regular intervals are used to control transect spacing and position along each transect. Successive transects are surveyed in a zigzag pattern until the grid is completed. The value and position of each data point is automatically recorded in digital format, and is later downloaded to a portable computer.

Generally, one or more assistants are required to assist the operator of each instrument. The number of assistants required will depend on instrumentation, survey design and field conditions (two per instrument is typical). The principal task of the assistants is to move the ropes that are used to control the position of the instrument during the survey (a more-or-less constant job). Other tasks include moving equipment, clearing obstacles, pounding stakes, etc. These assistants may be Archaeo-Physics personnel, or personnel provided by the client.

The task of staking out the site grid and clearing the site may be performed either by Archaeo-Physics or by the client. If performed by the client, it should be done under the direction of, or in consultation with, Archaeo-Physics personnel. The decision to use personnel employed by the client versus Archaeo-Physics personnel may be based on budget and available manpower.

Spatial Control

The usefulness of survey results is dependent on accurate and repeatable spatial control in both grid layout and data collection. With good spatial control, the recorded position of the anomaly may be expected to be within one meter (often much less) of the anomaly source. Avoiding additional errors in locating recorded anomalies on the ground will increase the chances of success in identifying anomaly sources, while minimizing search time and disturbance to the site.

The best means of assuring good spatial control is an accurate and permanently referenced survey grid system. The grid should be established using a total station or other instrument capable of decimeter-level accuracy. It is recommended that the survey grid system be permanently referenced using two or more permanent datums. Geographic coordinates may be sufficiently accurate for referencing the grid system if differential or RTK GPS is used, but would require a similar instrument to reestablish the grid.

Mapping of surface features is often done in conjunction with staking the survey grid. An accurate map of topography and surface features can be invaluable for interpretation and presentation of survey results, and can be useful references when locating positions on the ground.

Survey of Grid System

Each geophysical survey area will consist of a contiguous series of 'grids" - squares or rectangles marked on the ground with stakes. Stakeout of these grids may be performed by Archaeo-Physics personnel using a total mapping station, or by the client prior to survey.

If the site is to be gridded prior to survey, it should be done in consultation with Archaeo-Physics.

Generally, these guidelines should be followed:

- Generally, grids of uniform size, measuring either 30-x-30m or 20-x-20m grids are preferred. Although other dimensions may be used to cover irregular spaces, non-standard grids should be laid out only under the direction of Archaeo-Physics personnel.
- The corners of the grids should be marked with wooden or other non-ferrous stakes.
- Grid coordinates (e. g., N240/E180) should be marked on the stakes.
- It is helpful to flag the grid corners, datums, etc., but metal pin flags should not be used.
- It is preferable that these survey grids correspond with an established site grid, and must be tied in to permanent datums or landmarks.
- It may be expedient to orient the survey grid to the landform or site boundaries, in which case the corners of the survey area should be located within the existing grid system (if any).
- It is preferable to measure distances as horizontal distance rather than slope distance. This is particularly important on large sites, as small errors due to elevation, tape deflection, etc., may accumulate into errors of many meters over larger distances.
- Published magnetic declination (from topographic maps, older reports, etc.,) may be in error by several degrees. Archaeo-Physics can provide an accurate declination (we would need the exact latitude, longitude, and elevation).

Site Preparation

Physical obstacles such as vegetation, fences, and rough terrain can greatly affect both survey speed (and therefore cost) and data quality. Metal (even very small objects), brick, and other materials may be highly magnetic and can compromise magnetic survey data. Metal objects may also affect GPR and EM conductivity survey data.

Extensive clearing of the site is often impossible or undesirable, but the following measures may result in a faster (i. e., less costly) survey and better results:

- Sparse brush is generally not a problem, but thick brush should be cleared (or at least thinned to allow easy passage along closely spaced transects).

- It is often possible to easily survey through tall grasses or sparse weeds, but tall, thick, or tangled vegetation should be cleared to below knee height to allow easy passage.
- Larger trees are not a major problem unless they are growing very thickly or have spreading limbs close to the ground. When practical, spreading limbs may be trimmed to above shoulder height.
- Other physical obstacles such as rubbish, fallen trees, etc. should be removed from the survey area.
- Especially for magnetic surveys, it is important to remove as much ferrous metal as possible from the site (metal pin flags and spikes as well as rubbish and machinery).
- If the survey area is under cultivation, it may be possible to schedule fieldwork when field conditions will be favorable for survey and crop damage costs can be avoided.
- For GPR survey, the instrument is pulled along the surface like a sled. A smooth ground surface is desired to minimize jostling of the instrument. It is sometimes better to leave taller vegetation standing and allow the instrument to push it down, than to create stubble by clearing it.